The effect of Miss or Mrs. on female labour force participation: Quantitative research on the relationship between marital status, female labour force participation and the effect of children
Slagter, Roos

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The effect of Miss or Mrs. on female labour force participation

Quantitative research on the relationship between
marital status, female labour force participation
and the effect of children

Name: **Roos Slagter**

Student number: **s2945037**

Master: **MSc Public Administration**

Track: **Economics & Governance**

Supervisor: **Dr. Eduard Suari-Andreu**

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1. Introduction

1.1 Motivation and context

Female labour force participation in the Netherlands was lagging behind other Western countries until the 1970's. However, the past decades the numbers have risen largely. According to the OECD (2017), the number of employed women in the Netherlands has risen from 35% in the early '80's till 70% in 2016. Cross-county comparisons therefore make out the Netherlands as one of the countries with the highest female labour force participation rates in the Western world (Nientker & Alessie, 2019).

While the number of women working has increased largely, the number of hours worked has not increased as much. The growth in female labour force participation is almost fully due to the growth of women working part-time. The number of women working part-time is especially high in the Netherlands, with approximately 60% of the employed women working less than 30 hours per week. On average, women work 24 hours per week whereas men work 33 hours (OECD, 2017; Jaumotte, 2003). Possibilities of working part-time have increase female labour force participation, since it enables women to work besides taking care of families. However, with part-time work comes downsides. Part-timers often have less job security, lower hourly earnings, fewer job and promotion opportunities, lower pension benefits and higher risk of poverty in the long term (Thévenon, 2013). Additionally, wages lag behind that of men, lowering the incentives for women to work (Mehra & Gammage, 1999; Janse van Rensburg et al., 2019).

Policy measures are often seen as the driving force behind the increase of female labour force participation (Borck, 2014; Cipollone & D'Ippoliti, 2011; Cipollone et al., 2013). Therefore, throughout the years, the Dutch government has tried instating a variety of policies to improve labour force participation of women, their financial independence and to close the gender-gap (Government of the Netherlands, n.d.; Henkens et al., 2001). Since women can help reduce labour market shortages, more employment can lead to economic growth for the entire society (Government of the Netherlands, n.d.; Bosch & van der Klaauw, 2012; Henkens et al., 2001).

Especially childcare policies, such as the provision of childcare, tend to be successful. The growth of children entering in childcare facilities has led to more part-time and full-time female employment, especially in countries with a high degree of employment protection and/or long paid leave such as the Netherlands (Thévenon, 2013; Chevalier & Viitanen, 2002). Therefore, policies that are instated often mainly focus on alleviating childcare burdens

(Vlasblom & Schippers, 2004). For example, the increase in childcare subsidies in the Netherlands over the period 2005-2009 has increased female labour force participation by 2.3%-points. The average number of hours worked per week by women increased with 1.1 hours per week (Bettendorf et al., 2015).

1.2 Theory and literature

Scientific research has identified family background, such as having a partner and children as one of the most explanatory powers for female labour force participation (Vlasblom & Schippers, 2004). Theories that have been brought up as an explanation touch upon economic decisions that men and women make together within their marriage when it comes to dividing labour and childcare (Becker., 1960). In addition, social and cultural factors play a large role in the decision to participate on the labour market (Tumsarp & Pholphirul, 2020). Lastly, married women face gender-based discrimination when trying to enter the labour market (Becker et al., 2019).

To confirm these theories, research regarding female labour force participation and childcare has mainly focused on comparing married women with single women (Rindfuss & Parnell, 1989; Henkens et al., 2001). Little attention has been paid to women with other marital status (Connelly & Kimmel, 2003). Many previous research is outdated, and by mainly focusing on married women two recent societal trend are not included.

First, there is a large decrease in couples getting married, a change of 63.000 marriages in 2019 as opposed to 88.000 in 2000. Registered partnerships have increased, almost compensating fully for this decrease in marriages (CBS, 2018). Therefore, having a partner can influence female labour force participation in ways outside of marriage, making it relevant to look more into the effect of having a partner on female employment through other ways than marriage.

Second, childcare within partnerships has taken on different forms. It can no longer be assumed that children affect labour force participation only within marriage structures. The Netherlands has one of the largest increases of children born outside of marriage since the 1970's (OECD, 2020). Where in 1990 only 16% of children in the Netherlands were born outside marriage, this increased to 50% in 2010 (De Graaf, 2011). Due to this large increase in out-of-wedlock childbirths, it is relevant to look at how children impact labour force participation in family structures other than marriage.

1.3 Analysis

In this thesis I research the relationship between marital status and female labour force participation. Additionally, I investigate whether this effect remains present when controlling for having children. The research question therefore is: *'What is the relationship between marital status and labour force participation of women in the Netherlands? And is this effect mediated by having children?'*

I use data from the DNB Household survey, containing observations from Dutch women from the years 2010-2020. First, I research whether there is there a significant difference in labour force participation for women with various marital status. Marital status is treated as a categorical variable, enabling a thorough research into various effects of having a partner. I elaborate on the participation on the labour market (extensive margin of labour supply), as well as the hours of work for those who participate (intensive margin of labour supply), to facilitate a broad perspective. Additionally, I research whether marital status is truly a predictor of female labour force participation, or whether the effect can be explained by the presence of children. Lastly, I conduct an instrumental variable analysis to research whether causal inferences between having children and labour force participation can be drawn.

The results of the analysis show that for the extensive margin of labour supply, no overall significant differences between marital status can be seen. There is also no indication of a mediation effect through having children. For the intensive margin, however, the results indicate that marital status does have a significant effect on female labour force participation. Additionally, a small mediation effect is visible. While the outcomes of the instrumental variable analysis imply that the chance of having an additional third child is larger for women with two same-sex children than for women who have one boy and one girl, I find no significant results on female labour force participation.

The remainder of this paper is structured as followed. Section 2 discusses previous research, leading up to the conceptual framework and research questions in section 3. Section 4 provides an overview of the data and descriptive statistics. Section 5 discusses the operationalization of the variables and the methodology that I use. In section 6, I perform the multiple regression analysis, mediation analysis and an instrumental variable regression. Finally, the conclusion (section 7) discusses the scientific and societal implications of the results.

2. Literature Review

Female labour force participation is influenced by family background. The presence of a partner influences labour choices of women, as well as having children. Therefore, this section discusses the influence of marital status, that I use as an indicator of having a partner or having had a partner in the past. Additionally, I discuss the literature regarding the effect of children on female labour force participation. I provide an overview of previous research, as well as theoretical arguments that are suggested by scholars explaining research outcomes.

2.1 The impact of marital status on female labour force participation

Marital status is found to be strongly interrelated with labour force participation of women (Van der Klaauw, 1996). Married women are least likely to be employed compared to women with other marital status. For example, Janse van Rensburgen et al. (2019) research the relationship between marital status and employment in South Afrika, by using logistic regressions and recent data from 2008, 2010, 2012 and 2014. They find that women that have never been married are 33,2% more likely to be employed when compared to married women. In addition, divorced women are 92,7% more likely to be employed than married women. Therefore, women who do not live with their partner are most likely to be employed. Even more, they find that children in the household have a large effect. Women with biological children living with them are 14,1% less likely to be employed than those without children (Janse van Rensburgen et al., 2019). In line with these results is the research of Bhopal (1998), who finds that single women have higher employment rates compared to married women when looking at Great Britain with data from three different years. In 1984, single women are 29% more likely to be employed, in 1990 this is 15% and in 1994, single women are only 4% more likely to be employed than married women. This is also the case for cohabitating women; they are more likely to be employed than married women (19% in 1990; 13% in 1994). These results were found for women aged 25-30, since younger women are higher educated and less likely to marry. A large contribution of this paper is the finding that the effect of marital status on employment differs largely per ethnic group (Bhopal, 1998).

The correlation between marital status and labour force participation has been researched extensively, and several papers can be proposed that have similar outcomes. However, causal relationships are hard to identify because it is expected that the relationship between marital status and labour force participation runs both ways. On the one hand, having a partner influences female labour force participation. In developed economies, for example,

women tend to leave the labour market when getting married (Tumsarp & Pholphirul, 2020). On the other hand, women with thriving careers are less likely to get married. Rather, women entered in professional occupations make the decision to remain single or cohabitate, since getting married might jeopardize their career (Bhopal, 1998). Education level plays a large role in women's choice to wed or to enter the labour market. High-educated women make the decision to refrain from marriage of delay their marriage more often than low-educated women (Bhopal, 1998; Liefbroer & Corijn, 1999). Thus, not only does marriage affect employment, but the effect also goes the other way where women choose not to get married because of employment.

