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Work Autonomy, Gender, and Fertility: Labour-Market Differences and Household Behaviour in Europe

Zixiao Yang

Graduate School of Economics and Business, Hokkaido University, Kita 9, Nishi 7, Kita-ku, Sapporo 060-0809, Japan ; yang_zixiao@yahoo.co.jp

Abstract

This paper examines how work autonomy is related to fertility and labour-supply behaviour and whether these relationships differ between women and men. Using individual-level data from the European Social Survey collected in 2018–2019, with a supplementary analysis of the 2006–2007 survey, we relate the number of biological children, weekly working hours, and overtime to respondents' control over how their daily work is organised. The analysis allows these relationships to vary across levels of autonomy and between genders, controlling for observed socioeconomic characteristics and country differences. Overtime is examined through separate models of whether respondents work overtime and the hours worked among those who do. The main fertility estimates display a nonlinear association: the fitted number of children initially declines and then rises with autonomy. This pattern is less clear in the sample aged 25–49 and in the earlier survey. In the main survey, the relationship between work autonomy and the number of children differs between women and men. Total weekly working hours show weaker patterns, whereas overtime hours display nonlinearity among respondents working overtime. Because the data are cross-sectional and current work conditions may not reflect those prevailing when earlier fertility decisions were made, the results should be interpreted as associations rather than causal effects.

Keywords: fertility; gender differences; work autonomy; labour market; household behaviour; work–family conflict

1. Introduction

Fertility decline has become a central economic and demographic concern in many developed economies. A large literature has therefore examined how employment conditions, family policy, and the organisation of work shape fertility decisions. Recent research increasingly emphasises the interaction between career and family choices rather than treating fertility as a decision made independently of labour-market conditions [1]. This perspective is closely related to the growing importance of jobs that reward long, demanding, or inflexible work arrangements and to the possibility that differences in work organisation contribute to persistent gender differences in labour-market and family outcomes [2].

One important dimension of this interaction is work autonomy. Greater control over how daily work is organised may help workers accommodate family responsibilities, but it is distinct from control over working hours or location. Work–family border theory and job demands–resources theory provide reasons why control can facilitate coordination while its benefits depend on the demands and boundaries of the job [3,4]. Recent research directly linking work autonomy to childbearing also finds that its association varies by education

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and birth order [5]. These considerations motivate allowing a nonlinear association; they do not establish that a particular U-shaped relationship or threshold must occur. Existing empirical studies document strong links between employment conditions, work–family conflict, and fertility intentions or outcomes [6–10]. Related work emphasises the long-run career costs of childbirth and employment interruptions [11–13], while another strand focuses on childcare costs, female labour supply, relative wages, and the substitution between parental time and purchased childcare [14–18]. Together, these literatures suggest that the compatibility of employment and family responsibilities depends not only on income but also on how work is organised. Recent evidence broadens this perspective. A European meta-analysis synthesises the relationship between employment instability and fertility [19], while studies of work autonomy and home-based work distinguish entry into parenthood from subsequent childbearing [5,20]. Research published since 2020 also examines fertility intentions during the pandemic and the work–family implications of working from home [21–23]. Our pre-pandemic European Social Survey (ESS) analysis is situated within this debate, while its measure of daily-work control should not be equated with telework or hybrid arrangements.

This paper uses Round 9 of the ESS, with Round 3 as a supplementary replication, to examine how work organisation is associated with household behaviour. It asks whether the autonomy–fertility relationship is nonlinear, whether its shape differs between women and men, and whether the fertility profile varies across welfare-regime groupings. Weekly hours and the two margins of overtime are examined as complementary labour-supply outcomes. The empirical analysis adopts a reduced-form approach. The ESS does not provide an exogenous source of variation in work autonomy, nor does it observe the work conditions prevailing at every point in a respondent's fertility history. We therefore do not interpret the estimated coefficients as causal effects. Instead, the objective is to document robust cross-sectional patterns after controlling for observed socioeconomic characteristics and country fixed effects (FE).

The analysis yields three main findings. First, the preferred Round 9 Poisson pseudo-maximum likelihood (PPML) estimates have a negative linear and positive quadratic autonomy term, with the fitted number of children lowest at an autonomy score of approximately 5.28 on the 0–10 scale. The same signs and statistical significance are obtained using ordinary least squares (OLS) and ESS analysis weights, whereas the age-25–49 estimates are less precise and the Round 3 replication offers weaker evidence. Second, comparing women and men shows that work autonomy is related to the number of children differently in the two groups in Round 9. The welfare-regime specification also indicates that the pooled turning point should not be imposed on every group. Third, total weekly working hours show weaker autonomy associations. In the two-part overtime model, the positive-hours component displays a positive quadratic term, while the probability component provides weaker evidence. These labour-market results are treated as complementary evidence.

The paper contributes to research on gender differences in labour-market and household behaviour in three ways. First, it examines whether the observed relationship between work autonomy and fertility can be summarised by a single average slope. Second, it allows the shape of the autonomy–fertility profile to vary across gender and welfare-regime groupings rather than imposing common curvature. Third, by examining weekly hours and the two margins of overtime alongside fertility, it links household outcomes to labour-market behaviour using the same measure of workplace organisation. The supplementary Round 3 analysis assesses the extent to which the main findings recur in another survey round.

The remainder of the paper is organised as follows. Section 2 discusses the related literature and develops the conceptual framework. Section 3 describes the data, variables, and empirical strategy. Section 4 reports the main results. Section 5 presents the robustness

checks and supplementary ESS Round 3 replication. Section 6 discusses interpretation and limitations. Section 7 concludes.

2. Related Literature and Conceptual Framework

2.1. Career–Family Conflict and Fertility

Economic research on fertility has long emphasised the interaction between family formation, income, labour supply, and the opportunity cost of time [24–27]. More recent work places greater emphasis on the structure of employment itself. The cost of having children can depend on whether work schedules are predictable, whether employees can adjust tasks and hours, and whether interruptions carry persistent career penalties.

A first mechanism operates through career costs. Employment interruptions associated with childbirth can reduce experience, earnings, promotion opportunities, and the accumulation of occupation-specific human capital [11–13]. If family formation is expected to generate larger career losses, individuals may postpone or reduce fertility. A second mechanism operates through work–family compatibility. Childcare needs are difficult to coordinate with rigid or unpredictable employment. Greater control over work can reduce scheduling conflicts and may therefore make employment more compatible with family responsibilities. Evidence linking job control and work–family conflict to fertility intentions is particularly relevant to this channel [8]. Childcare institutions and the ability to substitute purchased care for parental time can further alter the relationship between employment and fertility [14,15,17,18].

Work–family border theory emphasises how people manage the temporal, spatial and psychological boundaries between employment and family life [3]. Greater control may facilitate coordination, but more permeable boundaries can also allow work to intrude into family time. Job demands–resources theory identifies autonomy as a potential resource whose role must be considered alongside workload and other demands [4]. Applied to fertility, these frameworks suggest that perceived control alone may not capture whether a job provides usable scope for caregiving. This is a conceptual interpretation, rather than a mechanism separately identified by the ESS regressions. These mechanisms do not imply that greater measured autonomy must always be positively related to fertility. Jobs with more autonomy may also involve stronger career attachment, greater responsibility, or self-directed workloads. Consequently, autonomy can simultaneously reduce scheduling constraints and proxy for employment environments in which the opportunity cost of family formation is high. The net association is therefore an empirical question.

The recent demographic evidence supports distinguishing employment dimensions and family stages. Using British longitudinal data, Osiewalska and Matysiak [5] distinguish control over tasks, schedules and workplace location. Among highly educated women, autonomy is negatively associated with entering motherhood but positively associated with a second birth; they find no corresponding association for men. Osiewalska et al. [20] examine home-based work and find a negative association with entry into motherhood and no clear association with a second birth. These findings complement the earlier work on fertility intentions [8], but also show why intentions, birth transitions and cumulative child counts should not be treated as interchangeable outcomes.

