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Research Article

An Analysis of the Relationship between the Number of Children and Employment Choices among Married Women

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Abstract

This study examines the impact of the number of children and external factors on married women's employment choices using probit models and Instrumental Variable (IV) regression with data from the International Social Survey Programme: Family and Changing Gender Roles IV. The analysis includes both an "employment choice" model and a "working hours" model to assess how fertility influences labour market outcomes. To address endogeneity, the study employs an IV measuring perceived restrictions on parental freedom, justified by the Second Demographic Transition Theory. While this variable reflects fertility preferences, it does not directly influence employment beyond its effect on child count, ensuring exogeneity. First-stage tests confirm relevance, with F-statistics exceeding the empirical threshold. Results show that having more children significantly increases women's self-employment rates while reducing their likelihood of being employed by companies. IV regression further reveals that the effect of childbearing on employment varies by education level and husband's employment status. Additionally, when the number of children increases, husbands are more likely to seek employment. These findings contribute to the literature on fertility and women's employment, highlighting the need for family-friendly policies and cultural shifts to support women's workforce participation while balancing family responsibilities.

Introduction

Research background

The global fertility rate has been declining for decades, leading to labour shortages and an ageing population [1]. To address this, some countries have implemented policies, such as South Korea's maternity subsidy and China's three-child policy. However, these policies have had limited success in reversing fertility declines [2,3].

Several factors contribute to this trend. Rising living costs, particularly housing prices, make childrearing increasingly difficult, especially in China. At the same time, many women prioritise career development and personal fulfilment, leading to delayed or reduced childbearing [4]. Furthermore, the COVID-19 pandemic has further reinforced this decline, as economic and health concerns have made couples hesitant to have children [5].

Childbearing also affects women's participation in the labour market. Studies show that having children often reduces women's working hours and career opportunities, reinforcing gender inequality [6]. In addition, higher birth rates are linked to lower wages and limited career progression for women [7]. Although support systems such as public preschool education and extended family assistance help working mothers, they do not fully address the gender norms that place most childcare responsibilities on women [4,8].

The employment types also influence childbearing. For example, self-employment offers a potential solution by providing more flexibility. Unlike paid employment, self-employment allows women to adjust their work schedules based on family needs [9]. Research suggests that self-employed women experience better work-life balance and higher happiness levels compared to employed women [10]. Additionally, self-employment can reduce conflicts between family and career, making it a more viable option for working mothers [11]. Studies also show that self-employed women face lower opportunity costs of childbearing compared to those in traditional employment [12].

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However, self-employment also has challenges, including financial risks and lower social protection. Policymakers should consider these factors when designing measures to support women in the labour market. By offering better flexibility and security, policies can help women balance career goals with family responsibilities more effectively.

Aims

This study aims to examine whether the number of children influences married women's employment choices using secondary data from the International Social Survey Programme: Family and Changing Gender Roles IV (ISSP 2012). Additionally, it explores the impact of external factors on these employment decisions and considers policy interventions to support work-family balance, particularly for mothers. Beyond policy measures, the study highlights the role of gender norms and cultural expectations in shaping workplace inequality. Promoting shared household responsibilities and increasing women's representation in leadership can contribute to greater gender equality at home and work.

Research questions

This study examines the short-term impact of the number of children on married women's employment choices in the labour market. It addresses two key research questions:

1. How does the total number of children in a household influence married women's employment decisions?

2. How does the number of children affect women's working hours? Additionally, the study considers external factors such as age, health, education level, and partner's employment type, which may also influence women's employment choices.

Literature review

Women's employment transitions around childbearing

Women's employment transitions around childbearing are complex and multifaceted phenomena that have significant implications for gender equality and women's economic empowerment. In many societies, having a child can trigger significant disruption in women's employment trajectories, often resulting in reduced work hours or temporary leave to care for the child, which can have long-term implications for women's career development, earnings potential, and financial security. It has been found that mothers' participation rates in the workforce were significantly affected by the age of their youngest child, which is due to the decline of their participation rates following the birth of a preschooler [13]. However, the number of children was less important. Furthermore, parents' aspirations for their children's success in school often lead to mothers becoming more directly involved in the raising of their own children, thereby increasing the opportunity costs of work for mothers [14].

Research has shown that women who take time out of the labor force to care for children are more likely to experience lower earnings and reduced career advancement over their lifetimes, compared to women who do not have children or those who have access to adequate support systems that enable them to balance work and family responsibilities [15]. In addition, it was found that women who were highly educated and by extension paid well exhibited the highest continuity in employment between childbirth [13]. This is often referred to as the "motherhood penalty", which is used to describe the negative effects that motherhood can have on women's employment opportunities and earnings. Research has shown that women with children are often seen as less committed to their careers than men or women without children and may be passed over for promotions or other career opportunities as a result [16]. This can have significant implications for women's economic well-being and their ability to achieve financial independence.

Moreover, the impact of women's employment transitions around childbearing is not limited to individual women but can also have broader societal implications. For example, the gender wage gap can be exacerbated by women's employment transitions around childbearing, as women who take time out of the labor force to care for children often face barriers to re-entering the workforce and may be forced to accept lower-paying jobs or reduced hours [17]. This can perpetuate gender inequality and contribute to broader societal issues such as income inequality and poverty.

Therefore, developing policies and interventions to support working mothers and reduce the negative impact of women's employment transitions around childbearing is crucial for promoting gender equality and women's economic empowerment. This can include measures such as paid parental leave, affordable childcare, flexible work arrangements, and policies that encourage employers to provide support for working parents. Furthermore, addressing broader societal issues such as gender stereotypes and discrimination can also play a crucial role in reducing the negative impact of women's employment transitions around childbearing and promoting gender equality in the labor market.