2.2 Economic advantages of marriage

Theoretical arguments behind the influence of having a partner on female labour force participation often point to the economic advantages of division of labour within the household. Many studies point out that it is expected that women alter their employments decisions when their husbands have better employments opportunities (Janse van Rensburg et al., 2019; Collet & Legros, 2016; Van der Klaauw, 1996; Becker, 1973). The traditional 'theory of marriage' by Becker (1973) states that, in general, men have more labour market opportunities and higher wages. At the same time, women are better at childcare. Within marriage these comparative advantages are fully utilized. Consequently, men tend to work more hours than women. Marriage occurs if both parties are better off and therefore increases utility for both parties (Becker, 1973). In addition, an increase in female income will lead to an increase in divorce rates and a lower marriage rate, because the economic gain from marriage decreases (Becker, 1973; Bremmer and Kesselring, 2004; van der Klaauw, 1996).

The economic disadvantage of work for women is partly due to a wage penalty when having children. This 'motherhood penalty 'is dependent on cultural norms and policies within countries and is especially high in the Netherlands (Budig et al., 2012). The motherhood penalty can be caused by various decisions, such as limiting education, turning down a promotion, cutting back on hours of work, or choosing a job that is more family friendly (Kahn et al., 2014). The combination of parenthood and having a professional career is often perceived as incompatible in the Netherlands. Additionally, childcare facilities are provided less than in other countries, and less working mothers make use of professional childcare (Liefbroer & Corijn, 1999).

A research article that has investigated the economic opportunity costs of Canadian women from 1988-1990 is that of Cook & Beaujot (1996). Their theoretical expectation is that

children bring on more need for unpaid work, while at the same time the need for income is enlarged. In line with the 'theory of marriage', they state that marital status influences the division of paid and unpaid work between spouses. The results from logistic regressions show that for single and divorced women, having children aged 0-5 increase the likelihood of work interruptions by 19%. Meanwhile, men are three times less likely than women to have work interruptions when having young children. While this effect appears to be slightly larger for married women (20%), it is not significant. Their results suggest that having children is more important than the effect of marital status on labour force participation (Cook & Beaujot, 1996).

Research by Henkens et al. (2001) also implies that having children is a more important predictor of female labour force participation than marital status. They research the difference between labour force participation of married women and cohabitating women in the Netherlands. The results show that the growth of female labour force participation is mainly due to growth by married women working more, since approximately 38% of married women worked in 1989, whereas this increased to 55% in 1998. For cohabitating women, a slight decrease in labour market participation is visible, as well as a decrease in hours of work per week. Hours of work by cohabitating women lower from 26 hours in 1981, to 24 hours in 1989 and 21 hours in 1998. The reason that the scholars bring forward is that it has become more normal to cohabitate with young children rather than get married, and children impact labour market decisions.

However, the scientific literature is not conclusive about the effects of marital status on female labour force participation, and especially large cross-country differences exist. For example, for women in the developing country Thailand, marital status of women does not negatively affect the probability of labour market participation. On the contrary, married women have a higher probability of working and work more hours than unmarried women do. This effect is the strongest for young, less educated women who are not the head of households and have few family members to look after. The authors suggest that poverty is higher among these women and their income is needed (Tumsarp & Pholphirul, 2020).

2.3 Socio-cultural norms and labour market discrimination

Becker's 'theory of marriage' is still highly valued in the world of economics and economic theories regarding the division of labour are often brought forward to explain women's employment choices. However, economic theory fails to capture reasons behind marriage that do not include economic opportunities. Even more, marriage is not fully a rational decision, but social and cultural factors also play a large role (Tumsarp & Pholphirul, 2020). Therefore, a

second theory should be added, touching upon the social and cultural norms leading up to the expectation that women are responsible for childcare. Married women work less than single women partly due to traditional gender roles that women are responsible for children and men are responsible for earning income. Marriage can reinforce these roles (Tumsarp & Pholphirul, 2020; Olvetti, 2006).

A third theory explaining female labour force participation touches upon the gender-based discrimination that married women face. Because of this discrimination, married women are discouraged in the search for employment (Tumsarp & Pholphirul, 2020). A selection from the literature tells us for example that being married negatively affects the likelihood of obtaining job interviews (Maurer-Fazio & Wang, 2018). Also, married female job applicants are seen as less suitable than single women, since it is expected that the performance and dedication of married women would decline when having children (Jordan & Zitek, 2012).

Becker et al. (2019) use a correspondence test, sending out 9000 job applications to research labour market discrimination in Austria, Germany, and Switzerland. They find that married women without children are less likely to be invited to a second job interview than single women. Marital status effects labour market participation even without the presence of children because childless, but married women, tend to be considered a risk of becoming pregnant by employers. When comparing women with children, those with older children receive more callbacks than those with young children. This effect is mainly visible for part-time jobs. When looking at fulltime jobs, the fertility argument does not result in different number of callbacks. The argument that is made is that employers think that part-time working mothers would take up more free days to take care of their children, as for full-time workers it is expected that childcare is arranged in a different way (Becker et el., 2019).

2.4 The effect of children

Closely intertwined with marital status and therefore integrated in much research is the effect of having children on female labour force participation. Women without children have higher labour force participation than those with children (CBS, 2001; Chen et al. 2014; Collet & Legros, 2016). Also, single, and cohabiting women have a higher probability to participate in comparison with women with children (Euwals et al., 2007). Scholars have identified this effect in countries where women have overall large labour force participation such as China, as well as in countries such as South Africa where female labour participation is relatively low (Janse van Rensburg et al., 2019; Chen et al., 2014). While young women tend to work full-time at the start of their careers, this changes when children are born. Then, a portion of women leaves the

labour market entirely and many women start to work part-time (Vlasblom & Schippers, 2004; OECD, 2017). The relationship between having children and labour force participation may be subjected to endogeneity: the choice of having children is related to labour force participation choices (Angrist & Evans, 1998). For example, women who are unemployed or work part-time enter motherhood sooner than full-time working women (Liefbroer & Corijn, 1999).

A well-known research paper that has investigated the causal effect of children on female labour force participation is that of Angrist & Evans (1998), who use micro-data from the United Stated looking at the years 1970, 1980 and 1990. They use an instrumental variable approach, whereby sex of the two oldest children is used as the instrument. Because sex is randomly assigned, they argue that sex-mix is a reliable instrument to research further childbearing. The quantity/quality model of fertility states that, in general, families prefer mixed sex composition. Hence, parent's utility is lower when two children are of the same sex. As a result, the utility of having an additional child is higher, increasing the chance that parents will have a third child. The results from their analysis show that women with children of the same sex are indeed more likely to have a third child. Where 37,2% of women with one boy and one girl choose to have a third child, this is 42,2% for women with same sex children (Angrist & Evans, 1998).

Angrist & Evans (1998) use the same-sex instrument to research female labour-supply of women with two or more children. The results show that having more than two children leads to a reduction in female labour-supply. Women with two same-sex children have a lower chance of working, work less weeks per year and work less hours per week. Additionally, they have lower annual earnings. The effect is, however, much smaller, or even absent, for high-educated women (Angrist & Evans, 1998).

3. Conceptual Framework and Research Questions

The following research question is leading throughout this research: *'What is the relationship between marital status and labour force participation of women in the Netherlands? And is this effect mediated by having children?'* The conceptual model (Figure 1) summarizes the variables, the direction of the effects and the expected mediation.

First, I research the effect of marital status on female labour force participation. The first sub-question therefore is: '*What is the effect of marital status on female labour force participation?'* Hereby I look at both the extensive margin of labour force participation (the choice to participate or not), as well as the intensive margin of labour force participation (for those who work, the hours of work per week). As can be seen in the conceptual model, the effect is expected to run both ways. On the one hand, it is expected that being married leads to less labour force participation (Tumsarp & Pholphirul, 2020; Janse van Rensburg et al, 2019). On the other hand, having a successful career has the effect that women tend to postpone marriage or remain unwed (Bhopal, 1998; Liefbroer & Corijn (1999). The following hypothesis correspond:

H1a: There is no effect of marital status on female labour force participation.

H1b: There is an effect of marital status on female labour force participation.