2.2. Recent Work Arrangements and Institutional Context

Research published since 2020 has renewed debate about whether flexibility improves work–family compatibility. In pandemic-era Poland, working from home was associated with changes in parents' fertility intentions, with gender and the division of unpaid work relevant to the relationship [22]. Evidence from Germany also links working from home to work–family conflict in ways that depend on gender and role salience [23]. These

studies indicate that spatial flexibility may coexist with care burdens and boundary blurring. Their pandemic or country-specific settings differ from our ESS samples; neither a publication date after 2020 nor pandemic evidence implies that our estimates describe post-pandemic conditions.

Institutional context is also relevant. Access to flexible arrangements varies across gendered occupations and workplaces in Europe [28], and national family policies moderate associations between flexible working and work-to-family conflict [29]. Broader demographic research documents regional variation in fertility during the Great Recession and cross-country differences in pandemic fertility plans [10,21]. These studies concern different outcomes, but motivate assessing whether a common autonomy profile is an adequate empirical summary. Our welfare-regime interactions provide a supplementary sensitivity check; they do not directly measure childcare provision, leave entitlements or the mechanisms through which national policies operate.

2.3. Why Allow a Nonlinear Relationship?

The coexistence of coordination resources and work demands [3,4], together with variation across autonomy dimensions and birth stages [5], motivates a specification that can accommodate curvature. These arguments do not uniquely predict a U-shape. To examine whether a single slope is adequate without imposing a structural interpretation on a subjective survey measure, the empirical specification includes both work autonomy and its square. Let A_i denote respondent i's reported control over daily work. The conditional mean of fertility is allowed to depend on

$$\beta_1 A_i + \beta_2 A_i^2. \tag{1}$$

When $\beta_1 < 0$ and $\beta_2 > 0$, the fitted quadratic has a minimum at

$$A^* = -\frac{\beta_1}{2\beta_2}. \tag{2}$$

This formulation is intended as a flexible reduced-form description rather than a structural model of occupational choice. A U-shaped profile within the observed scale additionally requires the minimum to lie between 0 and 10. Turning points reported below are descriptive point estimates; their location alone does not establish statistical evidence for a change in slope within that interval.

2.4. Gender Differences in Work–Family Constraints

Work–family constraints are unlikely to be gender-neutral. Differences in childcare responsibilities, labour-market attachment, and the career consequences of family formation can make the same degree of autonomy relevant in different ways for women and men [1,18]. Recent evidence on childbearing, access to flexibility and work–family conflict reinforces this motivation [5,23,28]. It does not imply that either gender must have a particular turning point. We therefore interact both work autonomy and its square with a male indicator, allowing gender differences in slope and curvature:

$$\beta_1 A_i + \beta_2 A_i^2 + \beta_3 Male_i + \beta_4 A_i Male_i + \beta_5 A_i^2 Male_i. \tag{3}$$

The purpose of this specification is not to impose a particular mechanism, but to test whether the autonomy–fertility profile differs systematically across gender.

These considerations motivate two empirical hypotheses.

H1. *The conditional association between work autonomy and fertility is nonlinear, so a single autonomy slope is insufficient. In Equation (5), the corresponding linearity restriction is* $\beta_2 = 0$*; the theoretical motivation does not predetermine the sign of the quadratic term.*

H2. *The autonomy–fertility profile differs between women and men. In Equation (6), identical profiles apart from a level difference imply* $\beta_4 = \beta_5 = 0$*. These hypotheses organise the associative analysis and are not preregistered causal predictions. The labour-supply analysis provides complementary evidence on working-time outcomes, while welfare-regime heterogeneity remains a supplementary analysis.*

3. Materials and Methods

3.1. Data and Sample

The empirical analysis uses the integrated Round 9 file of the European Social Survey (ESS), collected in 2018–2019 across participating European countries.[1] The analysis is restricted to respondents with valid information on work autonomy and the core covariates required for the corresponding specification. The cleaned analysis file contains 36,032 respondents with valid values for these core variables. Because the fertility, actual-hours, and contracted-hours items have different patterns of item non-response, the estimation sample is outcome-specific rather than forcing every regression to use the same observations. The preferred fertility specification uses 35,961 observations, the weekly-hours specification uses 34,015 observations, and the overtime specification uses 31,884 observations. The R code for cleaning and analysing ESS Rounds 9 and 3 is provided in Supplementary Materials, File S1.

The main fertility sample covers 29 countries; the hours and overtime samples cover 28. Of the 31,884 respondents with valid overtime, 11,676 (36.6%) report positive overtime and 20,208 report zero. The positive-hours component therefore uses 11,676 observations. The baseline is not restricted to ages 25–49: the cleaned Round 9 file includes ages 15–90, and the narrower age range is used only as a sensitivity check. Round 3 is introduced as a supplementary replication in Section 5.3, with its detailed results in Appendix D. Round 9 is retained as the primary analysis because it is the survey round underlying the original empirical results and contains the full set of measures used in those specifications. Round 3 is added as a supplementary check because it is the additional round identified in our variable-availability review where the principal outcomes and core explanatory variables can be operationalised for this analysis. The two rounds are estimated separately: country coverage and some covariate definitions differ, so pooling them would require stronger harmonisation assumptions. The present analysis therefore evaluates whether patterns recur in a second round; it does not establish stability across three or more rounds or identify a time trend.

3.2. Variables

The fertility outcome is the number of biological children. The ESS uses a routing question asking whether the respondent has ever given birth to or fathered a child. Respondents reporting no children are coded as zero, while the reported number of children is used for respondents who have ever had a child. This reconstruction is important because the raw number-of-children variable contains a "not applicable" code for many childless respondents. In the cleaned fertility sample, 9308 respondents report zero children, corresponding to approximately 25.9% of observations.

The principal explanatory variable is control over daily work , which ranges from 0 to 10 and is referred to throughout the paper as work autonomy. Higher values indicate greater control over how daily work is organised. The mean is 6.14 and the median is 7.

We also include influence over organisational policy, another 0–10 measure that captures a distinct dimension of workplace authority. Both this measure and its square enter the models. Because neither variable is a direct measure of flexible scheduling or childcare availability, we use their ESS wording as closely as possible and avoid interpreting them as structural parameters.

Gender is measured using the binary male/female classification available in the survey. For estimation, male is coded as one and female as zero, so female respondents form the reference category. We use the term gender because this is the terminology of the source variable and because the empirical question concerns gendered labour-market and household behaviour. The available binary item does not capture the broader range of gender identities, and the analysis should not be interpreted as doing so. Gender heterogeneity is examined because differences in work–family responsibilities and labour-market attachment are central to the hypotheses developed in Section 2.

The baseline fertility controls include age and age squared, years of education and its square, planning for the future, household income decile, subjective household income, gender, religiosity, and indicators for the main household income source. The omitted income-source category is pensions.

The planning measure (`plnftr`) ranges from 0, indicating the strongest orientation towards planning for the future, to 10, indicating a preference for taking life one day at a time; higher values therefore indicate less future planning. Subjective household income (`hincfel`) is coded from 1 to 4, corresponding to financial comfort, managing on current income, difficulty, and considerable difficulty, respectively. Higher values indicate greater perceived financial strain. Religiosity (`rlgdgr`) ranges from 0 (no religiosity) to 10 (a high degree of religiosity). These three measures enter the fertility model as numeric covariates in their original coding. Household income decile (`hinctnta`) ranges from 1 to 10, with higher categories indicating higher household income within the national income distribution. Income-source indicators are constructed from `hincsrca`: wages or salaries (code 1), self-employment excluding farming (2), farming (3), pensions (4), benefits or grants (5–6), and investment or other income (7–8). The last two groups combine unemployment or redundancy benefits with other social benefits or grants, and investment, savings, insurance or property income with other sources, respectively. Pensions are the omitted category.

Country fixed effects absorb country-level differences common to respondents within each country, including institutional and demographic environments. These controls address observed differences but do not capture every determinant of fertility, such as the full history of fertility intentions, health, partner characteristics, or access to childcare. The estimates should therefore be read as conditional associations given the available covariates, rather than as a complete model of household fertility decisions.

