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of female labour force participation  
and educational attainment?  
Evidence from Greece during the crisis

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223

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# **IS THERE A CASE FOR INTERGENERATIONAL TRANSMISSION OF FEMALE LABOUR FORCE PARTICIPATION AND EDUCATIONAL ATTAINMENT? EVIDENCE FROM GREECE DURING THE CRISIS**

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## **ABSTRACT**

Using logit regressions techniques for binary response models, fit by maximum likelihood with robust standard errors, the analysis investigates the intergenerational transmission of female labour force participation and the intergenerational transmission of educational outcomes in Greece. To conduct this study, we pioneer in the utilization of a unique dataset, the European Union Statistics on Income and Living Conditions (EU-SILC) for Greece. Data refer to 2011 when the first elements of the economic adjustment programme were being put into place. Most importantly, the EU-SILC 2011 wave is the latest one to include an ad hoc module on the intergenerational transmission of disadvantages. Results show that a wife's labour force participation decision is related to her husband's mother's and mother's participation, and even more strongly related to her own level of educational achievement along with the number of children in the household. The labour force participation of the mother of the husband is more important than that of the woman's own mother, indicating a strong transmission of the husband's cultural model. Concerning educational attainment, parental educational background, and especially maternal, is identified as a key determinant of women's high level of educational achievement.

*Keywords:* female labour supply; educational attainment; intergenerational mobility; preferences; Greece.

*JEL classification:* J22; J62; I21; D10; J21

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## **1. Introduction**

While various explanations have been put forward to account for female labour market behaviour and human capital acquisition, a most recent strand of empirical literature invokes the intergenerational transmission of norms, values and beliefs as the dominant contributor to the evolving labour market behaviour of females (Fernandez et al., 2004; Farre and Vella, 2013; Morrill and Morrill, 2013; Johnston et al., 2014). This implies similarities in the labour force participation and educational attainment across generations.

In Greece, the period from the early 1990s onwards was characterized by an increase in the labor force participation rate and particularly that of women. The increasing participation of women in the Greek labour market was strongly associated, among others, with changes in the structure of economic activity, such as the rising services sector, where women occupy a larger employment share compared with the secondary sector, institutional changes, namely labour market reforms, measures to improve gender equality and reconciliation of work and family life and socioeconomic changes, such as the improvement in the educational level of women.

This trend continued during the global financial crisis and after that when Greece, in May 2010, embarked on an ambitious economic adjustment programme to deal with the chronic deficiencies of the economy and restore sustainable public finances, competitiveness and set the foundation for solid long-term growth. During these recessionary years the participation rate continued to increase, albeit marginally, mainly reflecting the rising participation of women in the labour market. Meanwhile, concerns about emigration of highly skilled male and female workers proliferate. The prolonged downturn is matched with an exodus of highly educated male and female workers from the country and the Greek labour market, and although only few elements of this phenomenon are yet discernible, concerns about future labour market outcomes are raised.

Recently, the debate on the existence of an intergenerational transmission channel of gender role attitudes has attracted increased interest in terms of explaining labour market outcomes. While meritocratic ideals are widely shared, it is hard to visualize a world with no linkages between socioeconomic outcomes across generations. Most studies investigate the role of intergenerational transmission on various aspects of socioeconomic outcomes, among them labour force participation and/or educational attainment.

Relating to labour force participation, Powell and Steelman's (1982) seminal contribution suggests that maternal characteristics more strongly affect sons' rather than daughters' attitudes toward women in the labour force. An early paper by Fernandez et al. (2004), on US data, provides compelling explanations for the role of household attitudes and their intergenerational transmission in increasing the presence of women in the labour market. They develop the hypothesis that working women set an example for their sons, who develop a preference for working wives or are raised in a way that makes them help out more in the household, thus acting as a propagation mechanism of change in women's role in the economy. This implies not only that a woman's labour market behaviour is positively associated with that of her son's wife, but also gives rise to far-reaching dynamic consequences: more men with working mothers in a given generation leads to heightened incentives for women to invest in their own human capital and, thus, to higher women's labour supply in the generations to come. Similar conclusions are reached by Kawaguchi and Miyazaki (2009) for Japan. Using data from the Netherlands, Van Putten et al. (2008) suggest expanding the conventional explanations of women's labour supply beyond her own demographic characteristics and the presence of children, to incorporate explanations at the intergenerational level. The rationale is that the mother's early labour market behaviour matters to daughter's labour market behaviour, whose behaviour is, subsequently, linked to that of many significant others (husband, mother-in-law) and to educational achievement or occupational choices continuing long after adolescence. Bütikofer(2013) finds that Swiss married women whose mothers-in-law were working are themselves more likely to participate in the labour force. This is corroborated by Campos-Vazquez and Velez-Grajales (2014) for Mexico and Del Boca et al. (2000) for Italy. Morrill and Morrill (2013) find that intergenerational links in female labour force status are stronger for the mother-in-law/daughter-in-law pair than for the mother/daughter pair. In another, related literature, it is shown that second-generation US women's decision to participate in the labour market is significantly influenced by female labour force participation in their country of ancestry (Fernandez and Fogli, 2009). Fernandez (2013) models the dynamics of married women's labour force participation as reflecting a process of cultural change that occurs over time as part of an intergenerational learning process in which married women compare the merits of increased consumption from labour earnings with the expected utility cost of working. Issues related to the role of cultural values in enriching our understanding of socioeconomic

phenomena are discussed in Algan and Cahuc (2005), Bisin and Verdier (2001) and Guiso et al. (2006). An analysis of 25 OECD countries by Fortin (2005) reveals that anti-egalitarian views are negatively associated with female employment rates. Pagani and Marenzi (2008) alternatively highlight that care responsibilities toward elderly relatives hinders the labour market participation of Italian women by reducing the amount of time spent on the labour market. From a broader perspective, Albanese et al. (2016) accentuate the importance of intergenerational transmission of values within the Italian family, itself acting as a channel for historical persistence.

This positive maternal attitude effect may reflect assortative mating in which ‘sons marry their mothers’, thus maternal attitudes are a significant predictor of daughter-in-law labour supply. An alternative pathway derives from Becker’s household production theory (1965), on the allocation of time between work in the market, household work and leisure. Men whose mothers worked when they were adolescents are raised in a way that promotes participating in household duties and child-caring activities, freeing time for their wives to pursue their own career. Del Boca and Flinn’s (2012) econometric model of endogenous household interaction assumes that household time allocation decisions are either associated with a particular utility outcome on the Pareto frontier or with the non-cooperative (static Nash) equilibrium point. A third channel is that of contagion whereby daughters-in-law adopt their husbands’ attitudes toward gender roles in the home and the labour market, which is ultimately reflected in female labour supply, as suggested in Johnston et al. (2014).