The effects of marital status and number of children on wages

The effects of marital status and children on wages refer to the impact that family formation and childbearing have on individuals' earnings and employment outcomes. Research has shown that marital status and parenthood can have significant effects on men's and women's wages, with differences in earnings observed between married and unmarried individuals, as well as between parents and non-parents. The findings of the study suggest that marriage has a positive effect on wages for men, but not for women [18]. In fact, married women with children actually earn less than unmarried women or married women without children. This finding is consistent with the concept of the "motherhood penalty" - the idea that women with children face discrimination and lower earnings as a result of their caregiving responsibilities.

Married individuals, particularly men, tend to earn higher wages than unmarried individuals, a phenomenon known as

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the "marriage premium." This is due in part to the fact that marriage is associated with greater stability, a stronger work ethic, and increased social support, which can all contribute to better employment outcomes [19]. However, this effect is not universal, and in some cases, unmarried individuals may earn more than their married counterparts.

The effects of parenthood on wages are more complex and often depend on gender and family structure. The phenomenon that women with children tend to earn less than their childless counterparts, can be attributed to a variety of factors, including the time and resources required to care for children, the perceived lower commitment to work, and the impact of gender roles and societal expectations [20]. On the other hand, men with children tend to earn more than their childless counterparts, a phenomenon known as the "fatherhood premium" [21]. This may be due in part to the perception that fathers are more committed to their jobs and the potential for increased job stability that comes with having a family.

Theoretical framework

Second Demographic Transition (SDT) theory

Since the post-industrial era, there has been a continuous decline in the global fertility rate. Several theoretical explanations exist for this phenomenon, including globalisation theory, second demographic transition theory, and gender equity theory. Among these theories, the Second Demographic Transition (SDT) theory, which is defined as "Sustained sub-replacement fertility, a multitude of living arrangements other than marriage, the disconnection between marriage and procreation, and no stationary population" [22] is recognised as one of the main theoretical explanations for this global trend as discussed earlier. Specifically, for studies of contemporary European and Western world family and fertility change, the SDT theory has become a theoretical framework and structure for demographic research [23].

At the macro level, the SDT theory provides a view of how societies evolve over time, emphasising the role of changing perceptions in bringing about a range of demographic and household behaviours. At the individual level, the SDT framework considers an individual's value orientation as the main determinant of an individual's reproductive and family behaviour [24]. Lesthaeghe [22] argues that once basic needs, such as survival and security, are met, there is a shift toward higher-order needs for self-actualization and personal autonomy to motivate behavior, which could explain the phenomenon of low fertility. Meanwhile, Van de Kaa [25] believes that the main driver of the population decline is an ideational change—a dramatic shift in norms and attitudes from altruistic to individualistic. Both of them believe that the SDT is a fundamental framework for understanding the shifting motivations and values that lead to the phenomena of low fertility and population decline and extended its application to the field of demography.

In addition to the aforementioned sociocultural changes, the SDT theory recognizes the significance of economic factors in shaping women's employment choices. The escalating cost of living, coupled with the increased participation of women in higher education and evolving labor market dynamics, have necessitated dual incomes in many households. This economic pressure serves as a motivating factor ultimately contributing to a decline in fertility rates.

Furthermore, the SDT theory acknowledges the role of education and women's empowerment in shaping their employment choices. Improved access to education and higher levels of female empowerment have engendered greater economic independence and heightened career aspirations among women. As women gain increased education and empowerment, they are more likely to prioritize their professional development and pursue employment opportunities irrespective of the number of children they have.

Gender equity theory

In contrast to the SDT theory, gender equity theory emphasises structural changes, including women's increased participation in the public sphere and the incompatibility of women's domestic and public roles, as families and institutions struggle to adjust to women's new roles in modern times [26]. Although the SDT largely underestimates the role of gender change, the impact of gender equality on fertility is not negligible: in Western countries, gender equality has rapidly increased in institutions oriented toward individuals, such as education and the labour market system, which has largely made contributions to the shift from high fertility to low fertility [27].

From a gender equality perspective, Goldscheider [28] explains the persistently low fertility rate using the following arguments: firstly, the rapid increase or revolution of individual-oriented institutions, without a supplementary and sustained transformation of family institutions, has led to very low fertility rates; secondly, due to responsibilities in the family, gender asymmetries in areas such as equal sharing of economic tasks but unequal sharing of domestic tasks lead to increased divorce rates and decreased marriage rates, which in turn lead to lower fertility rates.

Gender equality theory provides a theoretical lens through which we can analyze the relationship between the number of children and employment choices among married women. This theory highlights the influence of gender norms and societal expectations in shaping individuals' decisions and opportunities. In many societies, traditional gender roles assign women the primary responsibility for child-rearing, while men are expected to focus on paid employment. Such gendered expectations can influence women's employment choices after having children.

The expectation that women should primarily focus on child-rearing can create tension between women's desire for career advancement and their familial responsibilities. Gender equality theory suggests that as societies strive for greater gender equality, women are increasingly challenging these traditional gender roles and seeking more balanced approaches

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to work and family. This shift in societal attitudes towards gender equality has created a space for married women to consider employment choices even after having children.

In conclusion, gender equality theory provides valuable insights into the relationship between the number of children and employment choices among married women. It underscores the influence of gender norms, societal expectations, and the pursuit of gender equality in shaping women's decisions regarding employment after having children.