For the labour-supply analysis, actual weekly working hours are cleaned before estimation. ESS special non-response codes (including 777, 888, and 999) are treated as missing, and values outside the feasible range of 0–168 hours per week are excluded. After cleaning, mean actual weekly hours are 40.10 and the median is 40. Overtime is defined as the non-negative difference between actual and contracted weekly hours:

$$Overtime_i = \max\{ActualHours_i - ContractedHours_i, 0\}. \quad (4)$$

Mean overtime is 3.43 hours per week, with a median of zero. Table 1 summarises the descriptive statistics for the main variables.

Table 1. Descriptive statistics.

Variable	N	Mean	SD	Min	Median	Max
Number of biological children	35,961	1.571	1.277	0	2	10
Actual weekly working hours	34,015	40.097	15.304	0	40	168
Weekly overtime hours	31,884	3.431	7.957	0	0	163
Control over daily work	36,032	6.142	3.496	0	7	10
Influence over organisational policy	36,032	4.181	3.605	0	4	10
Age	36,032	52.331	17.417	15	53	90
Years of education	36,032	13.232	3.978	0	13	29
Household income decile	36,032	5.340	2.772	1	5	10
Subjective household income	36,032	1.932	0.846	1	2	4
Planning for the future	36,032	5.047	2.976	0	5	10
Degree of religiosity	36,032	4.433	3.110	0	5	10

Notes: Statistics are calculated from the cleaned European Social Survey (ESS) Round 9 analysis file. Outcome-specific regressions may contain fewer observations because of item non-response. N denotes the number of observations; SD denotes standard deviation; Min and Max denote the minimum and maximum.

3.3. Empirical Strategy

3.3.1. Fertility

The preferred fertility specification uses Poisson pseudo-maximum likelihood (PPML). The dependent variable is a non-negative count and PPML provides a convenient conditional-mean specification without requiring equality between the conditional mean and variance for consistency of the coefficient estimates. The baseline equation is

$$E[N_i \mid X_i, \gamma_c] = \exp\left(\beta_1 A_i + \beta_2 A_i^2 + \delta' X_i + \gamma_c\right), \tag{5}$$

where N_i is the number of biological children, A_i is work autonomy, X_i is the vector of individual controls, and γ_c denotes country fixed effects. Standard errors are clustered by country.

The preferred specification is deliberately associative. Current or recent work autonomy is observed at the survey date, whereas the number of biological children summarises fertility history. The estimates therefore describe conditional relationships and should not be interpreted as causal effects of current autonomy on past fertility. The age-25–49 restriction is included as a sensitivity analysis motivated by the timing mismatch, not because fertility or labour-market participation begins at age 25. It narrows the age range but cannot align each respondent's current job with the period when each child was born; its weaker precision is relevant evidence about the limits of the baseline association.

We assess robustness using OLS, a negative binomial specification, ESS analysis weights, and a sample restricted to ages 25–49. The age restriction reduces, but does not eliminate, the mismatch between work characteristics and cumulative fertility. An additional PPML specification controls for a co-resident partner and the number of other relatives in the household, constructed from the household relationship items; these controls describe current household composition rather than conditions at earlier births. The weighted Round 9 models use the supplied analysis weight. All specifications retain country fixed effects and country-clustered standard errors. We report the exported McFadden-type pseudo R^2 and Poisson deviance for the PPML models; the latter is $2\sum_i w_i[N_i \log(N_i/\widehat{\mu}_i) - (N_i - \widehat{\mu}_i)]$, with the usual zero-count convention and $w_i = 1$ for unweighted models. These measures describe in-sample fit and are not proportions of variance explained or directly comparable across differently weighted samples.

3.3.2. Specification of Gender Interactions

To allow the autonomy–fertility relationship to differ by gender, we estimate

$$E[N_i \mid X_i, \gamma_c] = \exp\Big(\beta_1 A_i + \beta_2 A_i^2 + \beta_3 Male_i + \beta_4 A_i Male_i + \beta_5 A_i^2 Male_i + \delta' X_i + \gamma_c\Big). \quad (6)$$

Here X_i excludes the separately displayed male indicator. The implied turning points are $-\beta_1/(2\beta_2)$ for women and $-(\beta_1+\beta_4)/[2(\beta_2+\beta_5)]$ for men when the relevant denominators are nonzero. To assess H2, we jointly test $\beta_4 = \beta_5 = 0$ using a Wald test with country-clustered covariance and an $F(2, 28)$ reference distribution, based on 29 countries. The fertility predictions average over the same full fertility-sample covariate distribution after setting autonomy and gender to each plotted value.

3.3.3. Specification of Welfare-Regime Interactions

Country fixed effects absorb intercept differences but do not allow the autonomy profile to vary across countries. We therefore add interactions between both autonomy terms and welfare-regime indicators:

$$E[N_i \mid X_i, \gamma_c] = \exp\left[\beta_1 A_i + \beta_2 A_i^2 + \sum_{r \neq r_0} D_{ir}(\theta_{1r} A_i + \theta_{2r} A_i^2) + \delta' X_i + \gamma_c\right]. \quad (7)$$

The Continental group is the reference. Regime main effects are absorbed by country fixed effects. The Round 9 groups are Continental (Austria, Belgium, Switzerland, Germany, France, Netherlands), Nordic (Denmark, Finland, Iceland, Norway, Sweden), Southern (Cyprus, Spain, Italy, Portugal), Central/Eastern (Bulgaria, Czechia, Estonia, Croatia, Hungary, Lithuania, Latvia, Montenegro, Poland, Serbia, Slovenia, Slovakia), and Anglo-Saxon (United Kingdom, Ireland). This grouping is an empirical sensitivity specification, not an exhaustive description of national institutions. Standard errors remain clustered by country; some groups contain few countries. Regime-specific curves average predictions within each group's observed covariate distribution.

3.3.4. Labour-Supply Outcomes

Labour-supply outcomes are used as complementary evidence. Weekly actual working hours are estimated by OLS with country fixed effects and country-clustered standard errors:

$$Hours_i = \alpha_0 + \alpha_1 A_i + \alpha_2 A_i^2 + \lambda' Z_i + \gamma_c + u_i. \quad (8)$$

Here Z_i contains age and its square, education and its square, influence over organisational policy and its square, household income decile, the male indicator, subjective household income and income-source indicators, as summarised in the notes to Table 2. We repeat the regression after trimming the top 1% of the weekly-hours distribution and with ESS analysis weights.

Overtime has a mass at zero and a positive continuous component, so we replace the single full-sample OLS equation with a two-part conditional-mean specification. Define $D_i = 1\{Overtime_i > 0\}$. The first part estimates $P(D_i = 1 \mid Z_i, \gamma_c) = \Lambda(\eta_1 A_i + \eta_2 A_i^2 + \kappa' Z_i + \gamma_c)$ by logit, where Λ is the logistic function. The second estimates $E[Overtime_i \mid D_i = 1, Z_i, \gamma_c] = \alpha_0 + \alpha_1 A_i + \alpha_2 A_i^2 + \lambda' Z_i + \gamma_c$ by OLS on positive-overtime observations. Both parts use country fixed effects, country-clustered standard errors, and the labour-model controls. Contracted hours are used only to construct overtime and are excluded from both right-hand sides to avoid mechanical redundancy. We also estimate weighted versions and interact both autonomy terms with gender in each part. The positive-hours

OLS specification is a linear conditional-mean approximation; its coefficients concern overtime intensity among those working overtime, not the full-sample outcome. The figures display the two components separately.

Table 2. Preferred outcome models: ESS Round 9.