Second, I research whether this relationship is mediated by the effect of having children. I use the following sub-question to research this: *'Is the relationship between marital status and female labour force participation mediated by having children?'* The effect between having children and labour force participation can also run both ways. A portion of women leaves the labour market entirely and a large portion of women start to work part-time when children are born (Vlasblom & Schippers, 2004; OECD, 2017). However, women who are unemployed or work part-time also enter motherhood sooner than full-time working women (Liefbroer & Corijn, 1999). The following hypothesis correspond:

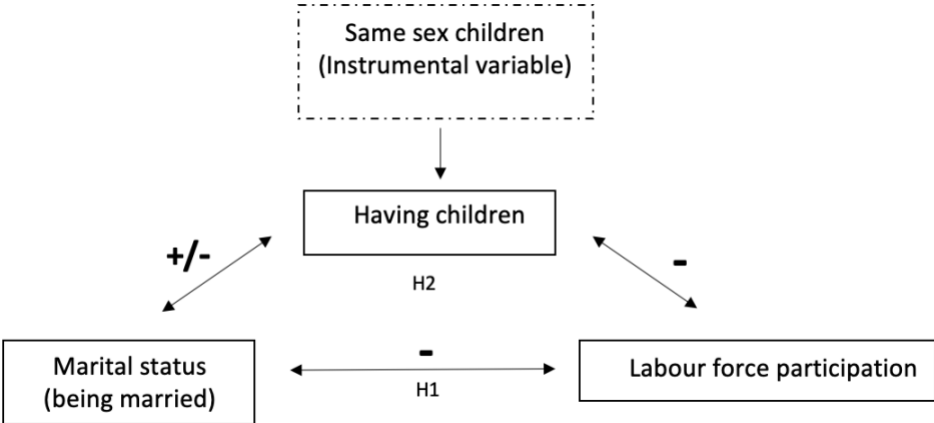*H2a. The relationship between marital status and female labour force participation is not mediated by having children.*

H2b. The relationship between marital status and female labour force participation is mediated by having children.

Figure 1: conceptual model

4. Data and descriptive statistics

4.1 Data description

The Data in this study is micro data at the individual level from the DNB Household Survey. The Survey consists of six questionnaires. In this research I use questions from three of the questionnaires: General Information on the Household (questionnaire 1), Household and Work (questionnaire 2) and Health and Income (questionnaire 5). The data from the years 2010-2020 is used to ensure that a more recent view can be drawn, since comparable research often uses outdated data (Cook & Beaujot, 1996; Henkens et al., 2001; Bhopal, 1998). The DHS Household Survey is a random sample from the Dutch population. To ensure that overrepresentation or underrepresentation of several groups is not the case (since the response rate varies per group), the sample is constantly corrected. Since the data is very strictly controlled for its quality, the data is widely used in scientific literature (Teppa & Vis, 2012).

4.2 Descriptive statistics

Table 11 (appendix 9.1) shows the descriptive statistics that give some basic information on the sample and the variables. The dataset contains 7853 year-observations of respondents, all female since only women are subject of interest in this research. Women younger than 20 and older than 65 are excluded because it is expected that they are either students or retired and could bias the results. On average, respondents are aged 46 at the time they filled in the survey. Also, on average respondent who are employed work 27 hours per week.

Tables 1-5 and the graphs below provide more detailed descriptive statistics of the main variables. Table 1 shows that out of the respondents most women are married or have a registered partnership with community of property (46%). 8% of the sample is married/registered partnership with a marriage settlement. Approximately 16% live together with their partner without being married and 19% is never married. Lastly, about 9% of the respondents is divorced and 2% is widowed. Graph 1 shows that marital status seems to stay steady throughout the years 2010-2020.

More respondents have a paid job (71%) than those without a paid job (29%) (table 1). Women without a job can be unemployed undesired or by choice. Disabled women are excluded from the sample, because they are not able to participate on the labour market. Table 2 shows that most respondents work between 31-40 hours (43%) a week. 10% work between 1-10 hours, 19% between 11-20 hours and 26% between 21-30 hours per week. Only a few dozen respondents work more than 40 hours per week. Through the years the number of women with

a paid job seems to go up compared to women not having a job (graph 2) and there seems to be a slight increase in the average number of hours work (graph 3).

Respondents that do not have children in the household are overrepresented, with 56% of the total sample (table 3). After that, the largest part or respondents has 2 children (20%) or 1 child living in the household (17%). For the instrumental variable approach, the number of children living outside of the household are used because only for those children there is available data on their gender. Table 4 shows that most respondents do not have children outside of the household (71%). The sample for the instrumental variable analysis contains women with at least two children in the household (table 5). Out of those 1338 women, 625 women have one boy and one girl (47%), and 713 women have two children of the same sex, either girls or boys (53%). For women that already have two children 399 of them had another child. Lastly, women with same sex children are more likely to have an additional child (31%) than women whose first two children are one boy and one girl (28%).

Table 1: summary status extensive margin by marital status

	Paid job 'no'	**Paid job 'yes'**	**Frequency (percentage)**
Married/registered partnership community of property	1182	2429	3611 (46%)
Married/registered partnership marriage settlement	137	501	638 (8%)
Divorced	208	456	664 (9%)
Living together	217	1026	1243 (16%)
Widowed	82	102	184 (2%)
Never married	440	1073	1513 (19%)
Total	**2266 (71%)**	**5587 (29%)**	**7853 (100%)**

Table 2: summary status intensive margin by marital status

Hours of work per week:	1-10	11-20	21-30	31-40	41-50	51-60	>60
Married/registered partnership community of property	265	638	747	758	10	6	5
Married/registered partnership marriage settlement	32	78	164	211	8	5	3
Divorced	17	71	163	194	6	5	0
Living together	50	133	234	570	23	7	5
Widowed	22	18	20	38	3	1	0
Never Married	155	102	145	647	18	6	0
Total frequency	**541**	**1040**	**1477**	**2418**	**68**	**30**	**13**
Percentage	**10%**	**19%**	**26%**	**43%**	**1%**	**,54%**	**,23%**

Table 3: summary status 'children in household' by marital status

Children in household:	0	1	2	3	4	5	6
Married/registered partnership community of property	1734	590	879	311	67	21	9
Married/registered partnership marriage settlement	248	122	184	64	17	3	0
Divorced	345	175	118	22	4	0	0
Living together	767	215	183	69	9	0	0
Widowed	132	22	17	13	0	0	0
Never Married	1156	172	132	48	3	1	1
Total	**4382**	**1296**	**1513**	**527**	**100**	**25**	**10**
Percentage	**56%**	**17%**	**20%**	**7%**	**1%**	**,32%**	**,13%**

Table 4: summary status 'children not in household' by marital status

Children not in household:	0	1	2	3	4	5	6	7	8	9
Married/registered partnership community of property	2186	356	740	230	52	24	15	3	1	4
Married/registered partnership marriage settlement	471	70	57	30	3	3	3	0	1	0
Divorced	358	122	136	32	15	0	0	0	0	1
Living together	1108	50	51	19	6	7	2	0	0	0
Widowed	60	22	66	21	6	5	0	3	1	0
Never Married	1444	41	27	1	0	0	0	0	0	0
Total	**5627**	**661**	**1077**	**333**	**82**	**39**	**20**	**6**	**3**	**5**
Percentage	**71%**	**8%**	**14%**	**4%**	**1%**	**,5%**	**,25%**	**,08%**	**,04%**	**,06%**

Table 5: Women with two children not in household that had an additional child

Sex of first two children in families with two or more children	Frequency of the sample	Frequency that had another child	Percentage that had another child
One boy, one girl	625 (47%)	177	28%
Same sex children	713 (53%)	222	31%
(1) Two boys	*321*	*121*	*38%*
(2) Two girls	*392*	*101*	*26%*
Total	**1338 (100%)**	**399**	**59%**