Comparing the SDT theory and gender equity theory

Gender equity theory and the Second Demographic Transition (SDT) theory have many differences. On the one hand, their cores are different. While the SDT theory emphasises that social values shift from altruism to a higher-order value orientation of self-actualisation and individualism, gender equity theory focuses on the shift of the gender system. According to the gender equity theory, women's increasing self-realisation and individualism have a greater impact on family changes, which can also be understood as the conflict between women's traditional roles and contemporary values. On the other hand, while proponents of the SDT believe that the low-fertility transition stage is irreversible and a long-term sustainable population structure change, the gender equity theory posits that some countries can recover from very low fertility after experiencing a stage in which their fertility is even lower than replacement fertility rates. This shift is interpreted as "gender equality catch-up" [29]. As opponents of the SDT, Goldscheider, et al. [28] argue that these changes in gender roles are inevitable and will result in a more equitable division of parenting and housework. These changes, in turn, will increase fertility and union stability. For example, countries with high post-materialism and secular values, such as Sweden, have begun to experience a recovery from a low fertility rate.

Method

Data

The secondary data utilized in this study is derived from the International Social Survey Programme (ISSP), which was obtained from the GESIS platform. The ISSP represents a comprehensive and enduring crossnational research aimed at conducting annual surveys on a diverse range of eleven pivotal social science themes, including Citizenship, Environment, Family and Changing Gender Roles, Health and Health Care, Leisure Time & Sports, National Identity, Religion, Role of Government, Social Networks, Social Inequality, Work Orientation. For this study, the specific dataset selected pertains to the critical subject of "Family and Changing Gender Roles". This study aims to investigate how the number of children affects the employment decisions made by married women. The data collected on this particular theme serves the purpose of identifying pertinent variables that impact both family dynamics and the vocational choices of women. To address potential issues of endogeneity between the dependent and independent variables, this study will concentrate its data collection efforts on a specific subgroup of interest: married women with at least one child.

The reason not to use all married women is that it also covers the three categories, including newly married individuals yet to experience parenthood; parents who have been married for an extended period but choose not to have children; as well and women who are facing fertility challenges due to medical reasons. These three groups are not the focus of the research. This is because ascertaining the decision-making process regarding having the first baby within these groups requires careful consideration of numerous work-related variables. These work-related variables include occupation, income, and working hours, which are also indicators to measure the dependent variables, which may exert an influence on the independent variable, the number of children. The study will exclude samples falling within these categories to address potential confounding effects. Moreover, considering the typical childbearing age range for women, the age criterion for the sample selection will predominantly range from 16 to 55 years. Therefore, married women who have lost labor capacity, and those without children will be excluded from the study analysis.

Furthermore, the data utilized in this study was gathered in 2012 from a diverse cross-sectional sample spanning 41 countries. The dataset was acquired through a comprehensive approach involving interviews and self-administered questionnaires, featuring both open-ended and closed-ended questions. This methodological design aimed to ensure extensive coverage of distinct populations across the various nations under investigation. Notably, the interview methodologies varied across countries, with some employing face-to-face interviews, including the Computer-Assisted Personal Interview (CAPI) technique and standardized questionnaires. Additionally, certain countries utilized traditional pen-and-paper surveys or adopted web-based surveys. The study's research cohort comprises married women between the ages of 16 and 55 years, who have at least one child, culminating in an analytical sample size of 6006 individuals drawn from diverse regions across the global landscape.

Definition of key variables

Employment choice: Employment choice is a binary variable distinguishing between wage employment (coded as 0) and self-employment (coded as 1). Wage employment includes individuals working as employees for a company, while self-employment encompasses those who own a business, work independently, or contribute to a family business.

Working hours: Working hours is a continuous variable, representing the total weekly hours married women work. It ranges from 1 to 96 hours per week, excluding respondents with missing or invalid data. This measure helps assess whether an increase in the number of children leads to a reduction in weekly working hours.

Additionally, the study distinguishes between part-time and full-time work based on weekly hours. While no strict

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definition is imposed, lower working hours indicate part-time employment, which is often associated with self-employment due to greater flexibility. This distinction is crucial in understanding whether self-employed women work fewer hours than those in wage employment.

The number of children

The explanatory variable in this study pertains to the number of children. In the original dataset, the count of children is delineated based on their age into two distinct categories: the count of infants (aged below school-going age) denoted by variable HHTODD, and the count of adolescents denoted by variable HHCHILDR. Samples within this study that lack offspring are purposefully excluded, specifically, those instances wherein married women exhibit neither infants nor adolescents in their households.

The cumulative count of children is computed as the aggregate of infant and adolescent counts. In Stata, this summation is operationally realised through the command: "gen Nchild = HHTODD + HHCHILDR", thereby engendering a novel variable termed "Nchild," encapsulating the composite count of children in a family.

Control variables

The study aimed to improve the accuracy of the results and reduce the influence of endogeneity and, therefore, controlled for variables. For instance, variables controlled for include health status (V58), level of education (DEGREE), husband's employment type (SPEMPREL), husband's employment status (SPWORK), and whether children hinder parents' freedom (V23), how you are satisfied to your job (V56).

Health status refers to the surveyed individual's perception of their own health status, categorized in the original data as follows: (1 represents excellent, 2 represents very good, 3 represents good, 4 represents fair, 5 represents poor, 8 represents not applicable, and 9 represents no answer).

Educational attainment pertains to the highest level of education attained by the surveyed individual and is classified into seven categories: 0 represents no formal education, 1 represents primary school education, 2 represents lower secondary education (completed lower secondary school without access to higher education: compulsory education), 3 represents upper secondary education (courses that allow access to higher education), 4 represents higher education, non-higher education (other) oriented towards the labor market or technical formation of upper secondary courses, 5 represents lower-level higher education, stage one (also technical school at the higher education level), 6 represents higher-level higher education (master's, doctorate), and 9 represents no answer.