	Fertility PPML	**Weekly Hours OLS**	**Overtime Participation Logit**	**Overtime Hours OLS, $O > 0$**
Work autonomy	−0.0187 ***	−0.2277 *	0.0271	−0.4936 *
	(0.0052)	(0.1294)	(0.0261)	(0.2412)
Work autonomy squared	0.0018 ***	0.0214	0.0003	0.0487 **
	(0.0004)	(0.0131)	(0.0023)	(0.0192)
Policy influence	−0.0082 *	0.1043	0.1274 ***	−0.4269 ***
	(0.0049)	(0.1207)	(0.0248)	(0.1293)
Policy influence squared	0.0013 ***	0.0503 ***	−0.0092 ***	0.0768 ***
	(0.0005)	(0.0158)	(0.0027)	(0.0140)
Household income decile	0.0421 ***	0.3972 ***	0.0779 ***	−0.0315
	(0.0039)	(0.0413)	(0.0080)	(0.0640)
Male	−0.0769 ***	5.014 ***	0.3694 ***	1.610 ***
	(0.0137)	(0.5602)	(0.0306)	(0.2748)
Full controls/country FE	Yes	Yes	Yes	Yes
Observations	35,961	34,015	31,884	11,676
Pseudo R^2	0.09423	–	–	–
Poisson deviance	34,808.4	–	–	–
R^2	–	0.09623	–	0.07001
Within R^2	–	0.07329	–	0.03586

Notes: The two overtime columns represent separate parts of the model. Logit coefficients are on the log-odds scale; positive-hours OLS coefficients are in hours. Fertility controls include age and its square, education and its square, planning for the future, religiosity, subjective household income and income-source indicators. Labour models omit planning and religiosity. Pensions are the reference income source. Contracted hours are excluded from both overtime regressions. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

4. Main Results

This section reports the main Round 9 estimates. Sensitivity checks and the supplementary Round 3 replication are presented in Section 5.

4.1. Main Outcome Models

Table 2 reports the preferred models for fertility, weekly working hours, and overtime. The main fertility result is a significant nonlinear association with work autonomy. The linear coefficient is negative (−0.0187) and the squared term is positive (0.0018), with both statistically significant at the 1% level. The implied turning point is 5.28 on the 0–10 autonomy scale, which lies well inside the observed range and below the sample mean of 6.14. Because the PPML coefficients are expressed on the log-mean scale, predicted child counts provide a more intuitive indication of the magnitude of this U-shaped relationship. Averaging predictions over the same estimation sample while retaining other observed characteristics and country fixed effects gives 1.611, 1.534 and 1.596 children at autonomy levels 0, 5 and 10, respectively. The fitted number of children thus declines by 0.077 between autonomy levels 0 and 5, before increasing by 0.062 between 5 and 10. These differences suggest that the statistically significant nonlinearity is modest in magnitude.

This fitted profile describes a conditional association rather than the effects of changing work autonomy. Likewise, the turning point summarises where the fitted number of children is lowest; it is not a behavioural threshold or a recommended autonomy level.

This result is consistent with the possibility that work autonomy captures more than one dimension of employment: greater autonomy may coincide with stronger career attachment over part of the distribution while very high levels of control may also make work more compatible with family responsibilities.

The corresponding coefficients for total weekly working hours are weaker. The linear autonomy term is negative and marginally significant at the 10% level, while the squared term is not statistically significant. Thus, the strong nonlinear pattern observed for fertility does not extend cleanly to total hours worked. This contrast also means that the fertility pattern should not be explained simply as a consequence of respondents with more autonomy working fewer total hours: the hour estimates do not provide a stable pattern of that kind. The analyses do not estimate a mediation pathway from autonomy through work hours to fertility.

For overtime, neither autonomy term is individually significant in the logit equation for positive overtime. Conditional on positive overtime, the linear coefficient is -0.4936 ($p = 0.0506$) and the squared coefficient is 0.0487 ($p = 0.0174$), with fitted overtime hours lowest at an autonomy score of 5.07. Thus, the evidence for nonlinearity concerns overtime intensity among respondents working overtime rather than a clearly established nonlinear relationship with the probability of working overtime. The within R^2 is 0.0359 for this component and 0.0733 for total hours, indicating limited in-sample explanatory power; these models are not presented as accurate individual-level forecasting tools.

4.2. Gender Differences in the Estimated Associations

Table 3 presents the revised specification interacting both autonomy terms with gender. For fertility, the linear interaction is 0.0047 ($p = 0.611$) and the quadratic interaction is 0.0010 ($p = 0.205$). Although neither interaction is individually significant, the joint Wald test rejects their simultaneous equality to zero ($F(2, 28) = 15.98$, $p < 0.001$), supporting H2. The autonomy scores at the fitted minima are 7.92 for women and 3.27 for men, but the statistical significance of this turning-point difference has not been tested. In the positive-overtime equation the corresponding interaction p-values are 0.921 and 0.810, and neither autonomy interaction is individually significant in the overtime logit model.

Figure 1 provides a more intuitive representation of the interaction. Because coefficients from a nonlinear count model are difficult to interpret in isolation, the figure plots model-based predicted fertility across the observed autonomy scale for women and men while averaging over the remaining covariates. The figure should therefore be read as a visualisation of the conditional association estimated in Table 3, not as a counterfactual causal response to changing autonomy.

Table 3. Gender interactions in fertility and both overtime components: ESS Round 9.

	Fertility PPML	**Overtime Participation Logit**	**Overtime Hours OLS, $O > 0$**
Work autonomy	-0.0194 ***	0.0361	-0.5070 *
	(0.0062)	(0.0337)	(0.2529)
Work autonomy squared	0.0012 **	-0.0007	0.0463 **
	(0.0005)	(0.0031)	(0.0202)
Male	-0.1589 ***	0.3820 ***	1.185
	(0.0279)	(0.0615)	(0.8798)
Work autonomy × Male	0.0047	-0.0189	0.0247
	(0.0092)	(0.0283)	(0.2471)
Autonomy squared × Male	0.0010	0.0021	0.0046
	(0.0008)	(0.0027)	(0.0189)

Table 3. *Cont.*

	Fertility PPML	Overtime Participation Logit	Overtime Hours OLS, $O > 0$
Full controls/country FE	Yes	Yes	Yes
Observations	35,961	31,884	11,676
Pseudo R^2	0.09458	–	–
Poisson deviance	34,767.7	–	–
Within R^2	–	–	0.03598
Joint Wald $F(2, 28)$	15.98	–	–
Joint Wald p-value	2.345×10^{-5}	–	–

Notes: Female is the reference category. Both the linear and quadratic autonomy terms interact with gender. The male main effect is evaluated at autonomy zero. The joint test concerns the two fertility interactions; it is not reported for overtime. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

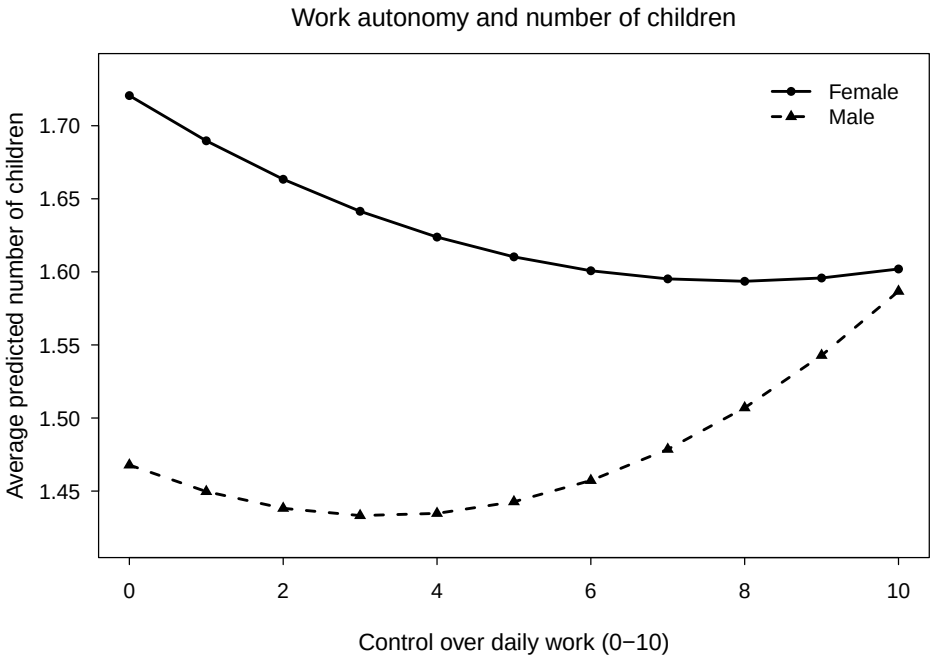

Figure 1. Fitted fertility by work autonomy and gender, ESS Round 9. Predictions average over the same full-sample covariate distribution. Lines are point estimates without confidence bands; separation of the curves does not establish a difference in curvature.