While the intergenerational transmission of maternal gender role attitudes toward female labour force participation has received rather limited attention, the intergenerational transmission of human capital accumulation has been scrutinized (Azam and Bhatt, 2015; Blanden, 2013; Chevalier et al., 2013; Conway and Li, 2012; Del Bello et al., 2016; Fessler et al., 2012; Holmlund et al., 2011; Oreopoulos et al., 2003; Orthner et al., 2009; Schneebaum et al., 2015). Holmlund et al. (2011) employ Swedish register data to demonstrate a link between the schooling of parents and their descendants due to unobserved genetic transmission, preferences or/and environmental influences. More educated and wealthier parents may get more educated children due to the greater opportunities bestowed on their children. Taking a slightly different perspective, Francesconi et al. (2010) explore the impact of childhood family structure upon schooling outcomes in Germany. Growing up in a non-

intact family is associated with worse schooling outcomes while most of this influence operates through lower household income and lower maternal employment. Motivated by heightening standards for knowledge acquisition, Orthner et al. (2009) posit that the family status and the quality of intra-household relationships are the most fundamental factors behind the educational progress and schooling outcomes of US adolescents. Similarly, Oreopoulos et al. (2003) report a positive impact of parental education on children's grade progression because better educated parents may also be better parents or because genetic factors that contributed to parents' educational attainment are shared by their children. While intergenerational mobility is shown to be relatively high in Finland (Osterbacka, 2001), the largest share of intergenerational correlation in economic outcomes is transmitted through education and, in particular, occupation. Daughters are less dependent on their family background than sons. In Schneebaum et al. (2015), the main focus is on intergenerational educational, instead of income, persistence in a panel of 20 European countries. Although there is evidence that children follow in their same-gender parents' educational paths, results additionally reveal noticeable cross-country differences within Europe. Blanden (2013) reviews the intergenerational mobility rankings, whether measured by education, income or social class, to find that South America and Southern Europe exhibit low mobility whereas the Nordic countries are the most mobile. Using UK Labour Force Survey data, Chevalier et al. (2013) address the intergenerational transmission of education and investigate the relationship between early school leaving and parental education and income, to find a statistically significant influence of education, even when controlling for household income. The latest approach of Del Bello et al. (2016) complements existing literature by simultaneously exploring the impact of parental educational effort/background and children's social networks on educational outcomes. A fresh insight into the intergenerational correlation of labour market outcomes in Australia is provided by Haurault and Kalb (2016). The authors find evidence of a positive association of labour market outcomes between parents and their children.

Although the intergenerational transmission of a specific aspect of labour market outcomes is well documented in the empirical literature, the examination of the intergenerational transmission of Greek female labour force participation is missing so far in the literature. Furthermore, there is limited evidence on the intergenerational transmission of educational outcomes in Greece (Daouli et al., 2010; Schneebaum et al., 2015). In particular,

Daouli et al. (2010) employ data from the Greek Household Budget Survey and three Greek censuses to emphasize the presence of substantial educational mobility across generations over the last 30 years. They report that daughters' educational attainment depends on parental educational background and especially on mothers' education. Schneebaum et al. (2015), using data from the 2010 European Social Survey, analyze the intergenerational educational persistence in Greece and 19 other European countries. They report a variation of intergenerational education mobility across Europe. Namely, they report high educational persistence for most Southern European whereas relatively lower persistence for Greece.

The purpose of this paper is to examine the intergenerational transmission of female labour force participation and the intergenerational transmission of educational outcomes in Greece. To this end a unique dataset is employed, the European Union Statistics on Income and Living Conditions (EU-SILC). Data refer to 2011 when the first elements of the economic adjustment programme were being put into place. Most importantly, the EU-SILC 2011 wave is the latest one to include an ad hoc module on intergenerational transmission of disadvantages. Its' main advantage lies in encompassing the labour market outcomes of the respondent's parents when he/she was around 14 years old. This allows investigating the role of intergenerational persistence as parents would pass on all advantages (and disadvantages) they faced to their children.

Initially, consistent with the growing literature on the intergenerational transmission of cultural traits, social norms and preferences, we investigate the impact of the mother-in-law's labour force participation on the daughter-in-law's labour force participation. We document a positive and significant relationship between a man's wife working with whether the man's mother was working during his childhood as in Fernandez et al. (2004), Bütikofer (2013), Morrill and Morrill (2013) and Campos-Vazquez and Velez-Grajales (2014). Second, we provide empirical evidence that women's high level of educational attainment is tightly linked to parental, and especially maternal, educational background. We believe that the findings of our analysis are important as they contribute to the existing literature on intergenerational transmission of socioeconomic outcomes in Greece, a country currently in a severe crisis, and the investigation of intergenerational transmission of socioeconomic outcomes is of paramount importance for policy making. The findings of our analysis might



apply to other countries sharing similar characteristics with Greece, such as Southern and Eastern European countries.

The remainder of this paper is structured as follows: Section 2 outlines the methodology. Section 3 describes the dataset and section 4 presents the empirical results for female labour force participation dynamics. Section 5 provides some extensions. Section 6 investigates the intergenerational transmission of female level of educational attainment. Section 7 concludes and delivers policy implications.

## 1. Methodology

Building on Fernandez et al.'s (2004) and Bütikofer's (2013) modeling strategy, the baseline logistic regression model for the estimation of the intergenerational transmission of labour force participation is:

$$p^w = x_i \beta + p^{hm} \delta + e, \quad e \sim N(0,1) \quad (1)$$

where  $p^w$  is the dependent variable indicating the labour force participation decision of the wife. It takes two unique values, 1 if the woman belongs to the labour force (employed or unemployed) and 0 if the woman does not belong to the labour force (retired or inactive). The dummy variable  $p^{hm}$  equals 1 if the husband's mother worked when her son was 14 years old and 0 otherwise. To rule out the possibility that the association of interest is primarily driven by background factors or environmental influences, a number of controls are included in the estimation.  $x_i$  is a vector of control variables representing wife's socioeconomic characteristics in household  $i$  (age, education, father's education, mother's education, husband's age, husband's education, the education of the husband's father and mother, the natural logarithm of husband's gross monthly wage, husband's satisfaction with the financial situation of the household in which he was living when he was around 14 years old) along with household characteristics that are common to the couple (presence, number and age of children, residence and region dummies and the natural logarithm of household disposable income).

Firstly, we examine whether the former labour market status of a married man's mother positively affects the likelihood that his wife works. The labour force participation status of the mother of the husband during the husband's adolescence serves as a proxy for his own gender role attitudes and is included in the estimation of his wife's labour supply decision.

Logit regressions fit the model for a binary response by maximum likelihood using robust standard errors. Various tests have been performed to confirm the goodness-of-fit of the model, such as the Pearson  $\chi^2$  test and the Hosmer-Lemeshow  $\chi^2$  test.<sup>1</sup> To rule out the possibility that a multilevel mixed-effects logistic regression would be more appropriate, we perform a likelihood-ratio (LR) test that compares the mixed-effects logistic regression with standard (marginal) logistic regression with no group-level random effects. The LR test indicates that an ordinary logistic regression model is not rejected by the data. Finally, Wald chi-squared tests return a zero significance level, so we can strongly reject the null hypothesis that all of the regression coefficients are simultaneously equal to zero.