Husband's employment type refers to the type of employment of the surveyed individual's partner. It is categorized as follows: 1 represents employed as an employee, 2 represents self-employed without employees, 3 represents self-employed with employees, 4 represents working for one's own family business, 8 represents don't know, and 9 represents no answer.

Husband's employment status refers to the employment status of the surveyed individual's partner and is classified as follows: 1 represents currently engaged in paid work, 2 represents currently not engaged in paid work but has worked for pay in the past, 3 represents never engaged in paid work, 8 represents don't know, and 9 represents no answer.

The following criteria measure job satisfaction: 0 represents not applicable, not employed, 1 represents completely satisfied, 2 represents very satisfied, 3 represents somewhat satisfied, 4 represents neither satisfied nor dissatisfied, 5 represents somewhat dissatisfied, 6 represents very dissatisfied, 7 represents completely dissatisfied, 8 represents not applicable, and 9 represents no answer.

Empirical models

A model-based approach will be employed to estimate two regression models to address the research question. Model 1: Examining the Impact of the Number of Children on Women's Employment Choice. In Model 1, the response variable will be a binary indicator distinguishing between women engaged in self-employment and those employed by others. Self-employment will be determined based on whether the primary occupation involves providing services to others for economic gain, coded as 1. Being employed by others will be coded as 0. Due to the binary nature of the dependent variable, which represents the employment choice of married women, the model is specified as follows:

$$Y(self\_empi = j) = \beta 0 + \beta 1 Nchildi + \varphi Xi + \mu i \quad (1)$$

"self_empi" represents the two employment choices, where "j=1" signifies self-employment and "j=0" represents being employed by others. "Nchildi" is the main explanatory variable, representing the number of children. "Xi" includes other control variables, primarily comprising individual characteristics and household features. "μi" is the random error term.

Model 2: Investigating the impact of the Number of Children on Women's Weekly Working Hours.

The primary explanatory variable in this model is the number of children. The primary dependent variable is working hours, representing the total hours worked per week. The weekly frequency of work determines whether the individual is engaged in full-time or part-time employment.

The model is specified as follows:

$$WRKHRS = \beta 0 + \beta 1 NChildi + \varphi Xi + \mu i \quad (2)$$

"WRKHRS" represents the total weekly working hours for each individual. "NChildi" is the number of children as the key independent variable. "Xi" includes control variables encompassing individual characteristics, household features, and regional factors. These variables explain potential confounding factors and provide a comprehensive analysis. "μi" represents the error term.

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Instrument Variable (IV)

The endogeneity in this study primarily stems from two aspects. Firstly, it is due to the omission of variables that simultaneously affect both the number of children and women's employment choices. Multidimensional factors such as education level, work environment, and occupation influence women's employment decisions. While we can control for some of these variables, there will inevitably be omitted variables. However, due to limitations in data and methodology, we cannot control for all influencing variables. The baseline regression results are biased, which will undoubtedly impact the accuracy of the model to a certain extent. Secondly, the association between the number of children and the employment choices of married women might exhibit a bidirectional causal relationship, leading to endogeneity. Family-related factors can influence women's employment; conversely, women's employment might influence family fertility decisions. For instance, if a woman's job requires frequent business trips, she may dedicate significant time to work, potentially suppressing her fertility desires and reducing the number of children. Therefore, relying solely on the Probit model may introduce simultaneity bias, necessitating the identification of appropriate instrumental variables to address endogeneity.

An additional model is included as follows:

$$NChildi = \alpha Zi + \beta Zi + vi \quad (3)$$

where Zi is the instrumental variable, Xi represents other control variables, and vi represents the error term. It is assumed that cov(μi, vi) = 0.

In many studies, researchers commonly choose instruments such as twin births [30,31] or the gender composition of the first two children [32] to serve as instrumental variables for the number of children. However, in the database of this study, there is no available data regarding child gender. Therefore, alternative instrumental variables need to be considered. In this research, an ordinal variable is employed as the instrumental variable, reflecting the extent to which children impede parental freedom. This variable consists of five levels: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree.

Firstly, within the Second Demographic Transition theory framework, Lesthaeghe [22] suggests that once basic needs such as survival and security are met, individuals shift towards higher-order needs of self-fulfillment and personal autonomy, which can prompt behaviors. This can explain the phenomenon of low fertility rates. Concurrently, Van de Kaa [25] posits that the primary driver of population decline is a change in values – a significant shift from altruism to individualism in norms and attitudes. These notions influence some women to perceive childbearing as hindering individual development. Therefore, the agreement or disagreement with the idea that children impede parental freedom might strongly correlate with the number of children women choose to have, reflecting their fertility intentions. Women who do not view children as hindrances to career development and have a stronger affinity for children are likelier to have more children. Hence, the instrumental variable meets the relevance assumption.

On the other hand, when women make employment decisions, they primarily consider factors such as education level, wages, and work environment. The degree of affection for children does not have a direct causal relationship with women's employment choices and has a relatively low correlation. Therefore, the instrumental variable also satisfies the exogeneity assumption. This study tests the validity of the instrumental variable, and the results indicate that the first-stage instrumental variable F-statistics exceeds the empirical critical value of 10 for the correlation test, thus addressing weak instrument concerns.

Therefore, this variable can largely alleviate the endogeneity issue concerning the number of children. This paper will elaborate on the instrumental variable's examination in the empirical section.

Empirical results

Descriptive statistics

Table 1 presents the descriptive statistical characteristics of the main variables, including sample size, mean and standard deviation, and minimum, median, and maximum values. From the table, it can be observed that the sample for this study is centered around the age of 40.

As shown in Table 2, the educational attainment of the sample exhibits a roughly normal distribution, with the majority concentrated in the upper secondary category. Regarding the number of children, most married women in the sample have an average of 1.86 children, significantly below the United Nations replacement-level fertility rate of 2.1, which reflects the current global trend of declining fertility rates.