4.3. Differences in Fertility Profiles Across Welfare Regimes

Table 4 relaxes the common-curvature restriction. In the Continental reference group, the linear and quadratic coefficients are −0.0242 and 0.0020. The Southern-group interactions are 0.0410 and −0.0037, respectively, both significant at 1%; adding them to the reference coefficients gives a positive linear and negative quadratic point estimate. Thus its fitted profile is inverted-U-shaped, unlike the pooled profile. The autonomy scores at the fitted extrema are 5.99 (Continental), 3.87 (Nordic), 5.01 (Southern, maximum), 4.56 (Central/Eastern), and 9.82 (Anglo-Saxon). Other individual interaction terms are not significant at conventional levels. These descriptive extrema are not universal thresholds, and no confidence intervals for them are reported. Figure 2 illustrates the fitted profiles; between-group level differences also reflect their different country and covariate distributions.

Table 4. Welfare-regime interactions in fertility: ESS Round 9.

	PPML
Work autonomy	−0.0242 ***
	(0.0073)
Work autonomy squared	0.0020 ***
	(0.0007)
$A \times$ Nordic	0.0076
	(0.0163)
$A \times$ Southern	0.0410 ***
	(0.0088)
$A \times$ Central/Eastern	0.0020
	(0.0111)
$A \times$ Anglo-Saxon	−0.0056
	(0.0075)
$A^2 \times$ Nordic	0.0001
	(0.0013)
$A^2 \times$ Southern	−0.0037 ***
	(0.0009)
$A^2 \times$ Central/Eastern	0.0004
	(0.0009)
$A^2 \times$ Anglo-Saxon	−0.0005
	(0.0007)
Observations	35,961
Country fixed effects	Yes
Pseudo R^2	0.09445
Poisson deviance	34,783.2

Notes: Continental is the reference group. Regime intercepts are absorbed by country fixed effects. Interaction coefficients measure differences from the Continental slope and curvature; they are not the group-specific total coefficients. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

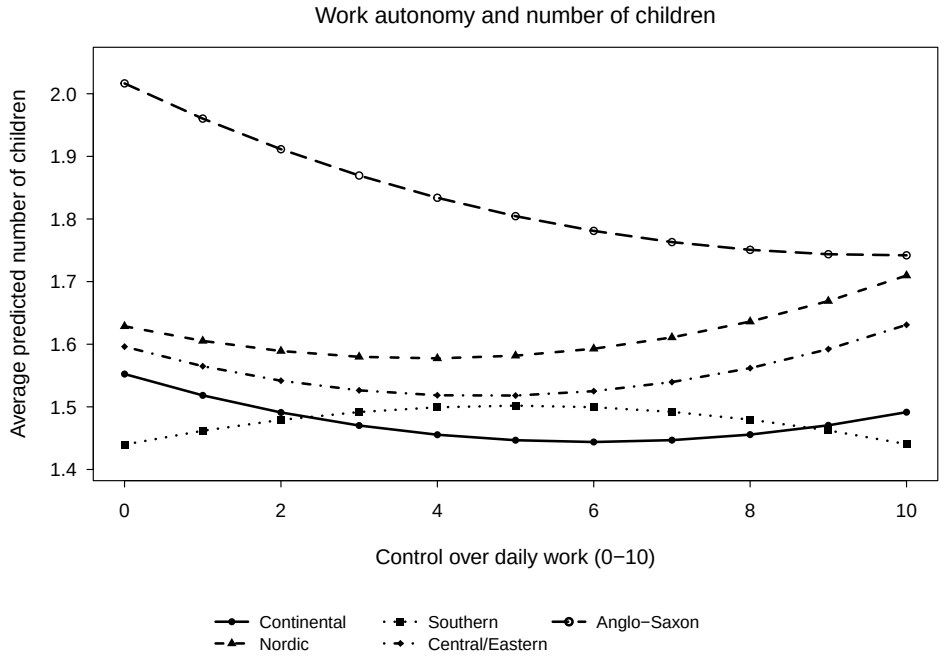

Figure 2. Fitted fertility by work autonomy and welfare-regime grouping, ESS Round 9. Curves average predictions within each regime and show point estimates without confidence bands.

5. Robustness and Supplementary Analyses

5.1. Fertility Robustness

Table 5 examines the stability of the fertility result. The first column repeats the preferred PPML specification. The second column estimates the same conditional relationship by OLS. The linear and squared autonomy coefficients remain negative and positive, respectively, and both remain statistically significant. The weighted PPML model in column (3) produces almost the same qualitative pattern: the autonomy coefficient is −0.0180 and the squared coefficient is 0.0019, both statistically significant.

The age-restricted specification in column (4) yields less precise estimates. Restricting the sample to ages 25–49 preserves the signs and approximate magnitudes of the autonomy coefficients, but statistical significance weakens: the p-values of the linear and squared terms are approximately 0.10. This result matters for interpretation. The baseline relationship is not driven by a particular estimator or by the absence of survey weights, but it is less precisely estimated within prime reproductive ages. We therefore regard the age restriction as an important limitation rather than describing the relationship as universally robust.

Table 5. Robustness of the fertility estimates: ESS Round 9.

	PPML	OLS	Weighted PPML	Ages 25–49
Work autonomy	−0.0187 ***	−0.0283 ***	−0.0180 ***	−0.0175
	(0.0052)	(0.0082)	(0.0059)	(0.0107)
Work autonomy squared	0.0018 ***	0.0027 ***	0.0019 ***	0.0015
	(0.0004)	(0.0007)	(0.0005)	(0.0009)
Household income decile	0.0421 ***	0.0611 ***	0.0280 ***	0.0579 ***
	(0.0039)	(0.0059)	(0.0054)	(0.0070)
Male	−0.0769 ***	−0.1155 ***	−0.0724 ***	−0.2029 ***
	(0.0137)	(0.0216)	(0.0174)	(0.0194)
Religiosity	0.0228 ***	0.0353 ***	0.0260 ***	0.0228 ***
	(0.0028)	(0.0039)	(0.0031)	(0.0046)
Full controls/country FE	Yes	Yes	Yes	Yes
ESS analysis weights	No	No	Yes	No
Observations	35,961	35,961	35,961	13,646
Pseudo R^2	0.09423	–	0.21456	0.10697
Poisson deviance	34,808.4	–	29,013.7	13,591.7

Notes: Column (2) is a functional-form check. The negative binomial model also retains negative linear and positive quadratic autonomy terms, both significant at 1%. Pseudo R^2 and deviance refer only to PPML. Weighted and unweighted fit statistics should not be compared as measures of relative model quality. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

5.2. Labour-Supply Robustness

Table 6 reports robustness checks for weekly hours and overtime. The weekly-hours estimates are notably weaker than the fertility estimates. The baseline linear autonomy coefficient is negative and only marginally significant, while the quadratic term is statistically insignificant. After trimming the top 1% of weekly working hours, neither autonomy term is statistically significant. The weighted specification produces the same conclusion. Accordingly, the evidence does not support a strong or robust relationship between autonomy and total weekly hours.

The positive-overtime component retains a negative linear and positive quadratic autonomy estimate under weighting, but precision decreases: the p-values are 0.104 and 0.057, respectively. Neither autonomy term is significant in the weighted logit equation for whether respondents work overtime (Appendix C). The positive-hours curvature is

therefore suggestive rather than uniformly robust. Figure 3 displays the probability and conditional-hours components separately, avoiding conflation of the two margins.

Table 6. Labour-supply robustness: ESS Round 9.