## 2. Data

The analysis is based on the European Union Statistics on Income and Living Conditions (EU-SILC) household survey compiled by Eurostat for 2011. EU-SILC is uniform and compulsory for all EU Member States, thereby enabling cross-country comparisons. Information is collected on households (living conditions, joint income) and individuals (basic demographic information, education, job characteristics, wages). In Greece, the survey is conducted by the Hellenic Statistical Authority (ELSTAT). This study draws on EU-SILC 2011, because that wave included an ad hoc module on intergenerational transmission of disadvantages. This module includes retrospective information on the socioeconomic conditions of each respondent's parent (educational background, labour force participation status, financial situation of the household) when the respondent was around 14 years old.

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<sup>1</sup> The Pearson  $\chi^2$  statistic is  $\chi^2 = \sum_{j=1}^M \frac{(y_j - m_j p_j)^2}{m_j p_j (1 - p_j)}$ . Let  $M$  be the total number of covariate patterns among the  $N$  observations. Data are viewed as collapsed on covariate patterns  $j=1, 2, \dots, M$  and  $m_j$  is defined as the total number of observations having covariate pattern  $j$  and  $y_j$  as the total number of positive responses among observations with covariate pattern  $j$ .  $p_j$  is defined as the predicted probability of a positive outcome in covariate pattern  $j$ . This  $\chi^2$  statistic has approximately  $M - k$  degrees of freedom for the estimation sample, where  $k$  is the number of independent variables. For a sample outside the estimation sample, the statistics has  $M$  degrees of freedom. The Hosmer-Lemeshow  $\chi^2$  statistic is calculated similarly. However, rather than using the  $M$  covariate patterns as the group definition, the quantiles of the predicted probabilities are used to form groups (Hosmer et al., 2013).

This allows investigating the role of intergenerational persistence as parents would pass on all advantages (and disadvantages) they faced to their children.

The merged dataset of married couples covers 2,790 households. To investigate the wives' labour force participation decision, the original sample is restricted to married men aged 30-65, and their wives aged 30-50 to ensure comparability with Fernandez et al. (2004). At these age intervals they are more likely to have completed education though still not retired. The exclusion of incorrect or missing values leaves a final sample of 430 households.

The dependent variable is wife's labour force participation status (`participate_f`), set equal to 1 if the wife belongs to the labour force and 0 otherwise.

Independent variables comprise:

- Labour force participation status of wife's mother (`mother_participate_f`)
- Labour force participation status of husband's mother (`mother_participate`)
- Age and its square of the wife (`age_f`, `age2_f`) and the husband (`age`, `age2`) are included as a measure of potential work experience.
- Three dummy variables for the highest educational level attained by the wife (`educlow_f`, `educmid_f`, `educup_f`) and the husband (`educlow`, `educmid`, `educup`).<sup>2</sup> Symmetrically, educational dummies for the wife's and husband's parents reflect the highest level of education attained by either the father or the mother, when the respondent was aged 14. Middle levels of educational attainment are excluded to serve as reference category.
- The natural logarithm of gross monthly earnings for male employees (`lwage`). It refers to the monthly amount in the main job before tax and social insurance contributions are deducted.
- A dummy variable indicating the presence of any child aged 0-15 in the household (`Pres_ofchild_0_15`).

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<sup>2</sup> The 'educlow' category includes those who have attended pre-primary, primary and/or lower secondary school. The 'educmid' category includes those with completed upper secondary and/or post-secondary non tertiary education. Finally, the 'educup' category pertains to those at the first stage or at the second stage of tertiary education, the latter leading to an advanced research qualification.

- Three variables for the number of children aged 0-4, 5-9 and 10-15 in the household, respectively.
- Four variables for the total number of children aged 0-15 in the household.
- A dummy variable indicating husband's satisfaction with the financial situation of the household in which he was living when he was around 14 years old (finsat).
- A dummy variable indicating the degree of urbanization of the household, with 1 denoting a densely populated area and 0 otherwise (urb).
- A full set of dummy variables indicating the region of residence (region).
- The natural logarithm of total disposable household income (lhdisp).
- A dummy variable reflecting women's marital status set to 1 for married women and 0 otherwise (married).

Table 1 reports the descriptive statistics of selected variables in EU-SILC 2011 for Greece. The labour force participation rate for married women aged 30-50 in the sample is 70.2%. The majority of both men and women have a middle level of educational attainment. Also noteworthy is that the labour force participation rate for the women's mother and mother-in-law is 45.8% and 42.3%, respectively.

**[Insert Table 1]**

### **3. Empirical results on labour force participation**

As in Fernandez et al. (2004) and Bütikofer (2013), we examine whether the probability that a man's wife works is positively and significantly associated with whether his mother worked, controlling for various background characteristics of the wife and her husband, alongside some characteristics common to the couple. Equation (1) is estimated.

Table 2 presents the baseline results (column 1) and the results adjusting for various control variables (columns 2-6). In particular, columns (2) to (4) extend the baseline specification by adding, among others, variables that reflect the presence and age group of children in the household. Columns (5) and (6) additionally incorporate control variables

capturing income constraints. The Pearson  $\chi^2$  test and the Hosmer-Lemeshow  $\chi^2$  test corroborate the goodness-of-fit of the model.<sup>3</sup>

**[Insert Table 2]**

Results show that a married woman's labour force participation decision (*participate\_f*) is positively and significantly related to whether her husband's mother was in the labour force (*mother\_participate*) for all specifications. Coefficient estimates remain broadly stable across columns (2) to (5). Thus, labour force participation by a husband's mother increases the probability of the labour force participation of his wife by 8.4 to 10.6 percentage points, quantitatively similar to Bütikofer (2013). The effect of maternal attitudes prevails even when controlling for a variety of background variables, thus points to a long-lasting impact of maternal attitudes on the daughter-in-law's labour supply decision through assortative mating. Results establish a significant intergenerational transmission channel of gender role attitudes reflected in the perseverance of socioeconomic outcomes across generations (Johnston et al. 2014).

In the same vein, empirical estimates unveil a positive and significant association between wife's participation and that of her mother's (*mother\_participate\_f*), as pointed out in Van Putten et al. (2008). Maternal views and actions are crucial to those of her child. The favourable effect of the maternal labour force participation variable may stem from the greater disposition of working mothers to transmit positive attitudes towards labour market involvement. Attitudes constitute the underlying basis for making critical life choices, such as the labour force participation decision, and determine daughters' contemporaneous level of labour supply. While daughters of working mothers find it not only acceptable, but also desirable, to participate in the labour force, this does not hold for daughters of non-working mothers because the latter did not have the opportunity to familiarize themselves with the working world or build on the work-family strategic plan developed by their own mother.