Regarding the instrumental variable, Table 3 reflects that 27.59% of women believe that children impede parental freedom, while 52.65% of women believe that children do

Table 1: Descriptive statistical characteristics of all variables.

VarName	Obs	Mean	SD	Min	Median	Max
AGE	6006	38.83	7.446	16	39	55
DEGREE	6006	3.66	1.585	0	4	9
EMPREL	6006	1.30	0.760	1	1	4
HHCHILDR	6006	1.21	1.025	0	1	18
HHTODD	6006	0.66	0.826	0	0	9
Nchild	6006	1.86	1.035	1	2	18
SPEMPREL	6006	1.52	1.529	0	1	9
SPWORK	6006	1.17	0.753	0	1	9
V23	6006	3.27	1.375	0	4	9
V56	6006	2.29	1.669	0	2	9
V58	6006	2.68	1.067	1	3	9
WRKHRS	6006	27.58	20.796	0	35	96
employed	6006	0.83	0.372	0	1	1
Self_emp	6006	0.17	0.372	0	0	1

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not hinder parental freedom. This aligns with traditional societal values, where most women do not resist parenting. A smaller subset of women may sacrifice their time and energy due to fear of parenting, or they may not have a fondness for children, leading them to perceive child-rearing and freedom as contradictory.

From the perspective of the dependent variable, Table 4 reflects that 83.47% of women would opt for employed positions, which may be attributed to several reasons. Firstly, employment offers stability and predictability: Employment often provides a stable and predictable income. With regular paychecks and benefits, individuals can experience financial security. Secondly, employment helps mitigate risks: Self-employment usually comes with higher financial and operational risks. Being employed shields individuals from risks associated with running a business, such as investment costs, market fluctuations, and business failures.

Furthermore, employment provides corresponding benefits and social security: Many positions offer health insurance, retirement plans, paid leave, and other perks. These benefits contribute to an individual's overall well-being and financial security. Lastly, most women might need more interest in entrepreneurship: Only some have a strong desire to run their own business. Some individuals prefer to focus on their skills and expertise rather than taking on the responsibilities of entrepreneurship. Another dependent variable is the weekly working hours of married women. As shown in Figure 1, married women work an average of 27.58 hours per week, and the sample mode is mainly concentrated at 40 hours (N=1198).

Basic regression results

We utilize the Probit model to empirically test the valid sample of the 2012 GESIS survey data. Subsequently, without controlling for other variables, we analyze the impact of the number of children on the employment type choice of married women. The fundamental regression results are presented in Table 5. As shown in Table 5, based on the regression results, it can be observed that women are more likely to opt for self-employment as the number of children increases.

After incorporating a series of control variables, as shown in Table 6, at a 5% significance level, when the number of children increases by one standard unit, the probability of women opting for self-employment will rise by more than 5.4%. Other results from the Probit regression indicate that the employment type of married women's spouses also influences their own employment choices. The partner's choice of job type is positively correlated with married women's employment choices, implying that when the husband's job is self-employment, the wife's job is also more likely to be self-employed. This could be based on the similarity of values, goals, and lifestyle preferences between spouses. If one partner chooses self-employment, it might signify a shared inclination towards entrepreneurship, autonomy, and flexibility. This alignment of values and priorities could lead the other partner to view self-employment as an attractive option.

We further employed correlation analysis to assess the relationship between the number of children and the weekly working hours of married women. From Table 7, it is evident that there exists an inverse relationship between the number of children and the weekly working hours of married women. Specifically, as the number of children increases by one, the

Table 2: The normal distribution of highest completed degree of education.

	Freq.	Percent.	Cum.
No formal education	163	2.71	2.71
Primary school	271	4.51	7.23
Lower secondary	1067	17.77	24.99
Upper secondary	1423	23.69	48.68
Post-secondary	985	16.40	65.08
Lower-level tertiary	1282	21.35	86.43
Upper-Level tertiary	791	13.17	99.60
No answer	24	0.40	100.00

Table 3: Description of the instrumental variable: Children interfere too much with parents' freedom.

	Freq.	Percent.	Cum.
NAP:ES	245	4.08	4.08
Strongly agree	286	4.76	8.84
Agree	1371	22.83	31.67
Neither agree nor disagree	904	15.05	46.72
Disagree	2224	37.03	83.75
Strongly disagree	938	15.62	99.36
Cannot choose	25	0.42	99.78
No answer	13	0.22	100.00

Table 4: The description of the main dependent variable: Employment relationship.

	Freq.	Percent.	Cum.
Employee	5013	83.47	83.47
Self-employed without employees	500	8.33	91.79
Self-employed with employees	186	3.10	94.89
Working for own family's business	307	5.11	100.00
Total	6006	100.00	100.00

Table 5: Regression results of the number of children and self-employment choices.

Self_emp	Coeff.	Std.err.	Z	P>|z|	[95%conf.interval]	
.Nchild	.0468941	.0177817	2.64	0.008	.0120427	.0817455
_cons	-1.061277	.0388817	-27.30	0.000	-1.137484	-.9850707

Figure 1: The coefficients of the first-stage instrumental variables.

Number of obs	6,006
F(7, 5998)	12.54
Prob > F	0.0000
R-squared	0.0144
Adj R-squared	0.0133
Root MSE	1.0284

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probability of married women decreasing their weekly working hours by 1 hour is 12.60%.

This study's total number of children comprises two variables: infants (HHTODD) and school-age children (HHCHILDR). Table 8 presents the Probit model results, analysing how the number of children influences married women's weekly working hours by distinguishing between infants (HHTODD) and school-age children (HHCHILDR). The results indicate that both variables are negatively correlated with weekly working hours, but the effect on infants is significantly stronger. Specifically, for each additional infant, the probability of married women increasing their weekly working hours by 1 hour is 27.09%.