	Hours Main	**Hours Trimmed**	**Hours Weighted**	**Overtime > 0 Main**	**Overtime > 0 Weighted**
Work autonomy	−0.2277 *	−0.1290	−0.1325	−0.4936 *	−0.3911
	(0.1294)	(0.1122)	(0.1910)	(0.2412)	(0.2324)
Work autonomy squared	0.0214	0.0144	0.0125	0.0487 **	0.0390 *
	(0.0131)	(0.0117)	(0.0237)	(0.0192)	(0.0196)
Policy influence squared	0.0503 ***	0.0406 ***	0.0674 ***	0.0768 ***	0.0833 ***
	(0.0158)	(0.0117)	(0.0186)	(0.0140)	(0.0144)
Male	5.014 ***	4.765 ***	6.488 ***	1.610 ***	1.928 ***
	(0.5602)	(0.5466)	(0.7167)	(0.2748)	(0.2366)
Full controls/country FE	Yes	Yes	Yes	Yes	Yes
ESS analysis weights	No	No	Yes	No	Yes
Observations	34,015	33,697	34,015	11,676	11,676
R^2	0.09623	0.11737	0.14842	0.07001	0.07770
Within R^2	0.07329	0.09199	0.12528	0.03586	0.04886

Notes: The trimmed-hours model removes observations above the 99th percentile. Overtime columns use only positive-overtime respondents and omit contracted hours as a regressor. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

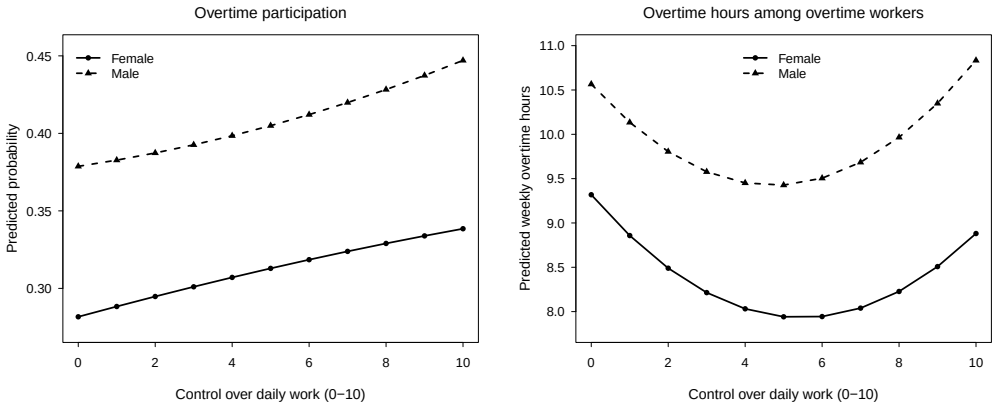

Figure 3. Fitted overtime components by autonomy and gender, ESS Round 9. Left: probability of positive overtime, averaged within each gender in the overtime sample. Right: fitted hours, averaged within each gender among positive-overtime respondents. These are separate component averages, not a prediction of unconditional mean overtime. No confidence bands are shown.

5.3. Supplementary Replication Using ESS Round 3

We repeat the analysis using ESS Round 3 as a supplementary cross-round check, retaining Round 9 as the main analysis. The fertility sample contains 26,421 respondents in 20 countries. The linear and quadratic autonomy estimates have the same signs as in Round 9 (−0.0123 and 0.000929), but their p-values are 0.063 and 0.10003; neither reaches the 5% level. The weighted estimates are also imprecise ($p = 0.186$ and 0.195). The age-25–49 model yields $p = 0.041$ and 0.090. Thus, Round 3 provides directional consistency rather than a robust confirmation of the fertility profile. Total-hours results remain sensitive to weighting, while the positive-overtime component retains negative linear and positive quadratic coefficients in both unweighted and weighted models. Appendix D reports the detailed results, gender and regime specifications, and sample differences. Because country coverage and income measurement differ, differences in significance across rounds do not establish changes in the underlying association over time.

6. Discussion

The Round 9 results point to a more nuanced relationship between work organisation and fertility than a simple "more flexibility, more fertility" interpretation would imply. Its preferred fitted fertility profile is U-shaped, with the same coefficient signs and significance under OLS, negative binomial estimation and ESS analysis weights. The age-restricted estimates are less precise, however, and the supplementary Round 3 analysis does not provide equally strong evidence. The welfare-regime results further show why the pooled turning point should not be applied uniformly to all participating countries. One possible interpretation draws on the distinction between work resources and work demands [4]. Control over daily work may provide a coordination resource, while autonomous jobs can also involve career commitments and demands that extend into family time. Work–family border theory helps explain why greater discretion and more permeable boundaries may have different implications for family life [3]. Recent evidence on working from home and family-policy contexts likewise cautions against assuming that flexibility uniformly reduces conflict [23,29]. These perspectives make a nonlinear association plausible, but do not identify the channels generating our fitted curve. The ESS measure does not directly record schedule control, care burdens or boundary management, and occupational selection remains an alternative explanation.

The revised gender specification allows both slope and curvature to differ. The ESS does not observe the intra-household allocation of childcare, gender-specific wage opportunities within couples, or work histories around each birth. These limitations prevent a direct interpretation of the profiles as evidence for a specific gender mechanism. The predicted number of children is lowest when autonomy is approximately 5.28 on the 0–10 scale. In the gender model, the corresponding autonomy scores are 7.92 for women and 3.27 for men (Table A2). The closest substantive comparison is Osiewalska and Matysiak [5], whose evidence varies across autonomy types, education and first versus second births. Their findings support interpreting autonomy in relation to workers' family stage and employment setting, rather than as uniformly family-friendly. They do not establish a common continuous U-shaped curve: their autonomy classes and birth-transition outcomes are not directly comparable to our 0–10 measure and cumulative child count. No equivalent numeric threshold is provided by that study for benchmarking our minima. The comparison is therefore qualitative, and the differences between our gender-specific minima should not be presented as statistically established gender gaps.

The labour-supply evidence is informative partly because it is not uniformly significant. Total weekly working hours do not display a comparably robust autonomy association. The two-part model distinguishes whether respondents work overtime from its intensity conditional on positive overtime: the latter shows more evidence of curvature, although Round 9 significance weakens under weighting. Individual gender interactions are imprecise in both components. The low within R^2 in the hours models and modest PPML fit statistics also caution against interpreting the fitted profiles as reliable individual-level forecasts or as evidence that the included covariates capture most determinants of fertility and working time. A related interpretation of the overtime findings is that discretion over daily work need not translate into shorter or more protected working time. The work–family conflict literature suggests that flexibility can coexist with intrusion into family life [23,29]. Our separate overtime components are useful because an association with hours among those working overtime need not imply a similar association with overtime participation. However, neither component measures work–family conflict directly, and these estimates do not establish that overtime mediates the fertility association.

Institutional differences provide another reason for caution. Chung [28] examines unequal access to flexible arrangements, while Chung [29] links national family policies

to differences in the flexibility–conflict relationship. Our welfare-regime profiles can be read alongside this contextual evidence, but regime labels do not isolate specific policy instruments. Likewise, the regional and cross-country fertility variation documented by Matysiak et al. [10] and Luppi et al. [21] concerns economic and pandemic contexts rather than autonomy turning points. These references motivate allowing heterogeneity; they do not validate the particular regime curves estimated here.

The recent telework literature also clarifies the limits of extrapolation. Evidence on home-based work and birth transitions [20], and on pandemic-era fertility intentions [22], distinguishes outcomes and contexts absent from the ESS specification. Our 2018–2019 main sample predates the pandemic, and daily-work control is not a measure of telework availability, actual home-working frequency or hybrid scheduling. The results therefore contribute pre-pandemic evidence to the contemporary flexibility debate, while the implications of post-pandemic arrangements require separate data.