Graph 1: marital status 2010-2020
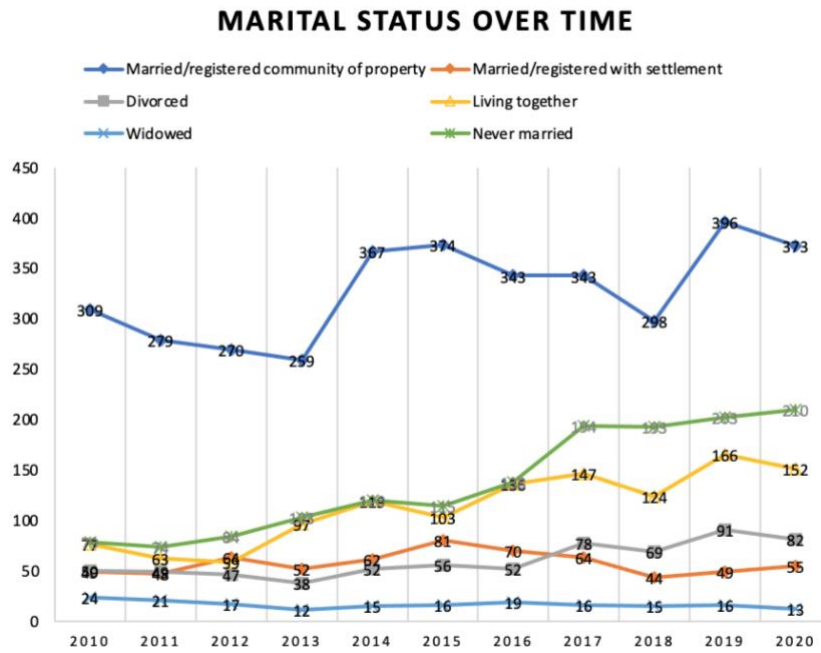
Graph 2: paid job yes/no 2010-2020
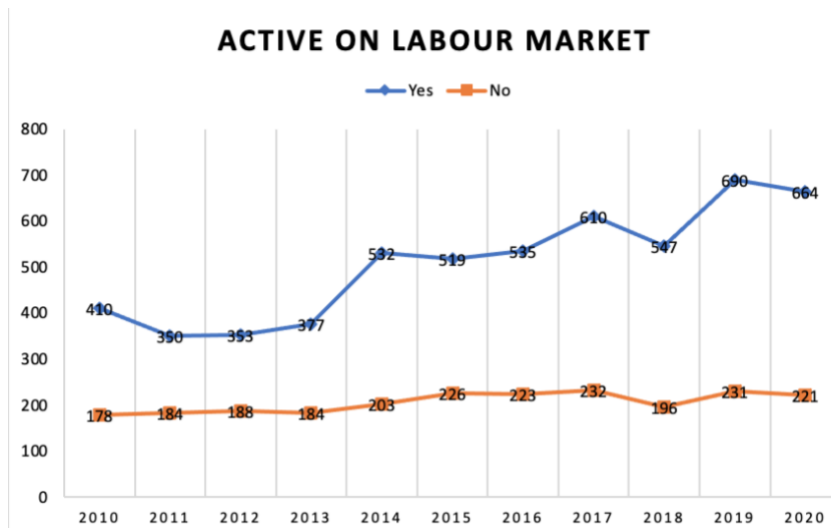
Graph 3: hours of work 2010-2020, for those who work

5. Methodology

5.1 Operationalization

The following section discusses the main variables and its indicators (the questions from the DHS survey), as well as the control variables that I use. For an overview of the variables, see table 17 and 18 (appendix 9.2). All variables have an individual subscript and an indication of time to control for time-effects in the panel data. The regression equation is as follows:

$$Y = \alpha + \beta_1 MS_{it} + \beta_2 CO_{it} + \beta_3 CH_{it} + \beta_4 CONTROLS_{it} + \Delta t + \varepsilon_{it}$$

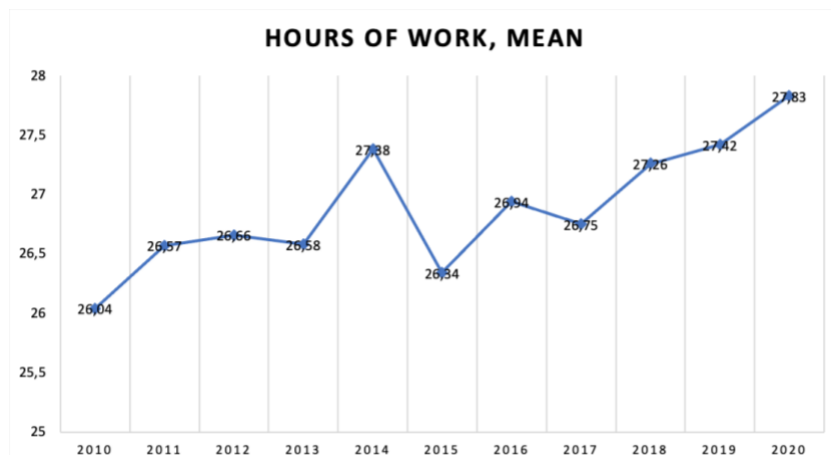The dependent, outcome variable (Y) in this research is 'labour force participation'. The first indicator of labour force participation is whether the respondents have a paid job or not (extensive margin). The second indicator is the number of hours worked per week, conditional on having a job (intensive margin). In the DHS survey there are two questions that indicate this, one question asking the contracted hours of respondents, and another question asking for actual hours that respondents usually must work. I look at the actual hours per week that the respondent usually must work, rather than contracted hours. The large amount of people with a 0-hour contract that work on call base, as well as self-employed respondents that do not have an hour contract can otherwise cause a bias.

The first independent variable ($\beta_1 MS_{it}$) in this research is 'marital status'. In the DHS survey marital status and registered partnership are taken together. They are, however, divided in two answer options separating those with community of property and those with a marriage settlement. Because in this research I look at how having a partner influences female labour force participation in the broadest way, I do not merge these two options. Other answer options are divorced, widowed, living together with partner, and never married.

The second independent variable ($\beta_2 CO_{it}$) is 'children in household'. I use this variable to research a possible mediation effect. The indicator is: *'Number of children in the household',* ranging from 0 up to 9 children.

As a third independent variable, children who are no longer in the household are taken into account ($\beta_3 CH_{it}$). Children who are no longer part of the household could have impacted labour force participation in the past, and the effect might still be visible today. The question that I use as an indicator is: *'How many of your children live outside your household?',* ranging from 0 up to 9 children. I also use this variable for the instrumental variable analysis. Since the DHS survey does not contain data on the gender of children still belonging to the household,

only the children not belonging to the household can be used for the instrumental variable analysis.

5.2 Control variables

Several other variables that are expected to influence all three variables are taken into account in this research in order to control for alternative explanations ($\beta 4$CONTROLSit).

First, education level is seen as an important predictor of labour force participation. Education is highly correlated with wage levels, therefore impacting employment and fertility decisions. I recode the answers to the question *'highest level of education'* to three indicators. 'Low educated' includes no education, other sort of education/training, special education, primary education, and pre-vocational education (MBO). The indicator 'middle educated' includes pre-university education (HAVO/VWO) and senior vocational training (MBO). The indicator 'highly educated' includes vocational colleges (HBO) and university education (WO).

Second, age influences the likelihood of labour force participation and the likelihood of having children. I use the answer to the question *"Year of birth of the respondent"* and recode it to the variable 'age' representing the age of the respondent in the year that the survey was filled in. Additionally, age is divided into five subgroups representing respondents from the age group 20-30, 31-40, 41-50, 51-60 and 61-65 to research heterogeneity of the effect.

Third, I use a measurement of household income as a control, since it is expected that partner's income influences labour market choices of women. I use the question *"Please indicate what the total net income of the household was over [year]"*. The answer options consist of 11 different income groups. From each group I use the average as a measurement of income.

Fourth, I add a general measurement of health as a control variable, specifically the question *"in general, would you say your health is excellent/good/fair/not so good/poor"*. Note that this is the health as people perceive it themselves. The possibility of a self-reporting might lead to measurement error since social desirability and survey conditions can alter the respondents' answer.

5.3 Method

The research strategy is descriptive and explanatory. First, I perform a descriptive analysis, whereby inferences about the variables are made based on the theory and the conceptual model. To identify a causal effect, I perform additional explanatory research, focusing on the causal

mechanism between having children and labour force participation of women. Suiting the deductive logic to test the hypothesis, is the Large-N research design. Large-N design is suited to uncover causal relationships, since the extent of data can identify weak heterogenous relationships when the data is noisy. Due to the great number of observations in large-N research it can be ruled out that the association arises due to change (the law of large numbers) (Toshkov, 2016).

Several linear regressions identify the relationship between the main variables in this research. I check for heterogeneity, by including various subgroups, such as various number of children and different age groups.