The reasons for this may be as follows: Firstly, having more infants or children often increases the demand for childcare and caregiving responsibilities. Married women may need to allocate more time to attend to their children's needs, which could reduce available working hours. Secondly, women with more children might prioritize balancing their work commitments and family responsibilities. They may reduce their working hours to ensure a harmonious equilibrium between work and family duties.

Furthermore, specific jobs might not offer flexible work arrangements that allow women to balance their work and family responsibilities effectively. As a result, women with more children may find it challenging to engage in extended work hours due to these limitations. Women with more children might also enjoy longer maternity or parental leave following each childbirth. This could lead to temporary reductions in working hours or a slower re-entry into the labor market.

Lastly, some women might choose to reduce their working hours to prioritize their roles as parents and spend more time with their children. This decision may involve a trade-off between career advancement and spending quality time with their family. In essence, the relationship between the number of children and the weekly working hours of married women is influenced by a complex interplay of factors, including family dynamics, work-life balance considerations, available support systems, and individual preferences.

Table 6: Results of Probit model when the dependent variable is employment choices.

self_emp	Coefficient	Std.err	Z	P>|z|	[95% conf. interval]
Nchild	.055429	.0181562	3.05	0.002	.0198441 .091015
AGE	.0073644	.0026556	2.77	0.006	.0021595 .012570
DEGREE	-.0782503	.0124075	-6.31	0.000	-.1025686 -.053932
SPEMPREL	.12591	.116795	10.78	0.00	.1030186 .1488014
SPWORK	-.0450501	.025287	-1.78	0.075	-.094611 .0045115
V23	-.0129743	.0143217	-0.91	0.365	-.0410442 .0150957
V56	.042193	.0115203	3.66	0.000	.0198137 .0647723
V58	-0.253667	.018797	-1.35	0.177	-.0622081 .0114747
_cons	-1.229261	.1385094	-8.87	0.000	-1.500735 -.957788

Table 7: Results of Probit model when the dependent variable is weekly working hours.

WORKHRS	Coefficient	Std.err	Z	P>|z|	[95% conf. interval]
Nchild	-.0252319	.0192084	-1.31	0.009	-.0628797 .0124159
AGE	.0141905	.0027307	5.20	0.000	0088384 .0195427
DEGREE	.1669486	.0131697	12.68	0.000	.1411365 .1927607
SPEMPREL	.0291061	.0138112	2.11	0.035	.0020366 .0561755
SPWORK	-.0830751	.0267932	-3.10	0.002	-.1355887 -.030562
V23	.0489051	.0151426	3.23	0.001	.0192262 .0785841
V56	.5493223	.0136059	40.37	0.000	.5226552 .5759894
V58	-.1276313	.0194651	-6.56	0.000	-.1657822 .0114747
_cons	-1.310479	.1440152	-9.10	0.000	-1.592743 -.957788

Table 8: Results of Probit model when the independent variable is divided into two variables: HHCHILDR (teenagers) and HHTODD (toddles).

WORKHRS	Coefficient	Std.err	Z	P>|z|	[95% conf. interval]
HHCHILDR	-.6408094	.2531199	-2.53	0.011	-1.137015. -.1446034
HHTODD	-2.738854	.332476	-8.24	0.000	-3.390627 2.087082
AGE	-.0556	.0352987	-1.58	0.115	-.1247981 .0135982
DEGREE	.9389378	.1608283	4.74	0.000	.6419023 1.235973
SPEMPREL	.761949	.0138112	2.11	0.035	.0020366 .0561755
SPWORK	-1.140578	.0267932	-3.10	0.002	-.1355887 -.030562
V23	.2532521	.0151426	3.23	0.001	.0192262 .0785841
V56	5.485244	.0136059	40.37	0.000	.5226552 .5759894
V58	-.9596564	.0194651	-6.56	0.000	-.1657822 .0114747
_cons	18.22344	.1440152	-9.10	0.000	-1.592743 -.957788

Instrumental variable regression

Table 9 presents the first-stage regression results in the IV Probit model. Due to the potential presence of omitted variables, the estimation results of the Probit model may suffer from bias, necessitating the use of the IV Probit model for estimation. Variable V23 is employed as the instrumental variable to mitigate the impact of omitted variables. The first-stage regression involves the Probit regression of the main explanatory variable Nchild on the instrumental and control variables. Consequently, the first-stage regression results allow us to identify the factors influencing the number of children. Based on the outcomes in Table 9, as indicated by the GESIS survey data, married women who are more inclined to believe that children impede parental freedom tend to have fewer children.

The coefficient for education level (DEGREE) is significantly negative, indicating that education level also has an impact on the number of children. The higher the education level of married women, the fewer children they tend to have. The spouse's job type and employment status (whether employed) also significantly impact the number of children. Compared to self-employment, when the spouse opts for wage employment, it provides the family with more stable material support. Therefore, the number of children is positively related to the husband's wage employment. Regression results for health status (V58) and job satisfaction (V56) with the number of children are both significant and negative. This suggests that women with better health and higher job satisfaction tend to have more children.

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The most significant information provided by Table 9 is that the coefficient of variable V23 is significantly positive. This indicates that the more married women agree that children impede parental freedom, the fewer children they tend to have. In this model, the coefficients of the first-stage instrumental variables are all statistically significant at the 1% level, as depicted in Figure 1, with an F-value of 12.54, indicating the absence of weak instrument issues. Furthermore, tests for the weak instrument problem were conducted in subsequent tests, and all results passed the tests.