Several limitations deserve emphasis. First, the ESS is cross-sectional. Current employment characteristics are measured at the survey date, whereas fertility is cumulative. This temporal mismatch is particularly relevant for older respondents, whose current work autonomy may differ substantially from conditions prevailing when fertility decisions were made. The age-25–49 sensitivity check preserves the direction of the estimated autonomy coefficients but reduces their precision, underscoring this limitation. Second, work autonomy may be endogenous to occupational choice, family status, or unobserved preferences. Individuals may select into jobs partly in response to family plans, making reverse causality plausible. Third, country fixed effects absorb average cross-country differences but do not identify within-country causal variation. Finally, subjective measures of autonomy capture perceived control rather than a detailed institutional measure of flexible scheduling. The Round 3 analysis provides one additional temporal comparison, but its weaker fertility precision means that the main Round 9 pattern is not uniformly replicated. Differences between two rounds may reflect sample composition, country coverage, variable measurement, or sampling uncertainty; they cannot by themselves be interpreted as evidence that the relationship changed over time. The welfare-regime estimates also rely on a finite number of countries within each group, and group-level fitted profiles combine institutional grouping with differences in the observed composition of respondents. These analyses are consequently descriptive and should not be treated as estimates of the causal effects of national policy regimes. These limitations imply that policy conclusions should be modest. The estimates do not establish that increasing autonomy alone would raise fertility, or that a specific autonomy score is a policy target. The employment-instability literature shows that autonomy is only one aspect of the employment conditions relevant to fertility [19]. Evidence on family policies and work–family conflict also suggests considering workplace discretion together with support for care [29]. This is a literature-informed implication for future research, rather than a policy effect estimated here.

7. Conclusions

This paper examines the relationship between work autonomy, fertility, and labour-supply outcomes using Round 9 of the European Social Survey, with Round 3 as a supplementary replication. The analysis departs from a simple linear view by allowing the association between control over daily work and fertility to vary across the autonomy distribution, gender, and welfare-regime grouping.

The preferred Poisson estimates show a significant nonlinear association between work autonomy and the number of biological children, with a U-shaped fitted profile and a turning point near the middle of the observed autonomy scale. The result is robust to OLS and ESS analysis weights. Restricting the sample to ages 25–49 preserves the signs

of the autonomy terms but reduces statistical precision, highlighting the limitations of relating current work characteristics to cumulative fertility histories. The sensitivity checks support a limited conclusion: the Round 9 association is not dependent on one estimator or the survey weights, but its precision falls in the age-restricted sample, and the Round 3 estimates do not provide equally strong confirmation. This pattern is consistent with an association that merits further study, not with a stable causal effect established across populations and periods.

The main survey also shows that the autonomy–fertility relationship differs between women and men. The welfare-regime specification also cautions against applying the pooled turning point to every country. In the labour analysis, total-hours associations are weak, while the two-part overtime model provides more evidence of nonlinearity in positive overtime hours than in overtime participation. The Round 3 fertility estimates retain the same signs but are less precise, particularly after weighting, so cross-round confirmation remains limited.

The findings should be interpreted as conditional associations rather than causal effects. They show the value of examining nonlinear profiles while assessing their sensitivity to specification, sample definition, and survey round. Future work using longitudinal data or exogenous changes in workplace arrangements would be particularly valuable for distinguishing scheduling flexibility from career attachment and for identifying how these mechanisms affect women and men over the life cycle.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/soc16100362/s1, File S1: R code for cleaning and analysing ESS Rounds 9 and 3.

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Institutional Review Board Statement: Ethical review and approval were not required for this secondary analysis because the study uses publicly available, de-identified survey data and the author had no direct contact with participants and no access to identifiable participant information.

Informed Consent Statement: The present study did not recruit participants or collect new human-subject data. No additional informed consent was required for this secondary analysis of the de-identified public-use survey data.

Data Availability Statement: The data analysed in this study are openly available from the European Social Survey European Research Infrastructure Consortium (ESS ERIC), Round 9 integrated file, edition 3.2, at https://doi.org/10.21338/ESS9E03_2, and the Round 3 integrated file is available at https://doi.org/10.21338/NSD-ESS3-2006.

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Conflicts of Interest: The author declares no conflicts of interest.

Appendix A. Additional Descriptive Information

Table A1 reports the distribution of the cleaned fertility outcome. Childless respondents are explicitly coded as zero using the ESS fertility-routing question rather than being treated as missing.

Table A1. Distribution of number of biological children.

Number of Children	N	Percent
0	9308	25.88
1	7069	19.66
2	12,635	35.14
3	4828	13.43
4	1420	3.95
5	433	1.20
6	159	0.44
7	53	0.15
8	26	0.07
9	12	0.03
10	18	0.05

Appendix B. Turning Points of the Estimated Autonomy Profiles

Table A2. Estimated turning points: ESS Round 9.

Model	Turning Point (Autonomy Score)
Fertility main	5.28
Fertility age 25–49	5.85
Weekly hours main	5.32
Overtime hours, positive sample	5.07
Fertility—female	7.92
Fertility—male	3.27
Overtime hours, positive sample—female	5.47
Overtime hours, positive sample—male	4.74

Turning points are calculated from the linear and quadratic coefficients, incorporating both gender interactions where relevant. The overtime entries refer to the positive-hours component, not to the probability of overtime or its unconditional mean. All listed Round 9 point estimates fall within 0–10. They are descriptive: no confidence intervals or formal interval-wide U-shape tests are reported, and an interior point estimate is not sufficient evidence for a precisely located threshold.

Appendix C. Additional Round 9 Specifications

Table A3. Overtime participation: ESS Round 9.

	Logit	Weighted Logit	Gender Model
Work autonomy	0.0271	0.0136	0.0361
	(0.0261)	(0.0276)	(0.0337)
Work autonomy squared	0.0003	0.0013	−0.0007
	(0.0023)	(0.0026)	(0.0031)
Male	0.3694 ***	0.3538 ***	0.3820 ***
	(0.0306)	(0.0278)	(0.0615)
Work autonomy × Male	–	–	−0.0189
	–	–	(0.0283)
Autonomy squared × Male	–	–	0.0021
	–	–	(0.0027)
Observations	31,884	31,884	31,884
Log-likelihood	−19,106.0	−14,965.7	−19,105.7

Notes: All columns include country fixed effects and the labour-model controls. Contracted hours are excluded from the regressors. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A4. Fertility with additional household-composition controls: ESS Round 9.

	Baseline	Household Controls
Work autonomy	−0.0187 ***	−0.0200 ***
	(0.0052)	(0.0054)
Work autonomy squared	0.0018 ***	0.0018 ***
	(0.0004)	(0.0005)
Partner in household	–	0.3608 ***
	–	(0.0244)
Other relatives in household	–	−0.1726 ***
	–	(0.0319)
Observations	35,961	35,961
Pseudo R^2	0.09423	0.10966

Notes: Both models include the baseline fertility controls and country fixed effects. Partner in household equals one when any listed household member is coded as the respondent's partner; other relatives count relationship codes 3–5. These are current composition controls and cannot reconstruct circumstances at past births. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Appendix D. Supplementary ESS Round 3 Replication

The Round 3 analysis follows the same outcome construction and model families as the Round 9 analysis. Household income is measured by `hinctnt`, with 12 income bands, rather than the 10 income deciles in Round 9; it is retained as a numeric ordinal control. Consequently, its scale should not be equated with the Round 9 income measure. The analysis weight is constructed as `pspwght` × `pweight`. These differences and changing country coverage limit direct cross-round comparisons.

The fertility, total-hours and overtime samples contain 26,421, 24,921 and 24,025 respondents, respectively, each covering 20 countries. There are 9552 positive-overtime observations (39.8%). The fertility sample includes 7024 childless respondents (26.6%). The cleaned core file spans ages 15–97; the restricted fertility sample contains 12,306 respondents aged 25–49. The core sample is complete-case on the specified covariates; outcomes have separate missing-data exclusions. The observed biological-child count reaches 31, with 23 observations above 10. These values are retained in the present replication and no extreme-count sensitivity analysis is claimed.

Table A5. Fertility replication and sensitivity checks: ESS Round 3.