The largest problem in this research is reversed causality, since the correlation between variables can run in several directions. Therefore, I perform an instrumental variable analysis. An instrumental variable needs to generally meet three assumptions to be reliable. First, the instrument needs to have a causal effect on the variable that you're trying to capture (first stage) (Angrist & Pischke, 2015). This assumption is met since the choice of having a third child has a causal relationship with the number of children. Second, referred to as the independence assumption, the instrument is randomly assigned (Angrist & Pischke, 2015). Because children's gender is exogenous (randomly assigned), this is a reliable instrumental variable that can be used for choosing to have a third child (Angrist & Evans, 1998). Third, the exclusion restriction requires that the instrumental variable only influences the outcome variable via the treatment variable (Angrist & Pischke, 2015). Based on the theoretical argumentation, stating that the choice of having a third child is based on the sex of the first two children rather than on labour force participation choices, it is likely that this assumption is met (Angrist & Evans, 1998)

6. Results

6.1 Checking assumptions

Linear regression analysis brings about several assumptions that should not be violated to make reliable inferences. First, I check for multicollinearity by performing a Variance Inflation Factor (VIF). In statistics, VIF is seen as a problem to be dealt with when VIF>10. As seen in table 19 (appendix 9.3), there is no problem with multicollinearity because for all variables VIF<2. Second, the relationship between the dependent and independent variables needs to be linear. This assumption is met, since in this research the nominal variables are recoded into dummy variables, and dummy variables are automatically linear because of the two datapoints. Third, the test for normality of the data shows that the data is not perfectly normal distributed (Graph 5, appendix 9.3). However, since this is a large-N design with sufficient sample size, no problems are expected. Lastly, graph 6 indicates heteroskedasticity (appendix 9.3). However, the outcome of the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity indicates that heteroskedasticity is not a problem (P=0.09, table 20, appendix 9.3). I use clustered robust standard errors when performing the regression to deal with possible heteroscedasticity and autocorrelation.

6.2 Analysis

In the following section I test the hypotheses that were introduced in the conceptual framework (section 3). First, by using multiple linear regressions I research the effect of marital status on having a paid job of not (extensive margin). Thereafter, I use a similar method to research for those who work, the hours they work per week (intensive margin). Additionally, for both the extensive and intensive margin of labor supply, I perform a mediation analysis to research whether the effect between marital status and labour force participation can be due to having children. Finally, I perform an instrumental variable estimation to make stronger causal inferences about the effect of having children on female labour force participation.

6.2.1.   Extensive margin of labour force participation

Table 6, model 1, shows the outcome of the first regression analysis for the extensive margin, whereby children are not yet included. Here the dependent variable is whether women have a paid job or not. The reference category is women without a paid job. When looking at marital status, several coefficients are significant. First, women who are married/registered partnership with settlement are more likely to participate on the labour market than women who are

married/registered partnership with community of property (b = 0.07, p < 0.01). Divorced women are also more likely to be employed than women who are married/registered partnership with community of property (b = 0.09, p < 0.01). The coefficients for women who live together with their partner, widowed women and never married women are not significant. Based on these results, I cannot yet draw convincing conclusions on the relationship between marital status and labour force participation.

In model 2 (table 6), I added children to the regression to research whether the coefficients of marital status remain similar. Adding children in household and children not in household does not change the coefficients for marital status largely. Additionally, the coefficients for married/registered partnership with settlement and divorced women remain highly significant, as was the case in model 1. Therefore, based on these results, I find no indication of a mediation effect.

When looking at the coefficients for children in the household, all coefficients are significant except for women with 5 children. Women who have 1-3 children are more likely to have a paid job than women without children (b = 0.06; b = 0.05; b = 0.07, p < 0.05). For women with 4 and 6 children, however, an opposite effect can be seen. Those women are less likely to have a paid job than women without children. The coefficients are large and highly significant indicating a large effect of having 4 of 6 children in the household on having a paid job (b = -0.28; b = -0.68, p < 0.001). Children no longer in the household do not have a significant effect on having a paid job or not, except for women with 7 and 8 children. Women with 7 children are much less likely to have a paid job than women without children no longer in the household (b = -0.62, p < 0.001). For women with 8 children the effect is slightly smaller but also highly significant (b = -0.26, p < 0.001). Overall, the coefficients for having children are similar or larger than the coefficient for marital status, indicating that the presence of children is a more important predictor of female labour force participation than marital status.

Age does not significantly influence having a paid job or not, except for the age group 61-65. Women in this age group are less likely to have a paid job than women aged 20-30 (b = -0.33, p < 0.001). Education level also has a large effect. Middle educated and high educated women are more likely to have a paid job than low educated women (b = 0.09; b = 0.19, p < 0.001). Lastly, women with fair, not so good and poor health are less likely to have a paid job than women with excellent health (b = -0.18; b = -0.42; b = -0.66, p < 0.001).

Based on the results for the extensive margin of labor supply, H1a '*There is no effect of marital status on female labour force participation*' cannot be rejected. While there is a small effect of married/registered partnership with settlement and divorced women on having a paid

job or not, I find no significant result for women with other marital status. Additionally, while the results show the importance of having children, there is no indication that children act as a mediator between marital status and female labour force participation. Therefore, H2a '*The relationship between marital status and female labour force participation is not mediated by having children'* cannot be rejected for the extensive margin of labour supply.

Table 6: regression extensive margin of labour force participation

Dependent variable: paid job [ref: people without paid job]	Model 1	Model 2
Main independent variables		
Marital status [ref: married/registered partnership having community of property]		
Married or registered partnership with settlement	0.07 (0.03) **	0.07 (0.03) **
Divorced	0.09 (0.03) **	0.08 (0.03) **
Living together	0.02 (0.02)	0.02 (0.02)
Widowed	0.07 (0.06)	0.08 (0.06)
Never married	-0.01 (0.02)	-0.00 (0.02)
Children in household [ref: no children]		
1 child	-	0.06 (0.02) **
2 children	-	0.04 (0.02) *
3 children	-	0.07 (0.03) *
4 children	-	-0.28 (0.07) ***
5 children	-	-0.18 (0.13)
6 children	-	-0.68 (0.03) ***
Children not in household [ref: no children]		
1 child	-	-0.02 (0.03)
2 children	-	0.04 (0.03)
3 children	-	-0.02 (0.04)
4 children	-	-0.12 (0.06)
5 children	-	0.05 (0.11)
6 children	-	0.04 (0.17)
7 children	-	-0.62 (0.07) ***
8 children	-	-0.26 (0.06) ***
Control variables		
Age [ref: age 20-30]		
Age 31-40	0.05 (0.03)	0.04 (0.03)
Age 41-50	0.03 (0.03)	0.03 (0.03)

Age 51-60	-0.04 (0.03)	-0.04 (0.03)
Age 61-65	-0.33 (0.03) ***	-0.33 (0.04) ***
Income	0.00720 (0.00487)	0.00678 (0.00467)
Education level [ref: low educated]		
Middle educated	0.09 (0.02) ***	0.09 (0.02) ***
High educated	0.19 (0.02) ***	0.19 (0.02) ***
Health [ref: excellent]		
Good	-0.03 (0.02)	-0.02 (0.02)
Fair	-0.18 (0.03) ***	-0.18 (0.03) ***
Not so good	-0.42 (0.04) ***	-0.42 (0.04) ***
Poor	-0.67 (0.05) ***	-0.66 (0.05) ***
Time effect	0.01 (0.00)	0.01 (0.00)
Constant	0.69 (0.04) ***	0.66 (0.04) ***
N	7853	7853
R-squared	0.2518	0.2712
*p<0.05 **p<0.01 ***p<0.001*		

6.2.2. Intensive margin of labour force participation

Table 7 shows the results of the number of hours worked per week, for those who work (intensive margin). In model 1, having children is not included in this regression. Almost all coefficients for marital status are highly significant, indicating that marital status influences female labour force participation when looking at hours of work. Women who are married/registered partnership with settlement work 3.81 more hours per week than married women with community of property ($p < 0.001$). Additionally, divorced women work more hours more per week ($b = 4.29$, $p < 0.001$). The effect is even larger for those who live together with their partner, who work 4.63 hours per week more ($p < 001$). Lastly, women who are not married work on average 3.18 hours per week more than women who are married/registered partnership with community of property. The coefficient for widowed women is not significant.