Table 10 presents the results of the two-stage regression in the IV Probit model. With the inclusion of the instrumental variable, there have been changes in the estimation results. This is attributed to the endogeneity issue present in the Probit model, resulting in biased and inconsistent estimations. The outcomes from the IV Probit estimation are more reliable, providing a more accurate assessment of the impact of the number of children on the employment of married women.

The results of the instrumental variable regression indicate that the instrumental variable V23 is significant at the 1% level and positively correlated, consistent with the Probit regression results. This implies that regardless of the circumstances, married women are more likely to opt for self-employment as the number of children increases. In the regression results from the latest survey data in 2015, for every one-unit increase in the standard value of the number of children, the likelihood of married women choosing self-employment increases by 5.5%. Compared to the Probit estimation results, the influence of the number of children on women's choice of self-employment is greatly amplified, and the significance level is also enhanced. This suggests that without using instrumental variables, the impact of the number of children on women's employment choices would be underestimated.

Table 9: The first-stage regression results in the IV Probit model.

	(1)
	First stage
Variables	Nchild
AGE	-0.0081***
	(0.002)
DEGREE	-0.0166*
	(0.009)
SPEMPREL	-0.0179**
	(0.009)
SPWORK	0.0626***
	(0.018)
V56	-0.0198**
	(0.008)
V58	-0.0119
	(0.013)
V23	0.0631***
	(0.010)
Constant	2.0621***
	(0.090)
Observations	6,006
R-squared	0.014

Standard errors in parentheses *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 10: The results of the two-stage regression in the IV Probit model.

	(1)	(2)
	First stage	Second stage
VARIABLES	Nchild	self_emp
AGE	-0.0081***	0.001*
	(0.002)	(0.001)
DEGREE	-0.0166*	-0.021***
	(0.009)	(0.003)
SPEMPREL	-0.0179**	0.037***
	(0.009)	(0.003)
SPWORK	0.0626***	-0.009
	(0.018)	(0.008)
V56	-0.0198**	0.010***
	(0.008)	(0.003)
V58	-0.0119	-0.007
	(0.013)	(0.005)
V23	0.0631***	
	(0.010)	
Nchild		-0.038
		(0.055)
Constant	2.0621***	0.215*
	(0.090)	(0.128)
Observations	6,006	6,006
R-squared	0.014	0.014

Standard errors in parentheses *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

The tendency for women to lean towards self-employment as the number of children increases might be attributed to several factors. Firstly, self-employment offers flexibility: Entrepreneurial roles can provide greater flexibility in working hours and scheduling, enabling women with more children to adjust their routines based on caregiving responsibilities. Secondly, work-life balance: Self-employment empowers women to balance family obligations better and work. They can tailor their work hours to accommodate their children's needs, school schedules, and other household duties. Additionally, childcare arrangements: Women with more children may need help securing suitable childcare arrangements while engaging in traditional employment. Self-employment allows them to autonomously manage their schedules and cater to their children's needs.

Furthermore, the regression results clearly indicate that higher education levels in women make them more inclined to choose wage employment. This could be due to several reasons. Firstly, higher education often opens up a broader range of job opportunities and career paths. Women with higher education may have the chance to take on specialized and professional roles typically associated with traditional employment arrangements. Secondly, education provides individuals with specialized skills and knowledge that make them more competitive in the job market. These skills may align more closely with specific roles offered by existing employers. Additionally, employment in established organizations often offers stability, benefits, and job security, which can be attractive to individuals with higher education. Such positions may provide retirement plans, healthcare benefits, and paid leave, contributing to financial security.

Robustness test using propensity score matching

This study employs a propensity score matching method to conduct a robustness test on the relationship between the

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number of children and nonagricultural employment choices among married women. The fundamental principle involves constructing experimental and control groups with similar individual characteristics. In this study, married women with only one child are selected as the control group, while married women with multiple children are assigned to the experimental group. When the individual characteristics between the experimental and control groups are similar, any differences in employment choices between the two groups represent the net effect of the number of children on married women's employment decisions. To achieve this, the study incorporates covariates such as age (AGE), health status (V58), highest education level (DEGREE), husband's employment type (SPEMPREL), husband's employment status (SPWORK), job satisfaction (V56), agreement on whether children hinder parents' career development (V23), as shown in Table 11. The results of the balance test are presented in Table 11. It is evident from Table 11 that, post-matching, sample imbalances are all below 10%, with p-values greater than 0.05 or absolute t-values less than 1.96, thus failing to reject the null hypothesis. While significant imbalances exist within the sample prior to matching, the inter-group imbalances between the treatment and control groups are substantially reduced after matching. Consequently, there are no significant differences between the treatment and control groups, satisfying the balance assumption.

The utilization of propensity score matching in this study contributes to enhancing the validity and reliability of the observed relationship between the number of children and married women's employment choices. This methodological approach substantiates the robustness of the findings and underscores the significance of the number of children as a determinant in shaping married women's labor force participation decisions.

To enhance the robustness of the matching results, this study employs multiple matching methods including nearest neighbor matching, radius matching, and kernel matching. The primary focus of this study is to ascertain the average treatment effect of the number of children on married women's employment choices. The findings underscore that an increase in the number of children leads to a rise in the self-employment rate among married women. Specifically, married women with multiple children exhibit a higher probability of engaging in self-employment than those with only one child.

These results corroborate the notion that family size significantly shapes married women's labor market decisions. The positive relationship between an elevated number of children and the propensity for self-employment highlights women's strategic adaptations to accommodate their changing familial responsibilities. This pattern aligns with the ongoing work-family balance discourse and underscores the intricate interplay between family dynamics and women's economic choices.