The coefficient of mother's participation is similar in size, though slightly lower, than the coefficient of her husband's mother's participation. Both the labour force participation experiences of her husband's mother and her own mother are significantly related to a

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<sup>3</sup> In the most encompassing column (6): Pearson  $\chi^2$  (404) = 424.61, Prob >  $\chi^2$  = 0.2307 and Hosmer-Lemeshow  $\chi^2$ (8) = 5.97, Prob >  $\chi^2$  = 0.6506 provide evidence of a good fit of the model. Similar estimates are reported for columns (1) to (5).

woman's own labour supply choices, a hypothesis suggested in Morrill and Morrill (2013). However, it is the participation status of the husband's mother that appears to be the most important, thus unveiling a preference formation channel running from husband's mothers to wives. This implies that a married woman's mother-in-law participation status is a better predictor of her participation decision than the participation status of her own mother.

Apart from the labour market status of both her own mother and her husband's mother, a married woman's participation decision is also determined by her own level of educational attainment. The probability of participating in the labour market is significantly higher for women with an upper level of education (*educup\_f*) compared with women with a middle level of education. The magnitude of the coefficient on educational attainment remains substantially large and highly significant across specifications. An explanation for this result, as outlined in Pagani and Marenzi (2008), may relate to the lower market wage and inferior working conditions that less educated women are confronted with. Child-rearing responsibilities compound the lower remuneration typically associated with less education-intensive occupations, thus further discouraging participation in the labour market. In all specifications, the effect of the educational attainment of her husband and her parents is rather negative, small and weakly significant.

The coefficients relative to the presence and number of children in the household are jointly negative and highly significant, confirming that the probability of labour force participation is lower for women that have children, compared to childless ones (Farre and Vella, 2013). Results in column (2) indicate that the presence of children aged 0-15 (*Pres\_ofchild\_0\_15*) decreases the chances of wife's participation (*participate\_f*) by about 16.2 percentage points. Furthermore, it is the presence of children aged 10-15 (*child\_10\_15*) that mostly reduces the chances of women's labour force participation (column (3)), though with minor differences compared to other age groups. Similarly, when accounting for the total number of children in the household (column (4)), results point to an almost progressively negative influence on woman's labour market participation decision, ranging from minus 14.7 percentage points in the case of 1 child to 46 percentage points in the case of 4 children or more. This negative impact increases monotonically with the number of children in the household, broadly as corroborated in Bütikofer (2013).

In columns (5) and (6), the woman's own educational achievement, the number of children in the household along with the labour market status of her mother-in-law and her own mother, again, emerge as the strongest predictors of female propensity to labour force participation. Total household disposable income (lhdisp) is also positively and significantly associated with female labour force participation (participate\_f). Similar issues are discussed in Pagani and Marenzi (2008).

Finally, none of the variables describing the socioeconomic background of the husband, including his own gross monthly earnings level (lwage) or his former level of financial satisfaction (finsat), influence his wife's participation decision. The dummy variable for densely populated urban areas (urb) is not statistically significant though, as expected, is positively signed. Controlling for regional dummies leaves empirical estimates broadly unchanged.<sup>4</sup>

## **4. Extensions of labour force participation**

In this section, we consider various extensions of the estimated equation (1). Firstly, we investigate how female labour force participation effects, at the household level, vary across different EU-SILC subsamples for Greece. Households are classified according to total disposable income (lhdisp)<sup>5</sup> as household income is a key measure of females' economic status. Such a breakdown is, to our knowledge, novel in the literature and is illustrated in Table 3 of section 5.1. Moreover, separate estimations for female labour force participation at the individual level are reported in section 5.2.

### **5.1 Low versus high income households**

Results reported in Table 3 document a significantly positive relationship between mothers' and daughters' participation status in low income households at the 5% significance level across all specifications. A similar pattern is identified for the effect of the husband's mother's participation status (mother\_participate) on that of her son's wife. The magnitude of

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<sup>4</sup> Results are not reported here but are available from the authors upon request.

<sup>5</sup> The breakdown is performed as follows: High income households are those whose total disposable household income (lhdisp) exceeds the median. Low income households are those with total disposable household income (lhdisp) lower than the median.

these effects is higher than the baseline estimates (Table 2), implying that the intergenerational transmission channel of gender role attitudes with respect to female being in the labour force derives primarily from low income households. Similar findings are reported in Fernandez et al. (2004) and Morrill and Morrill (2013). However, results provide no robust evidence that maternal labour force participation (`mother_participate_f`) significantly influences daughter's participation status (`participate_f`) in high income households.

Results in Table 3 additionally reveal that, a married woman's labour force participation is strongly associated with her actual level of educational attainment (`educup_f`) (Herault and Kalb, 2016). The magnitudes of the coefficients are broadly similar to Table 2 though relatively more pronounced for the low income households. Highly educated women living in low income households are more likely to be in the labour force than their counterparts living in high income households.

Finally, compared to the benchmark specifications (Table 2), the argument that the husband's gross monthly earnings (`lwage`) impact negatively on wife's participation decision is fairly strong only in low income households (at the highest significance level) though still negatively signed elsewhere. Similar results are reported in Farre and Vella (2013). The higher the husband's earnings the lower the likelihood of the wife's joining the labour force in relatively poor households. This effect remains robust across columns (2)-(5).

**[Insert Table 3]**

## **5.2 Female labour force participation at the individual level**

As an additional robustness check, we re-estimate equation (1) for the subsample of women aged 30-50. Experimenting with other age groups (25-60, 30-60) leaves empirical estimates largely unaffected.<sup>6</sup> This means that we consider all females in the sample irrespective of their marital status, at the individual and not at the household level, as suggested in Van Putten et al. (2008) and Farre and Vella (2013).<sup>7</sup> Results are reported in Table 4 and remain qualitatively similar to those in Table 2, thus confirming the robustness of empirical estimates. Of particular relevance is the woman's level of educational achievement,

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<sup>6</sup> Results are not reported here but are available from the authors upon request.

<sup>7</sup> To this end, a dummy variable denoting married women (`married`) is added in the analysis.



mother participation in the labour market, presence/number of children in the household and marital status.

As mentioned before, the former labour market status of a woman's mother (*mother\_participate\_f*) is a crucial determinant of her own labour force participation decision (*participate\_f*). Following Fernandez et al. (2004), we show that the intergenerational transmission of family attitudes plays a crucial role in the evolving role of women in economic life, from the standpoint of role-modeling. The mother's former participation decision appears to affect her daughter's preferences/abilities, making it more likely that she participates in the labour force. Results are essentially unchanged by additional controls and remain broadly similar across specifications.

Likewise, we find that woman's educational attainment turns out to be the most important determinant of female participation (Thevenon, 2013). With respect to middle level education, the participation probability of women with upper education level (*educup\_f*) is 21.3 percentage points higher (column (6)), broadly similar to results reported in column (6) of Table 2. The coefficients on the presence and number of children (of various age groups) in the household still enter negatively and significantly in determining the probability that a woman participates in the labour force.

For married women (*married*), the likelihood of labour force participation decreases by around 17-22 percentage points, which is consistent with theoretical explanations (Spitze, 1988) and with most recent empirical analyses (Farre and Vella, 2013). Deeply entrenched beliefs in that a married woman's labour force participation interferes with her capacity to manage a family, still hold.