The same regression output (table 7) shows the results for model 2. Here, I add children in the household and children no longer in the household to identify a mediation effect. Adding children in household to the model has changed the results for marital status. All coefficients have become smaller and remain significant. Only for widowed women the coefficient remains

not significant. When including children, the coefficient for women who are married/registered partnership and divorced changes slightly compared to model 1 (b = 3.46; b = 3.75, p < 0.001). For women who are living together and never married women, adding children has changed the coefficient largely. The results indicate that women who live together with their partner now work 3.02 hours per week more than women who are married/registered partnership having community of property (p < 0001). The coefficient for never married women has decreased indicating that they work 1.37 hours per week more than women who are married/registered partnership with community of property (p < 0.05).

When including children, the effect of marital status on female labour force participation remains visible for the largest part. This indicates that marital status affects labour force participation of women through other ways than having children. It should be noted that the change in the coefficient for marital status, when adding children to the regression can also be due to perfect correlation. The descriptive statistics (section 4, table 3/4) show that some categories of marital status can be perfectly predicted by number of children. This is especially the case when looking at 4 or more children within and outside of the household. The change in the coefficients of marital status does therefore not necessarily imply a full mediation effect.

Many coefficients for the variable number of children in the household are significant, except that of 1 child. Women with 2 and 3 children work approximately 4 hours per week less than women without children (b = -4.32; b = -4.99, p < 0.001). Women with 4 children work on average 14.14 hours less (p < 0.001). The effect is especially large for women who have 5 children, who work 24.67 hours per week less and for women who have 6 children who work 19.79 hours per week less than women without children in the household (p < 0.001). All coefficients for children not in the household are not significant indicating that there is no effect on hours of work per week. The coefficients for having children are in general larger than the coefficient for marital status, indicating that having children is a more important predictor of female labour force participation than marital status.

When looking at the control variable age, women aged 31-40 and 41-50 work significantly more hours per week than women aged 20-30 (b = 3.42; b = 2.75, p < 0.001). Women aged 61-65 work approximately 4.59 hours per week less (p < 0.001). Income goes up with hours of work, but the coefficient is very small (b = 0.00122, p < 0.001). Middle educated women work 0.49 hours more per week than low educated women, and this is 2.75 for high educated women (p < 0.01). When looking at health, women with not so good health work 4.48 hours significantly less hours per week than women with excellent health (p < 0.05).

Based on the results for the intensive margin of labor supply, different conclusions can be drawn than for the extensive margin. First, since all coefficients for marital status (except widowed women) are highly significant, marital status influences female labour force participation. Therefore, H1a '*There is no effect of marital status on female labour force participation'* can be rejected. Second, whereas the results of the extensive margin indicated no mediation effect of having children, the results of the intensive margin do indicate a small mediation effect. All significant coefficients of marital status become smaller when adding children into the analysis. Therefore, H2a*. 'The relationship between marital status and female labour force participation is not mediated by having children'* can be rejected for the intensive margin of labour supply.

Table 7: regression intensive margin of labour force participation

Dependent variable: number of hours	Model 1	Model 2
Main independent variables		
Marital status [ref: married/registered partnership having community of property]		
Married or registered partnership with settlement	3.81 (1.05) ***	3.46 (0.99) **
Divorced	4.29 (0.66) ***	3.75 (0.65) ***
Living together	4.63 (0.67) ***	3.02 (0.68) ***
Widowed	1.69 (1.87)	1.66 (1.87)
Never married	3.18 (0.66) ***	1.37 (0.69) *
Children in household [ref: no children]		
1 child	-	0.32 (0.61)
2 children	-	-4.32 (0.64) ***
3 children	-	-4.99 (0.93) ***
4 children	-	-14.14 (1.68) ***
5 children	-	-24.67 (1.23) ***
6 children	-	-19.79 (1.18) ***
Children not in household [ref: no children]		
1 child	-	-0.44 (0.83)
2 children	-	-1.36 (0.96)
3 children	-	0.70 (1.52)
4 children	-	-2.52 (1.64)
5 children	-	-0.69 (3.37)
6 children	-	0.54 (2.44)
Controls		
Age [ref: age 20-30]		
Age 31-40	2.55 (0.92) **	3.42 (0.89) ***
Age 41-50	1.65 (0.93)	2.75 (0.92) **
Age 51-60	0.30 (1.00)	-0.25 (1.05)
Age 61-65	-3.80 (1.11) **	-4.59 (1.25) ***
Income	0.00013 (0.00) ***	0.00122 (0.00) ***

Education level [ref: low educated]		
Middle educated	0.37 (0.72)	0.49 (0.71) **
High educated	2.42 (0.79) **	2.75 (0.76) ***
Health [ref: excellent]		
Good	0.47 (0.74)	-0.02 (0.71)
Fair	-1.11 (0.92)	-1.48 (0.88)
Not so good	-3.99 (2.03) *	-4.48 (2.05) *
Poor	2.65 (1.19) *	0.51 (1.19)
Time effect	-0.05 (0.07)	-0.03 (0.07)
Constant	18.93 (1.41) ***	21.06 (1.44) ***
N	5587	5587
R-squared	0.2043	0.2607
*P<0.05 **p<0.01 ***p<0.001*		

6.2.3. Instrumental Variable analysis

Lastly, I perform an instrumental variable analysis using the instrument 'same sex' to see whether I can identify a causal relationship between having children and female labour force participation. The method I use is similar to that of Angrist & Evans (1998) as elaborated on in the literature review. Only women with two children or more are included in the sample; women with less than two children are excluded. Therefore, 1338 women are left in the sample.

Before performing the IV regression, and to check whether the instrument can lead to causal inferences, it must be established that the sample of women with same sex children and women with one boy and one girl are not statistically different from each other. Table 8 shows the difference in means of demographical characteristics. The reference category is women with one boy and one girl. The outcome of the t-test shows that there are overall no large differences in means for several demographics. Only for marital status and income, the two samples differ significantly. Table 16 (appendix 9.1) gives an overview of the marital status of both groups. This also indicates that the difference in means is likely due to the small sample size. Consequently, this can influence the outcome of the instrumental variable regression and external validity cannot be guaranteed.

Table 9 shows the results of the first stage regression. Here, the dependent variable is the number of children no longer in the household. The explanatory variable is the 'same sex' instrument, whereby a dummy indicates if the first two children are of the same sex. I add

control variables to eliminate bias from omitted variables that influence the number of children. However, I leave out the variable 'household income' since the large number of missing values would limit the sample size even further to 662 observations. The results show (table 9, model 1) that for women who have same sex children, the chance of having an additional child is indeed larger than for women who have one boy and one girl ($b = 0.08$, $p < 0.05$). As a robustness check, I look at whether this effect differs for women with two girls and two boys (table 9, model 2/3). The results show that the effect is particularly large for women with two boys ($b = 0.21$, $p < 0.001$). For girls the effect seems to be negative, however it is not statistically significant.

Next, I use sex mix to research the effect of more than 2 children on female labour force participation. Here, I use 'same sex' as an instrument for having more than 2 children. I perform the analysis for both the intensive margin of labour force participation and the extensive margin. Table 10 shows the results of the second stage IV regression. The output indicates that the presence of a third child reduces the probability of having a job ($b = -0.51$, $p > 0.05$). However, the effect is not significant. For hours of work per week, the coefficient indicates that women having a third child decreases the hours of work per week ($b = -12.96$, $p > 0.05$). However, here again the effect is not significant. Therefore, based on these results, I cannot draw conclusions on whether having an additional third child leads to lower female labour force participation.