The utilization of multiple matching methods bolsters the robustness of these findings by demonstrating their consistency across different methodologies. This study addresses potential selection biases by employing various matching techniques. It enhances the credibility of the conclusions drawn regarding the influence of childbearing on married women's self-employment decisions.

In summary, this study contributes to understanding the nuanced relationship between family size and women's employment choices by employing a comprehensive range of matching methods. The discerned propensity for increased self-employment rates among married women with larger numbers of children sheds light on women's multifaceted strategies to harmonize work and family roles. These findings have implications for policies and practices aimed at supporting women's participation in the labor market while recognizing the pivotal role of motherhood in shaping their vocational trajectories.

Discussion

This study finds that as the number of children increases, women are more likely to choose self-employment over wage employment. This trend suggests that self-employment may serve as a strategy for work-life balance, allowing women to have

Table 11: The results of Propensity Score Matching.

	Unmatched	Mean		%reduct		t - test		V(T)/ V(C)
Variable	Matched	Treated	Control	%bias	|bias|	t	P>|t|	
AGE	U	38.424	39.327	-12.8		-5.01	0.000	0.61*
	M	38.424	38.28	1.9	85.2	0.83	0.408	0.70*
DEGREE	U	3.7195	3.5802	8.8		3.37	0.001	1.09*
	M	3.7195	3.6993	1.3	85.5	0.54	0.591	1.14*
SPEMPREL	U	1.4722	1.5743	-6.6		-2.56	0.011	0.70*
	M	1.4722	1.4137	3.8	42.7	1.74	0.082	1.02*
SPWORK	U	1.1761	1.164	1.6		0.62	0.536	1.21*
	M	1.1761	1.1597	2.2	-35.1	0.93	0.355	1.26*
V23	U	3.3125	3.2132	7.2		2.76	0.006	0.92*
	M	3.3125	3.2692	3.1	56.4	1.29	0.197	0.88*
V56	U	2.2635	2.3307	-4.0		-1.51	0.130	1.04*
	M	2.2635	2.2473	1.0	76.0	0.40	0.689	1.08*
V58	U	2.644	2.7213	-7.3		-2.78	0.006	1.03
	M	2.644	2.68	-3.4	53.4	-1.43	0.151	1.11*

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greater flexibility while managing caregiving responsibilities. However, this shift may also reflect constrained choices rather than purely strategic decisions. Prior research suggests that many women turn to self-employment not because it is their preferred choice but because traditional employment lacks the flexibility they need or due to workplace discrimination against mothers [33]. This dual interpretation suggests that while self-employment may provide greater autonomy, it may also signal barriers to stable employment, warranting further investigation into whether self-employment is a pathway to empowerment or a response to structural limitations.

The results highlight an inverse relationship between family size and weekly working hours, consistent with existing research. As the number of children increases, women tend to reduce their work hours, likely due to childcare demands. This finding aligns with previous studies showing that larger family sizes increase household responsibilities, leading to lower labour force participation [34]. However, the extent of this effect is likely shaped by institutional support such as parental leave and childcare availability. For instance, in countries with strong family policies, such as Sweden, mothers with multiple children may still maintain stable working hours, whereas in countries with limited childcare support, they may have no choice but to reduce their work time [35].

A more detailed analysis reveals that child age plays a critical role in shaping maternal employment. The study finds that having infants significantly reduces mothers' weekly working hours, while the effect is less pronounced for school-age children. This finding aligns with previous literature showing that labour force participation is lowest when children are very young, as childcare responsibilities are most demanding in the early years [36]. These results emphasise the importance of early childhood care policies in helping mothers maintain employment. In countries where subsidised childcare is widely available, such as Denmark, the negative effect of infants on working hours is weaker, suggesting that access to childcare can mitigate work disruptions.

Since this study analyses data from 41 countries, it is important to consider how cultural and institutional differences shape the relationship between family size and employment. In Nordic countries, where state-funded childcare and flexible parental leave are common, mothers can more easily balance work and family responsibilities. In contrast, in Southern Europe and East Asia, where workplace flexibility is limited and childcare remains largely privatised, women with larger families are more likely to exit the labour force [37]. These cross-national differences highlight the context-dependent nature of maternal employment decisions, emphasising that policy interventions should be tailored to specific economic and social structures rather than assuming a universal solution.

Limitations and future research

This study has several limitations that should be acknowledged. First, it relies on cross-sectional data from 2012, which limits the ability to establish causal relationships or track employment changes over time. Women's employment choices are dynamic and may evolve due to economic shifts, policy changes, or changing family circumstances. Future research should use longitudinal data to track employment trajectories as family sizes grow, providing deeper insights into how employment choices evolve over the life course.

Second, while this study identifies broad employment trends, it does not fully capture women's motivations behind their employment choices. Distinguishing between voluntary and involuntary self-employment would provide a clearer understanding of whether women choose self-employment out of preference or necessity. Future research should incorporate qualitative interviews or mixed-method approaches to explore how social norms, discrimination, and policy constraints shape women's employment decisions.

Finally, given the cross-national scope of this study, future research should explore how different policy environments, cultural expectations, and labour market structures interact with family size to shape employment outcomes. Comparative case studies between countries with contrasting gender policies could provide deeper insights into how institutional settings either support or constrain mothers' workforce participation.

Conclusion

This study contributes to the literature on maternal employment and family size, providing insights into the increasing prevalence of self-employment among mothers and the impact of child age on working hours. However, it is essential to recognize that self-employment may not always be a choice but rather a response to structural employment constraints. Furthermore, cross-national differences highlight the importance of context-specific policies, as employment patterns are shaped by institutional and cultural environments. Future research should use longitudinal approaches to better understand long-term employment trajectories and investigate how structural barriers affect women's labor market participation over time.

(Appendices)

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