**[Insert Table 4]**

## **5. Empirical results on educational attainment**

In this section, we examine the intergenerational transmission of female educational attainment. This allows us to assess whether women's educational achievement is influenced by parental human capital. Building on Holmlund et al.'s (2011) modeling strategy, the baseline logistic regression model for the estimation of the intergenerational transmission of educational attainment is:

$$e^w = x_i \beta + e^m \delta + e^f \theta + e, \quad e \sim N(0,1) \quad (2)$$

where  $e^w$  is the dependent variable indicating the educational attainment of women aged 30-50. It takes two unique values, 1 if the woman possesses an upper level of educational attainment and 0 if the woman does not possess an upper level of educational attainment. The dummy variable  $e^m$  equals 1 if her mother is highly educated and 0 otherwise. The dummy variable  $e^f$  equals 1 if her father is highly educated and 0 otherwise. To rule out the possibility that the association of interest is primarily driven by background factors or environmental influences, a number of controls are included in the estimation.  $x_i$  is a vector of control variables representing a woman's socioeconomic characteristics in household  $i$  along with several household characteristics. Independent variables generally consist of dummies for the highest educational level attained by the woman's parents, her age, parental labour force participation status, two dummies reflecting whether her parents have held managerial positions, a dummy variable reflecting her marital status, a dummy variable indicating her satisfaction with the financial situation of the household in which she was living when she was around 14 years old, a dummy variable for the degree of urbanization of the household and the natural logarithm of total disposable household income.

Logit regressions fit the model for a binary response by maximum likelihood using robust standard errors. Various tests have been performed to confirm the goodness-of-fit of the model, such as the Pearson  $\chi^2$  test, the Hosmer-Lemeshow  $\chi^2$  test and Wald tests. Intergenerational mobility indices for education outcomes are subsequently discussed in section 6.1, following the recent work of Savegnago (2016). We estimate equation (2) for the subsample of women aged 30-50.<sup>8</sup> Results are reported in Table 5.

Empirical estimates identify parental educational background as a key determinant of daughters' educational achievements (Fessler et al., 2012). All estimates for the positive association between parental upper education level and daughters' high educational achievement have the expected positive signs. This implies that children of highly educated parents are more likely to be highly educated themselves. The role of family in children's educational progress is of the essence, as evidenced in Oreopoulos et al. (2003) who find a

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<sup>8</sup> Experimenting with other age groups (25-60, 30-60) leaves empirical estimates largely unaffected. Results are not reported here but are available from the authors upon request.

substantial and significant influence of parental education on descendants' human capital accumulation. Following Orthner et al. (2009), children's capacity for good educational outcomes is enhanced when parents support educational development. In this context, others (Azam and Bhatt, 2015) argue that the positive parental schooling effect runs through enhanced parental productivity in child-rearing activities which then translate into better educational outcomes for their children. It may also be that highly educated parents act as role models for their children. Therefore, human capital assets appear to flow from one generation to the next such that policy interventions that increase educational attainment in a given generation create positive spillovers on subsequent generations (Del Bello et al., 2016).

Quantitatively, the positive influence of higher maternal education is somewhat larger than that of the father, a pattern documented in Schneebaum et al. (2015). According to the gender role theory, descendants follow in the educational steps of their same-gender parent. Hence, daughters are more likely to be educated like their mothers, meaning that higher-educated mothers are more likely to raise higher-educated daughters. Indeed, while the likelihood of women's high educational attainment (*educup\_f*) is strongly increasing with maternal high educational attainment (*mother\_edup\_f*), this does not hold for paternal high educational attainment (*father\_edup\_f*). Results reveal stronger effects of maternal education relative to paternal, probably because women tend to be the main care providers. Related issues are discussed in Chevalier et al. (2013).

However, the negative impact of low level parental education on daughters' education is stronger for fathers than mothers. This implies fathers' low educational attainment matters most for their daughters' poor educational achievement, in line with the thesis advocating that paternal education has a stronger effect on children's educational outcomes than maternal education (Fessler et al., 2012). In particular, irrespective of the regression specification, the estimates on maternal low education (*mother\_edlow\_f*) are always negative and significant. The probability of upper level educational attainment for a woman whose mother is poorly educated is lower by about 7 to 13 percentage points. The point estimate of paternal low education (*father\_edlow\_f*) is again negative and statistically significant at the 1% level, albeit slightly more pronounced than the respective maternal negative impact. Having a poorly educated father lowers the probability of his daughter being highly educated by approximately 13 to 16 percentage points. Despite these differences, results clearly point to

an adverse effect of parental poor educational background on daughters' high educational performance.

Superior educational outcomes may arise from factors other than parental educational background. Mothers holding managerial positions (*mother\_manpos\_f*) lead to greater chances of daughters' high educational achievement. Women's ascendance to high-level managerial positions is strongly and positively associated with their descendants' superior education status. Similar conclusions can be drawn for paternal managerial position (*father\_manpos\_f*) though solely in columns (2) to (4) and not statistically significant, indicating that there is scant evidence of any influence of fathers' advancement in the labour market upon daughters' high educational achievement (*educup\_f*). However, the association between mother's labour force participation (*mother\_participate\_f*) and daughter's educational attainment turns out to be negative, though half in magnitude compared to the positive impact of mother's supervisory position (*mother\_manpos\_f*). To account for this interplay, we additionally consider the interaction effects of maternal labour force participation (*mother\_participate\_f*) with maternal managerial position (*mother\_manpos\_f*) in columns (3) and (4). Although results show a substantial complementary effect, it is statistically significant solely at the 10% level. When a mother participates in the labour force and holds a managerial position, the probability that her daughter acquires an upper level of education is enhanced. In a related context, Schildberg-Hoerisch (2011) report similar findings.

Women's satisfaction with the financial situation of the household when she was around 14 years old (*finsat\_f*) contributes significantly to her own superior educational outcomes (*educup\_f*) by relaxing the family budget constraint, and even more so in column (4). Similar arguments are put forward by Francesconi et al. (2010).

Along these lines, it is not only educational attainment, but also higher household income (*lhdisp*) that fosters good educational outcomes (*educup\_f*), potentially contributing to even greater future earnings (Orthner et al., 2009). The high income status of the household significantly increases the likelihood of daughters' high educational achievement by about 22 percentage points (column 5). The importance of financial resources is outlined in Chevalier et al. (2013). Income constraints significantly impact on educational attainment, as consistently corroborated by our findings.

[Insert Table 5]

## 6.1 Intergenerational mobility indices of educational attainment

In this section, following the most recent contribution of Savegnago (2016), we estimate a set of intergenerational mobility indices for education levels. To further explore whether daughters' education depends on their parents' education, we focus on the subsample of women aged 30-50.<sup>9</sup> Results are reported in Table 6. Parental education is one of the most fundamental factors in explaining descendants' educational success while educational outcomes of daughters are more closely related to maternal than paternal educational background.