Table 8: differences in means for demographical characteristics same sex

Variable [ref: women with one boy and one girl]	Mean difference
Marital status	0.19 (0.08) *
Age	0.23 (0.32)
Income	-5472.21 (1648.35) *
Education level	0.03 (0.08)
Health	0.04 (0.04)
*P<0.05 **p<0.01 ***p<0.001*	

Table 9: first stage IV regression – fraction of women that had another child

Dependent variable: more kids	Model 1	Model 2	Model 3
Same sex children	0.08 (0.04) *		
(1) Two boys	-	0.21 (0.05) ***	
(2) Two girls	-		-0.07 (0.04)
Marital Status	-0.00 (0.01)	-0.00 (0.01)	-0.01 (0.01)
Age	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Education level	0.03 (0.14) *	0.03 (0.01) *	0.03 (0.01) *
Health	-0.01 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Time dummy	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Constant	-20.11 (12.27)	-20.11 (12.10)	-15.85 (12.23)
N	1336	1336	1336
R-squared	0.0260	0.0506	0.0233
*P<0.05 **p<0.01 ***p<0.001*			

Table 10: second stage IV regression

Dependent variable:	Model 1 Paid job yes/no	Model 2 Number of hours
More than two children [instrument: same sex]	-0.51 (0.91)	-12.69 (16.04)
Marital status	-0.01 (0.03)	0.24 (0.77)
Age	-0.02 (0.00) ***	-0.13 (0.09)
Education level	0.08 (0.01) ***	1.82 (0.37) ***
Health	-0.15 (0.02) ***	-0.35 (0.82)
Time dummy	0.00 (0.01)	0.15 (0.94)
Constant	-6.24 (20.70)	-273.16 (325.77)
N	1336	730
*P<0.05 **p<0.01 ***p<0.001*		

7.   Conclusion and discussion

7.1 Summary of results and relation with theory

This research looked at the relationship between marital status and female labour force participation. It contributed to the scientific field by looking at the effect of having a partner for a variety of marital status, rather than only researching married and single women. Additionally, I researched whether having children acts as a mediator. Lastly, an instrumental variable approach was performed, based on work by Angrist and Evans (1998). The main question is: *'What is the relationship between marital status and labour force participation of women in the Netherlands? And is this effect mediated by having children?'*

The first sub-question is: '*What is the effect of marital status on female labour force participation?'* In conclusion, it can be stated that there is an effect of marital status on labour force participation of women in the Netherlands. Women who are married/registered partnership with settlement, as well as divorced women are more likely to be employed than women with married/registered partnership with community of property. In addition, women who are married/registered partnership with settlement, divorced women, women who live together with their partner and never married women all work more hours per week than women who are married/registered partnership with community of property.

The theory brought forward several reasons that can explain why married women are less likely to be employed and work less hours per week than women with other marital status. Economic incentives, such as better employment opportunities and higher wages for men, can lead to women working less within marriage (Becker, 1973). This theory can explain why women who live together with their partner, as well as divorced and never married women are more active on the labour market than married women. Being married in community of property ensures that women can claim assets of their partner, and in case of divorce those assets are equally divided. In case of a different partnership structure, these conditions do not automatically apply wand women cannot (legally) depend on their partner's income. Therefore, women are more financial independent from their partner, increasing their odds of working. This can also explain why women who are married/registered partnership with settlement are more likely to work than women who are married/registered partnership with community of property.

The second sub-question is: *'Is the relationship between marital status and female labour force participation mediated by having children?* Only an indication of the relationship between marital status and labour force participation being mediated by having children was

found for the intensive margin of labor supply, and the effect is small. In line with the theoretical prediction is the result that the presence of children is a more important predictor of female labour force participation than marital status. This can be explained by the socio-cultural norm that women are responsible for childcare and that childcare is not compatible with working. Consequently, women with children can work less than women without children. Additionally, since marriage reinforces these traditional gender roles, this can explain that the effect of having children is larger for married women than for women with other marital status.

Marital status is only for a small part mediated by having children and the effect of marital status holds up on its own. This is in line with the theory of gender-based discrimination that states that married women are less employable from the perspective of employers, even when they do not have children. Therefore, when applying for a job, having the stamp of 'being married' can lower the odds of being accepted. This can also explain the result that women who live together with their partner are more likely to have a job than married women, even though both have a partner. However, this theory cannot explain the difference between women who are married/registered partnership with community of property and women with settlement.

The effect of marital status on labour force participation can also be due to the anticipation of children, whereas partners already choose to get married or cut down on hours of work because they know that they will have children in the future. Thereby, the 'motherhood penalty' can also play a role, leading to women cutting back on hours of work and anticipate having children. Therefore, it cannot be ruled out completely that the effect of marital status on female labour force participation is fully independent from having children.

Lastly, the results of the instrumental variable approach are partly in line with the theory by Angrist & Evans (1998). The results show that for women who have same sex children, the change of having an additional child is indeed larger than for women who have one boy and one girl. Since the sample used in this research consisted only of children no longer in household, this is a contribution to the work of Angrist & Evans that has not been made before. However, I found no significant effect of having a third child on female labour force participation, unlike their work.

7.2 Limitations

Even though this research has contributed to understanding the relationship between marital status and labour force participation, several limitations should be mentioned. First, there is a limitation in the measurement of marital status. Since marital status was one of the main variables of this research, the differences between women with various marital status was

researched extensively. However, the DHS data does not differentiate between married women and women with registered partnership. Therefore, it could not be research whether the decrease in couples getting married and increase in registered partnerships has implications for female labour force participation.

Second, omitted variable bias and reversed causality cannot be ruled out completely. Labour force participation is influenced by many factors of which several are not taken into account. For example, the literature review indicated that the income of the partner is a predictor for women's labour force participation. While general household income was used as a control, the DHS survey does not contain enough valid data measuring the income of a partner. Therefore, the risk of omitted variable bias cannot be fully excluded. This is also the case for ethnicity. Previous research has shown that the relationship between marital status and employment differs per ethnic group (Bhopal, 1998; Janse van Rensburgen et al., 2019). The DHS survey does not include data on ethnicity so this could not be included in this research.

Third, the main shortcoming of this research relates to the instrumental variable approach. Since there is no data on sex of children who still live in the household, only the sex of children who no longer live in the household was included. While this has still contributed to the research, it has limited the analysis. Additionally, the sample size was small and the demographics of women with same sex children and one boy and one girl differ.

7.3 Recommendations

Based on these conclusions, several recommendations can be drawn. First, in government policies regarding female labour force participation, childcare is often a focus because childcare policies have a positive effect on the labour force participation of women. This research confirms that having children has a large influence on hours of work by women, that leads up to 0-25 hours per week of working less than women without children. These results therefore indicate that focusing on childcare policies is helpful. However, when instating policies to improve female labour force participation, a recommendation is to look at other factors that can explain the difference of labour force participation between married women and women with other marital status. While the effect of having children is large, being married/registered partnership with community of property on its own can account up working up to 5 hours less than other women. Additional research is needed to identify the underlying causal factors of the relationship between marital status and labour force participation.

Second, previous research on female labour force participation has mainly focused on labour force participation of married women and women. This research has shown, however,

that there are large differences in labour force participation of women with different marital status. Labour force participation is even different for women who are married in a different form, such as community of property or marriage settlements. Therefore, I recommend that in future research regarding labour force participation and having children, there is elaborated on the heterogeneity of the results by various marital status.

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9.   Appendix

9.1 Descriptive statistics

Table 11: general descriptive statistics

Variable	Observation	Mean	Std. Dev.	Min.	Max.
Hours of work	5587	26.97	0.45	1	112
Children in household	7853	0.83	1.09	0	6
Children not in household	2226	2.05	1.06	1	9
Age	7853	45.73	12.37	20	65
Income	3107	35393.64	39800.24	0	1370179

Table 12: detailed descriptive statistics variable 'household income'

Household income	Frequency	Percentage	Cumulative
<8.000 euros	419	5,34%	5,34%
8.000-9.500 euros	139	1,77%	7,11%
9.500-11.000 euros	186	2,73%	9,47%
11.000-13.000 euros	243	3,09%	12,57%
13.000-16.000 euros	387	4,93%	17%
16.000-20.000 euros	787	10,02%	27,52%
20.000-26.000 euros	1087	13,84%	41,36%
26.000-38.000 euros	1929	24,56%	65,92%
38.000-50.000 euros	1728	22%	87,93%
50.000-75.000 euros	757	9,64%	97,57%
>75.000 euros	191	2,43%	100%
Total	**7853**	**100%**	

Table 13: detailed descriptive statistics variable 'age

Age	Frequency	Percentage	Cumulative
20-30	981	12,49%	12,49%
31-40	1969	25,07%	37,56%
41-50	1807	23,01%	60,57%
51-60	1838	23,41%	83,98%
>60	1258	16,02%	100%
Total	7853	100%	

Table 14: detailed descriptive statistics variable 'health'

General health condition	Frequency	Percentage	Cumulative
Excellent	982	12,50%	12,50%
Good	4916	62,60%	75,11%
Fair	1517	19,32%	94,42%
Not so good	371	4,72%	99,15%
Poor	67	0,85%	100%
Total	7853	100%	

Table 15: detailed descriptive statistics variable 'education level'