	PPML	Weighted PPML	Ages 25–49	Gender Model
Work autonomy	−0.0123 *	−0.0109	−0.0246 **	−0.0106
	(0.0066)	(0.0082)	(0.0121)	(0.0077)
Work autonomy squared	0.0009	0.0014	0.0016 *	0.0002
	(0.0006)	(0.0010)	(0.0010)	(0.0007)
Male	−0.0871 ***	−0.0528 ***	−0.1742 ***	−0.1576 ***
	(0.0179)	(0.0139)	(0.0221)	(0.0376)
Work autonomy × Male	–	–	–	−0.0003
	–	–	–	(0.0091)
Autonomy squared × Male	–	–	–	0.0014 *
	–	–	–	(0.0008)
Observations	26,421	26,421	12,306	26,421
Pseudo R^2	0.10267	0.07755	0.09192	0.10298
Poisson deviance	28,215.0	29,710.1	12,798.7	28,188.1

Notes: All specifications include country fixed effects and the outcome-specific controls. The age-restricted column uses PPML. Income is an ESS Round 3 income band, not an income decile. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

In the main fertility model, the fitted number of children is lowest at an autonomy score of 6.64. The gender-model turning points are 24.86 for women (outside the autonomy scale) and 3.36 for men. The linear gender interaction is imprecise ($p = 0.976$), and the quadratic interaction is only weakly estimated. An OLS check also gives negative linear and positive quadratic autonomy terms ($p = 0.083$ and $p = 0.134$); the negative binomial estimates are close to PPML ($p = 0.063$ and approximately 0.100). These results do not establish a robust cross-round replication of the fertility profile or of gender differences.

Table A6. Working-time replication and sensitivity checks: ESS Round 3.

	Hours Main	Hours Trimmed	Hours Weighted	Overtime > 0 Main	Overtime > 0 Weighted
Work autonomy	−0.1743	−0.1522	−0.3170 **	−0.4567 ***	−0.3179 ***
	(0.1511)	(0.1493)	(0.1402)	(0.1414)	(0.0753)
Work autonomy squared	0.0194	0.0166	0.0367 **	0.0523 ***	0.0357 ***
	(0.0159)	(0.0154)	(0.0157)	(0.0133)	(0.0099)
Observations	24,921	24,798	24,921	9552	9552
R^2	0.15848	0.15881	0.14655	0.08959	0.07530
Within R^2	0.13209	0.13228	0.12257	0.07321	0.05786

Notes: All columns use OLS, the labour-model controls and country fixed effects. The overtime columns use only positive-overtime observations and exclude contracted hours. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A7. Overtime participation and gender interactions: ESS Round 3.

	Participation Logit	Participation Weighted Logit	Participation Gender Logit	Positive Hours Gender OLS
Work autonomy	0.0672 ***	0.0485	0.0668 **	−0.4172 ***
	(0.0253)	(0.0302)	(0.0304)	(0.1261)
Work autonomy squared	−0.0018	0.0002	−0.0016	0.0432 ***
	(0.0022)	(0.0019)	(0.0031)	(0.0113)
Male	0.5634 ***	0.5598 ***	0.5852 ***	1.642 **
	(0.0328)	(0.0347)	(0.0716)	(0.6720)
Work autonomy × Male	–	–	0.0007	−0.0677
	–	–	(0.0341)	(0.2242)
Autonomy squared × Male	–	–	−0.0005	0.0165
	–	–	(0.0035)	(0.0192)
Observations	24,025	24,025	24,025	9552
Within R^2	–	–	–	0.07364

Notes: All specifications include country fixed effects and the labour-model controls. The last column describes the positive-hours component. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A8. Welfare-regime fertility interactions: ESS Round 3.

	PPML
Work autonomy	−0.0040
	(0.0096)
Work autonomy squared	0.0004
	(0.0007)
A × Nordic	0.0224
	(0.0170)
A × Southern	−0.0111
	(0.0200)
A × Central/Eastern	−0.0025
	(0.0149)
A × Anglo-Saxon	−0.0607 **
	(0.0300)

Table A8. *Cont.*

	PPML
$A^2 \times$ Nordic	−0.0015
	(0.0013)
$A^2 \times$ Southern	0.0003
	(0.0014)
$A^2 \times$ Central/Eastern	−0.0001
	(0.0015)
$A^2 \times$ Anglo-Saxon	0.0039 *
	(0.0020)
Observations	24,667
Countries	19
Pseudo R^2	0.10476
Poisson deviance	26,899.5

Notes: Continental is the reference group. Russia (1,754 fertility observations) is omitted only from this regime analysis because it is outside the adopted grouping; it remains in the other Round 3 models. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

The autonomy scores at the group-specific fitted extrema are 5.05 for Continental (minimum), 8.08 for Nordic (maximum), 10.20 for Southern (outside 0–10), 12.88 for Central/Eastern (outside 0–10), and 7.62 for Anglo-Saxon (minimum). The groups contain six, four, three, four and two countries, respectively. Country composition is not identical across rounds. These point estimates neither establish significant cross-round changes nor support a common turning point for all regimes.

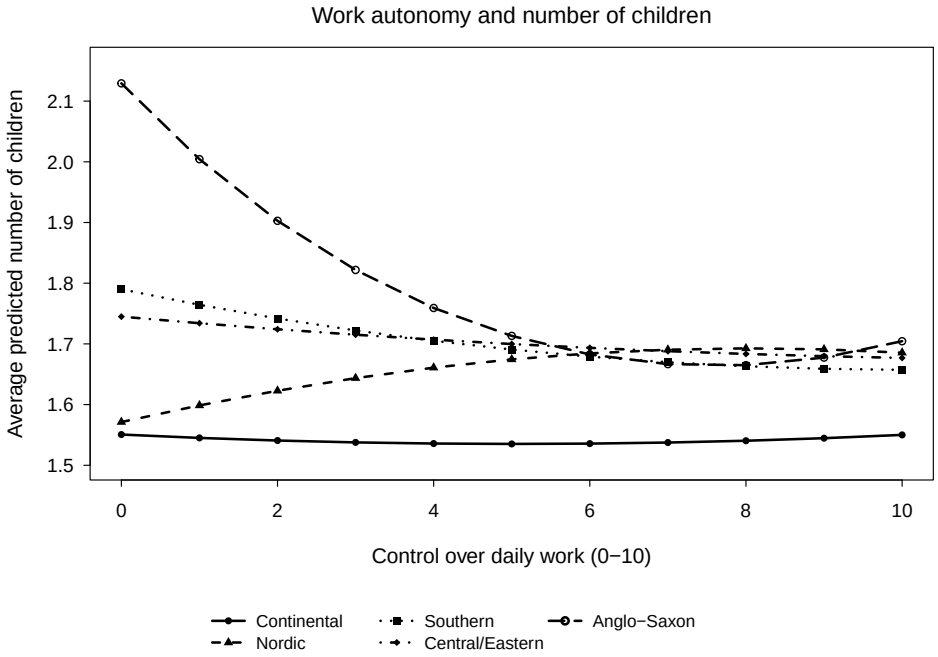

Figure A1. Supplementary fitted fertility profiles by welfare-regime grouping, ESS Round 3. Predictions average within each regime; curves are descriptive point estimates without confidence bands.

Table A9. Household-composition sensitivity check: ESS Round 3.

	Baseline	Household Controls
Work autonomy	−0.0123 *	−0.0110
	(0.0066)	(0.0073)
Work autonomy squared	0.0009	0.0008
	(0.0006)	(0.0006)

Table A9. *Cont.*

	Baseline	Household Controls
Partner in household	–	0.3956 ***
	–	(0.0221)
Other relatives in household	–	−0.1990 ***
	–	(0.0385)
Observations	26,421	26,421
Pseudo R^2	0.10267	0.12132

Notes: The specifications use the same baseline controls and country fixed effects as the main fertility analysis. Household variables are defined as in Table A4. Standard errors clustered by country are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Note

[1] Data cleaning, estimation and the original figures were produced using the R analysis scripts. The separate overtime-component figure is plotted from their exported predictions.

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