In particular, Table 6 presents transition matrix indices for educational attainment for the mother-daughter and father-daughter pairs separately. Intergenerational mobility indices, derived from a transition matrix between parents' and children's education level, combine the elements of the main diagonal (Shorrocks and Prais index); consider the average 'jump' of education classes (Bartholomew index); account for the second-largest eigenvalues or the determinant of the matrix itself.

Let the vector  $(Y_i, X_i)$  denote the education level of a child and his parent for family  $i$ . We test whether and to what extent the child's education level,  $Y_i$ , is influenced by his parent's education level,  $X_i$ . Intergenerational mobility indices,  $M(Y, X)$ , are any function  $M : R^{2n} \rightarrow R$  that maps the vectors of education levels  $(Y, X)$  into a scalar. Indices based on a transition matrix are functional of a matrix  $P_{K \times K}$  between the parent's and the child's education level. The generic element  $p_{jk}$  reflects the probability that the child's education falls in the  $k$ th class given that his parent's education falls in the  $j$ th class. In particular, the Shorrocks/Prais index is  $(K - 1)^{-1}\{K - \text{trace}(P)\}$ ; the Bartholomew index is  $\{K(K - 1)\}^{-1} \sum_i \sum_j p_{ij|i-j}$ ; the Eigenvalue2 is  $1 - |2nd\ largest\ eigenvalue|$  and the Determinant index is  $1 - |\det(P)|$ . The inferential measures (standard errors and confidence intervals) are approximated by the bootstrap procedure. Larger values of the indices signify greater

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<sup>9</sup> Experimenting with other age groups (25-60, 30-60) leaves empirical estimates largely unaffected. Results are not reported here but are available from the authors upon request.

positional movement. Higher intergenerational mobility would, in turn, imply lower persistence in educational attainment.

Results show that parental educational attainment matters for daughters' educational status, but by a magnitude that suggests higher mobility for the father-daughter pair than for the mother-daughter pair. This conforms to findings in prior sections in the sense that parental advantages and disadvantages are transmitted across generations, among others, through human capital investments. However, educational outcomes of daughters are more closely related to those of their mothers than their fathers. As mentioned, larger values for the indices indicate greater positional movement and higher mobility. The Shorrocks /Prais index is 0.794 for the mother-daughter pair and 0.813 for the father-daughter pair (Shorrocks 1978), broadly in line with Daouli et al. (2010).<sup>10</sup> This implies that daughters' educational achievements are more independent from the paternal educational distribution compared to the maternal one and, therefore, mothers are more influential for their daughters' superior educational outcomes than fathers. The Bartholomew index (the average 'jump' of education classes) for the mother-daughter pair is 0.309 with a bootstrapped standard error of 0.012. Analogous estimates for the Bartholomew index, though slightly higher in magnitude, are reported for the father-daughter pair. The other two mobility indices display similar patterns. The Eigenvalue2 index is 0.694 for the mother-daughter pair and 0.729 for the father-daughter pair.

**[Insert Table 6]**

## **6. Conclusion**

In this paper we have applied logit regressions techniques for binary response models, fit by maximum likelihood with robust standard errors, to investigate the empirical relevance of the intergenerational transmission of gender role attitudes and its implications for female labour force participation. In particular, we focus on whether and to what extent the former labour force participation status of a husband's mother can affect his wife's labour supply.

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<sup>10</sup> The Shorrocks and Prais index takes values in the interval [0, 1] where zero (0) implies perfect immobility and one (1) implies perfect mobility. Immobility assumes that no transitions between education levels take place across generations, thus implying that a daughter whose parents attained a certain education level will attain the same education level with a probability of one. Perfect mobility would assume that daughters' probability of moving to any education level is independent of that occupied by their parents.

We additionally examine the relevance of the intergenerational transmission of educational outcomes among females and estimate intergenerational mobility indices, a rare combination of various strands of this literature, so far untested in Greece. To conduct this study, we utilize the European Union Statistics on Income and Living Conditions (EU-SILC) for Greece for 2011. Data refer to 2011 when the first elements of the economic adjustment programme were being put into place. Most importantly, the EU-SILC 2011 wave is the latest one to include an ad hoc module on intergenerational transmission of disadvantages. Its' main advantage lies in encompassing the labour market outcomes of the respondent's parents when he/she was around 14 years old.

Results provide evidence of high intergenerational persistence in labour force participation and educational attainment. Concerning the former, a married woman's labour force participation decision is found to be related to the mother of her husband's and her own mother's participation in the past, and even more strongly related to her own level of educational achievement along with the number of children in the household.

In particular, a participating husband's mother is fundamental in increasing a wife's probability of being in the labour force by 8.4 to 10.6 percentage points. A participating mother is also instrumental in increasing the chances of her daughter's labour force participation since she acts as a role model. Maternal influences picture as prominent because of the formation of attitudes and norms early in life. However, the labour force participation of the mother of the husband is more important than that of the woman's own mother, indicating a strong transmission of the husband's cultural model. Controls for the wife's, husband's and household's socioeconomic characteristics do not affect the strength of this conclusion.

However, the intergenerational transmission of advantages and disadvantages does not solely operate through labour force participation. Results additionally reveal that daughters' educational attainment is influenced by parental educational background. Mothers play a predominant role in passing on exceptional academic achievement to their daughters. Therefore, the patterns of intergenerational transmission of socioeconomic characteristics suggest that gender role attitudes are a critical determinant of women's educational attainment insofar as attitudes prescribe norms about the importance of educational

attainment. Intergenerational mobility indices corroborate that daughters' educational outcomes are more closely related to maternal rather than paternal educational attainment.

Our empirical findings, on the whole, suggest that there is room for the intergenerational transmission of gender role attitudes in accounting for a wide range of socioeconomic outcomes such as female labour force participation and educational attainment, with far-reaching repercussions on the generations to come. Therefore, policy interventions that increase female labour force participation and enhance educational outcomes, especially in financially distressed countries in a severe crisis, like Greece, would also benefit subsequent generations through the intergenerational transmission of the participation choice and educational attainment potentially leading to higher output growth.