Highest level of education completed	Frequency	Percentage	Cumulative
Low educated	1795	22,86%	22,86%
Middle educated	2969	37,81%	60,67%
High educated	3089	39,33%	100%
Total	7853		

Table 16: summary status sex of children by marital status

	Same sex children	**One boy, one girl**	**Total**
Married/registered partnership community of property	419	498	917
Married/registered partnership marriage settlement	33	57	90
Divorced	70	80	150
Living together	34	30	64
Widowed	54	40	94
Never married	15	8	23
Total	**625**	**713**	**1338**

9.2 Operationalization

Table 17: operationalization main variables

Variable	**Question**	**DHS Answer options**
Marital status	What is your marital status?	Married or registered partnership, having community of property (including separation from bed and table)
		Married or registered partnership, with a marriage settlement (including separation from bed and table)
		Divorced from spouse
		Widowed
		Living together with partner (not married)
		Never married
Children in household	Number of children in the household	None

		1 child
		2 children
		3 children
		4 children
		5 children
		6 children
		7 children
		8 children
		9 children
Children outside of household	Do you have any children not/no longer belonging to your household?	Yes
		No
Gender of child	Gender of child	Male
		Female
Paid job	Do you have a paid job, even if it is only for one or a few hours per week or for a short period?	Yes
		No
Hours of work	How many hours per week do/did you usually have to work?	Number of hours

Table 18: operationalization control variables

Variable	Question	DHS Answer options
Education level	Highest level of education completed	Did not have education (yet)
		Other sort of education/training
		(Continued) Special education
		Kindergarten/primary education
		Pre-vocational education (VMBO)

		Pre-university education (HAVO, VWO)
		Senior vocational training or training through apprentice system
		Vocational colleges
		University education
Age	Year of birth of the respondent	Number of years
Household income	Please indicate what the total net income of the household was over [year]	<8.000 euros
		8.000-9.500 euros
		9.500-11.000 euros
		11.000-13.000 euros
		13.000-16.000 euros
		16.000-20.000 euros
		20.000-26.000 euros
		26.000-38.000 euros
		38.000-50.000 euros
		50.000-75.000 euros
		>75.000 euros
Health	In general, would you say your health is	Excellent
		Good
		Fair
		Not so good
		Poor
Children no longer in household	How many of your children live outside your household?	Number of children

9.3 Assumption checks

Table 19: VIF test for multicollinearity

Variable	VIF	1/VIF
Marital status	1.33	0.753692
Children in household	1.27	0.790392
Children not in household	1.59	0.630450
Education level	1.11	0.901945
Health	1.04	0.965473
Income	1.00	0.997912
Age	1.56	0.640529
Mean VIF	**1.27**	

Graph 4: check for normality
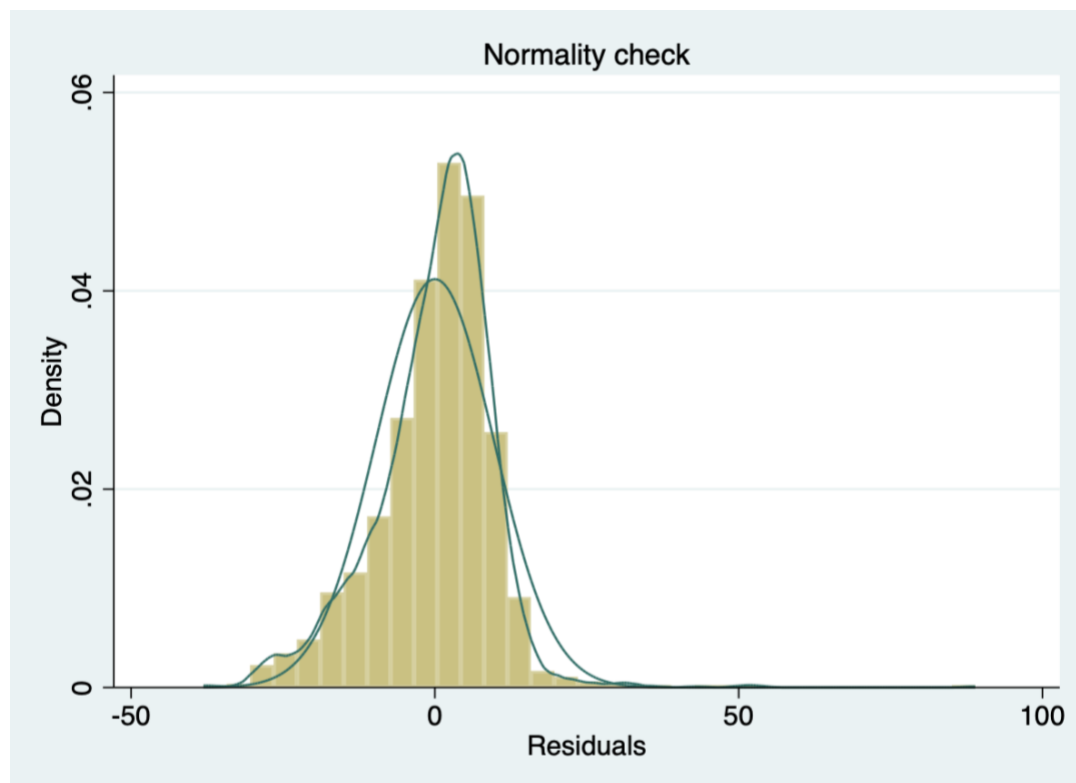
Graph 5: check for homoskedasticity
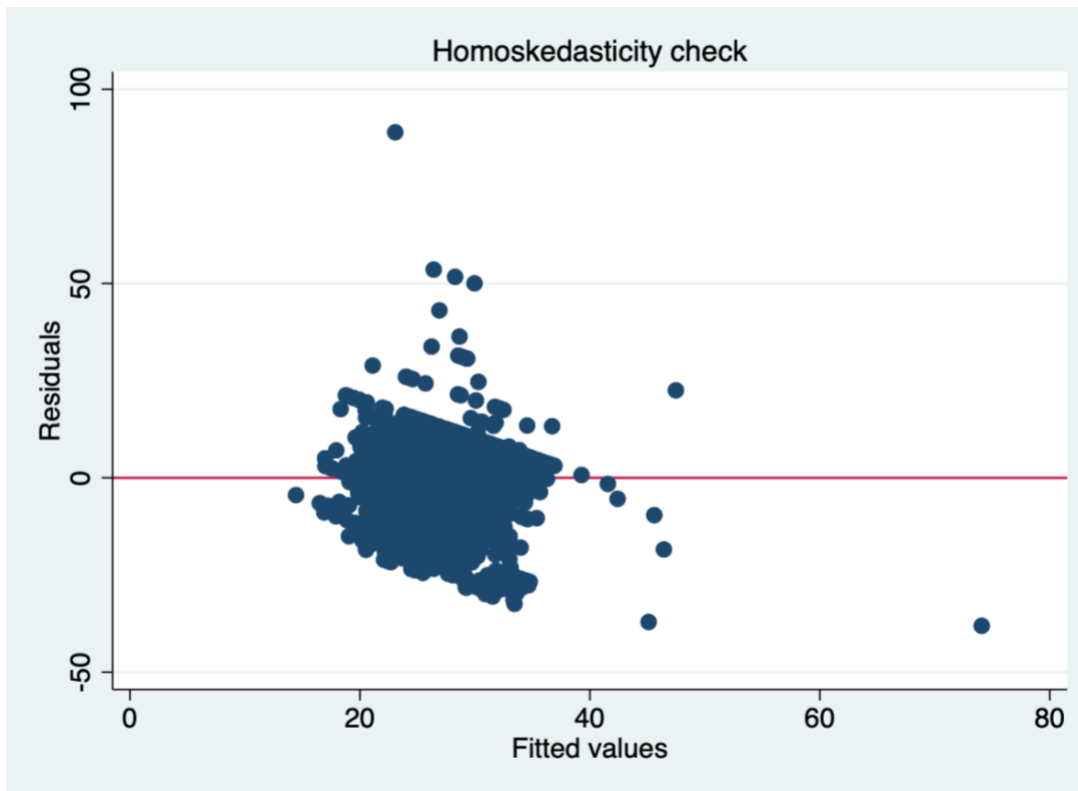
Table 20: Test for heteroskedasticity

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity	
H0: Constant variance	
Variables: fitted values of hours of work	
Chi2(1)	2.75
Prob > Chi2	**0.0976**