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## Tables

**Table 1**  
Descriptive statistics

VARIABLES	WOMEN			MEN					
	(1)	(2)	(3)	(1)	(2)	(3)	(4)	(5)	(6)
	N	mean	sd	N	mean	sd	N	mean	sd
				Mother not in labour force			Mother in labour force		
in labour force	430	0.702	0.458						
age	430	40.07	5.622	248	43.30	6.547	182	43.95	6.634
child_0_15	430	1.181	0.994	248	1.190	0.944	182	1.170	1.061
Pres_ofchild_0_15	430	0.702	0.458	248	0.710	0.455	182	0.692	0.463
education lower	430	0.179	0.384	248	0.165	0.372	182	0.214	0.411
education middle	430	0.460	0.499	248	0.452	0.499	182	0.495	0.501
education upper	430	0.360	0.481	248	0.383	0.487	182	0.291	0.456
father education lower	430	0.760	0.427	248	0.710	0.455	182	0.819	0.386
father education middle	430	0.133	0.339	248	0.177	0.383	182	0.115	0.320
father education upper	430	0.107	0.309	248	0.113	0.317	182	0.0659	0.249
mother education lower	430	0.802	0.399	248	0.786	0.411	182	0.830	0.377
mother education middle	430	0.149	0.356	248	0.185	0.389	182	0.115	0.320
mother education upper	430	0.0488	0.216	248	0.0282	0.166	182	0.0549	0.229
gross monthly earnings	202	1,342	616.1	248	1,733	811.7	182	1,583	780.8
mother in labour force	430	0.458	0.499						
mother-in-law in labour force	430	0.423	0.495						

**Table 2**

Female labour force participation

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Marginal effects	Marginal effects	Marginal effects	Marginal effects	Marginal effects	Marginal effects
mother_participate	0.0980** (0.0446)	0.104** (0.0414)	0.104** (0.0412)	0.106** (0.0414)	0.106*** (0.0412)	0.0847** (0.0366)
age_f	-	0.0663 (0.0604)	0.0730 (0.0596)	0.0690 (0.0605)	0.0727 (0.0612)	0.0788 (0.0571)
age2_f	-	-0.000802 (0.000752)	-0.000883 (0.000741)	-0.000853 (0.000749)	-0.000906 (0.000758)	-0.00102 (0.000717)
educlow_f	-	-0.0507 (0.0524)	-0.0411 (0.0538)	-0.0418 (0.0528)	-0.0383 (0.0520)	-0.0501 (0.0496)
educup_f	-	0.373*** (0.0579)	0.381*** (0.0582)	0.375*** (0.0572)	0.378*** (0.0568)	0.247*** (0.0586)
mother_participate_f	-	0.0921** (0.0423)	0.0951** (0.0421)	0.0983** (0.0420)	0.102** (0.0422)	0.0933** (0.0368)
lwage	-	-0.0421 (0.0609)	-0.0461 (0.0615)	-0.0472 (0.0580)	-0.0404 (0.0582)	-
age	-	0.00517 (0.0435)	0.0143 (0.0426)	0.0187 (0.0438)	0.0103 (0.0439)	-0.00682 (0.0369)
age2	-	-0.000193 (0.000481)	-0.000282 (0.000472)	-0.000336 (0.000482)	-0.000235 (0.000484)	-5.95e-05 (0.000414)
educlow	-	-0.0267 (0.0523)	-0.0295 (0.0542)	-0.0334 (0.0526)	-0.0272 (0.0533)	0.0152 (0.0481)
educup	-	0.000844 (0.0632)	-0.00141 (0.0616)	-0.000634 (0.0621)	-0.00768 (0.0603)	-0.0375 (0.0530)
father_edlow_f	-	-0.0920 (0.0735)	-0.0666 (0.0734)	-0.0782 (0.0685)	-0.0637 (0.0677)	-0.0914 (0.0688)
father_edup_f	-	-0.0725 (0.118)	-0.0563 (0.112)	-0.0695 (0.110)	-0.0596 (0.110)	-0.121 (0.106)
mother_edlow_f	-	-0.0991 (0.0828)	-0.111 (0.0784)	-0.104 (0.0792)	-0.113 (0.0791)	-0.167** (0.0715)
mother_edup_f	-	-0.0501 (0.179)	-0.0590 (0.186)	-0.0223 (0.177)	-0.0376 (0.183)	-0.140 (0.199)
father_edlow	-	-0.0103 (0.0851)	-0.00754 (0.0799)	0.00349 (0.0833)	0.00654 (0.0840)	-0.0307 (0.0774)
father_edup	-	-0.141 (0.106)	-0.141 (0.0985)	-0.120 (0.0970)	-0.114 (0.0994)	-0.148* (0.0851)
mother_edlow	-	-0.0694 (0.0907)	-0.0677 (0.0864)	-0.0598 (0.0860)	-0.0569 (0.0868)	0.0477 (0.0745)
mother_edup	-	-0.0997 (0.114)	-0.0978 (0.114)	-0.0916 (0.108)	-0.0908 (0.108)	-0.0466 (0.0774)
Pres_ofchild_0_15	-	-0.162*** (0.0469)	-	-	-	-
child_0_4	-	-	-0.0719* (0.0409)	-	-	-
child_5_9	-	-	-0.0446 (0.0396)	-	-	-
child_10_15	-	-	-0.0963*** (0.0273)	-	-	-
1 child	-	-	-	-0.147*** (0.0508)	-0.147*** (0.0509)	-0.151*** (0.0482)
2 children	-	-	-	-0.130** (0.0538)	-0.130** (0.0535)	-0.124** (0.0482)
3 children	-	-	-	-0.341*** (0.0931)	-0.328*** (0.0921)	-0.292*** (0.0892)
4 children or more	-	-	-	-0.460*** (0.177)	-0.437** (0.177)	-0.358* (0.218)
finsat	-	-	-	-	-0.0112 (0.0436)	-0.0526 (0.0412)
urb	-	-	-	-	0.0632 (0.0424)	0.0543 (0.0395)
lhdisp	-	-	-	-	-	0.301*** (0.0505)
Observations	430	430	430	430	430	430

Marginal effects are reported. Standard errors are in parentheses, \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

**Table 3**

Female labour force participation - low versus high income households

VARIABLES	low income households					
	(1) Marginal effects	(2) Marginal effects	(3) Marginal effects	(4) Marginal effects	(5) Marginal effects	(6) Marginal effects
mother_participate	0.115* (0.0668)	0.146** (0.0649)	0.135** (0.0667)	0.148** (0.0663)	0.145** (0.0648)	0.115* (0.0591)
educlow_f	-	-0.130* (0.0747)	-0.108 (0.0797)	-0.118 (0.0754)	-0.107 (0.0756)	-0.0547 (0.0758)
educup_f	-	0.297*** (0.112)	0.301*** (0.113)	0.292*** (0.113)	0.279*** (0.108)	0.294*** (0.104)
mother_participate_f	-	0.158** (0.0664)	0.165** (0.0680)	0.154** (0.0670)	0.156** (0.0658)	0.126** (0.0605)
lwage	-	-0.337*** (0.108)	-0.337*** (0.110)	-0.329*** (0.107)	-0.288*** (0.109)	-
Observations	215	215	215	215	215	215
high income households						
mother_participate	0.100* (0.0517)	0.0608 (0.0408)	0.0513 (0.0397)	0.0684 (0.0428)	0.0637 (0.0449)	0.0761* (0.0438)
educlow_f	-	-0.0832 (0.0709)	-0.102 (0.0741)	-0.0863 (0.0687)	-0.0777 (0.0660)	-0.0791 (0.0653)
educup_f	-	0.162*** (0.0485)	0.188*** (0.0493)	0.187*** (0.0499)	0.207*** (0.0557)	0.193*** (0.0462)
mother_participate_f	-	0.0259 (0.0446)	0.0251 (0.0421)	0.0606 (0.0393)	0.0643 (0.0399)	0.0662* (0.0383)
lwage	-	-0.0851 (0.0595)	-0.0832 (0.0592)	-0.0960 (0.0584)	-0.106* (0.0591)	-
Observations	215	215	215	215	215	215
<b>controls for:</b>						
age, urbanization level	no	yes	yes	yes	yes	yes
husband's education and financial satisfaction	no	yes	yes	yes	yes	yes
parental education	no	yes	yes	yes	yes	yes
presence/age/number of children	no	yes	yes	yes	yes	yes

Marginal effects are reported. Standard errors are in parentheses, \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

**Table 4**

Female labour force participation - individual level

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Marginal effects	Marginal effects	Marginal effects	Marginal effects	Marginal effects	Marginal effects
mother_participate_f	0.0654*** (0.0220)	0.0754*** (0.0212)	0.0755*** (0.0211)	0.0744*** (0.0211)	0.0756*** (0.0211)	0.0692*** (0.0211)
age_f	-	0.0436 (0.0275)	0.0475* (0.0277)	0.0477* (0.0275)	0.0473* (0.0275)	0.0469* (0.0272)
age2_f	-	-0.000620* (0.000342)	-0.000688** (0.000344)	-0.000683** (0.000342)	-0.000679** (0.000342)	-0.000680** (0.000338)
educlow_f	-	-0.0403 (0.0248)	-0.0383 (0.0248)	-0.0365 (0.0246)	-0.0333 (0.0248)	-0.0253 (0.0248)
educup_f	-	0.248*** (0.0303)	0.253*** (0.0302)	0.253*** (0.0300)	0.252*** (0.0300)	0.213*** (0.0311)
father_edlow_f	-	-0.0342 (0.0449)	-0.0268 (0.0450)	-0.0202 (0.0447)	-0.0187 (0.0445)	-0.0204 (0.0447)
father_edup_f	-	-0.0282 (0.0596)	-0.0296 (0.0588)	-0.0294 (0.0591)	-0.0274 (0.0591)	-0.0268 (0.0599)
mother_edlow_f	-	-0.00104 (0.0461)	-0.00701 (0.0458)	-0.0114 (0.0458)	-0.00922 (0.0459)	-0.00551 (0.0459)
mother_edup_f	-	-0.0247 (0.0765)	-0.0313 (0.0757)	-0.0291 (0.0759)	-0.0330 (0.0755)	-0.0389 (0.0750)
married	-	-0.188*** (0.0360)	-0.174*** (0.0364)	-0.180*** (0.0358)	-0.178*** (0.0358)	-0.220*** (0.0382)
Pres_ofchild_0_15	-	-0.0752*** (0.0241)	-	-	-	-
child_0_4	-	-	-0.0574** (0.0233)	-	-	-
child_5_9	-	-	-0.0605*** (0.0192)	-	-	-
child_10_15	-	-	-0.0485*** (0.0153)	-	-	-
1 child	-	-	-	-0.0493* (0.0272)	-0.0486* (0.0272)	-0.0423 (0.0271)
2 children	-	-	-	-0.0716** (0.0295)	-0.0718** (0.0295)	-0.0635** (0.0292)
3 children	-	-	-	-0.232*** (0.0462)	-0.230*** (0.0463)	-0.224*** (0.0459)
4 children or more	-	-	-	-0.215** (0.0922)	-0.211** (0.0924)	-0.205** (0.0898)
urb	-	-	-	-	0.0219 (0.0234)	0.0170 (0.0231)
lhdisp	-	-	-	-	-	0.0785*** (0.0163)
Observations	1,519	1,519	1,519	1,519	1,519	1,519

Marginal effects are reported. Standard errors are in parentheses, \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

**Table 5**  
Female educational attainment - individual level

VARIABLES	(1) Marginal effects	(2) Marginal effects	(3) Marginal effects	(4) Marginal effects	(5) Marginal effects
mother_edlow_f	-0.133*** (0.0370)	-0.132*** (0.0374)	-0.127*** (0.0375)	-0.114*** (0.0371)	-0.0709** (0.0337)
mother_edup_f	0.114** (0.0574)	0.147** (0.0590)	0.111* (0.0576)	0.113** (0.0572)	0.120* (0.0632)
father_edlow_f	-0.165*** (0.0363)	-0.161*** (0.0362)	-0.167*** (0.0364)	-0.156*** (0.0364)	-0.128*** (0.0325)
father_edup_f	0.0249 (0.0456)	0.0111 (0.0460)	0.0192 (0.0460)	0.0146 (0.0461)	0.00771 (0.0453)
age_f	-	0.00253 (0.00190)	0.00276 (0.00191)	0.00318* (0.00191)	0.00111 (0.00179)
mother_participate_f	-	-0.0737*** (0.0228)	-	-	-0.0630*** (0.0211)
father_participate_f	-	0.0676 (0.0906)	0.0807 (0.0901)	0.0253 (0.0863)	0.0446 (0.0789)
mother_manpos_f	-	0.158** (0.0683)	-	-	0.124** (0.0613)
father_manpos_f	-	0.0107 (0.0293)	0.0170 (0.0293)	0.00347 (0.0291)	-0.00530 (0.0280)
interaction= mother_participate_f* mother_manpos_f	-	-	0.120* (0.0671)	0.110* (0.0653)	-
married	-	-0.0198 (0.0274)	-0.0160 (0.0276)	-0.0233 (0.0274)	-0.0790*** (0.0279)
finsat_f	-	-	-	0.133*** (0.0266)	0.0996*** (0.0242)
urb	-	-	-	-	0.0695*** (0.0214)
lhdisp	-	-	-	-	0.222*** (0.0219)
Observations	1,519	1,519	1,519	1,519	1,519

Marginal effects are reported. Standard errors are in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



**Table 6**

Transition matrix Indices for educational attainment - individual level

Mother-Daughter pair

Transition matrix Indices (original categories of X,Y)

Child generation: educlevel = Y

Parent generation: mother\_edlev = X

Type of indices	IGM estimate	Bootstrap SE*	[95% Conf. Interv.] normal approx.	
Shorrock/Prais	0.794	0.031	0.733	0.855
Bartholomew	0.309	0.012	0.285	0.333
1-Second largest eigenvalue	0.694	0.072	0.553	0.835
Determinant index	0.968	0.014	0.94	0.996
Observations	1,519	1,519	1,519	1,519

Father-Daughter pair

Transition matrix Indices (original categories of X,Y)

Child generation: educlevel = Y

Parent generation: father\_edlev = X

Type of indices	IGM estimate	Bootstrap SE*	[95% Conf. Interv.] normal approx.	
Shorrock/Prais	0.813	0.027	0.759	0.867
Bartholomew	0.314	0.01	0.294	0.335
1-Second largest eigenvalue	0.729	0.041	0.648	0.81
Determinant index	0.972	0.014	0.944	1
Observations	1,519	1,519	1,519	1,519

\* The default of 50 bootstrap replications is reported.

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