CHARLES UNIVERSITY
FACULTY OF SOCIAL SCIENCES
Institute of Economic Studies

How Does Motherhood Influence Drinking Habits?

An Investigation of Alcohol Consumption Among Women in the Czech Republic.

Bachelor's thesis

Author: Denisa Urbanová
Study program: Economics and Finance
Supervisor: PhDr. Mgr. Jana Votápková, Ph.D.
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Declaration of Authorship

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During the preparation of this thesis, the author used the AI system ChatGPT to get advice on coding and solving errors in R Studio and LaTeX. After using this tool, the author reviewed and edited the content as necessary and takes full responsibility for the content of the publication.

Prague, April 30, 2024

Denisa Urbanova

Abstract

This thesis investigates the influence of motherhood on alcohol consumption among female residents of the Czech Republic while focusing on the underlying effects of women's social roles. Although there are legitimate reasons to believe that motherhood leads to increased alcohol consumption, evidence also suggests that acquiring a role as a mother results in the opposite effect. By utilizing 2019 data from the European Health Interview Survey and employing logistic regressions, we uncovered that Czech women's drinking behavior is indeed influenced by acquired social roles whose effects vary across age groups. While motherhood is protective for alcoholism in younger women, older women with more children or multiple social roles are more prone to alcoholism.

JEL Classification	J12, J13, I12, Z13
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Author's e-mail	88251472@fsv.cuni.cz
Supervisor's e-mail	jana.votapkova@fsv.cuni.cz

Abstrakt

Tato práce zkoumá vliv mateřství na konzumaci alkoholu u žen žijících v České republice a dopady jejich společenských rolí na alkoholismus. I když existují oprávněné důvody proč se domnívat, že mateřství vede ke zvýšené konzumaci alkoholu, důkazy zároveň naznačují, že nabytí role matky má opačný efekt. Za použití dat z roku 2019 z Evropského dotazníkového šetření o zdraví (EHIS) a pomocí logistických regresí jsme zjistili, že konzumace alkoholu českých žen je ovlivněna nabytými společenskými rolemi, jejichž efekty se liší pro jednotlivé věkové skupiny. Zatímco u mladších žen má mateřství ochranný vliv na alkoholismus, starší ženy s více dětmi nebo více sociálními rolemi mají větší sklon k alkoholismu.

Klasifikace JEL	J12, J13, I12, Z13
Klíčová slova	mateřství, spotřeba alkoholu, Česká republika, EHIS
Název práce	Ovlivňuje mateřství sklony k pití alkoholu mezi ženami v České republice?

E-mail autora	88251472@fsv.cuni.cz
E-mail vedoucího práce	jana.votapkova@fsv.cuni.cz

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Acronyms

AME Average Marginal Effect

EHIS European Health Interview Survey

FASD Fetal Alcohol Spectrum Disorder

LR Likelihood Ratio

pp percentage points

US United States

ÚZIS ČR Ústav zdravotnických informací a statistiky České republiky

Chapter 1

Introduction

Motherhood comes along with plenty of challenges, constraints, uncertainties, and unpleasant experiences. Acquiring a role as a mother places significant demands on moms to provide child-centered, labor-intensive, and financially costly care. These expectations stem from patriarchal standards of motherhood, which emphasize that a woman's primary role in life is to care for her children. These standards are often seen as unrealistic, demanding, and time-consuming, placing significant social pressure on moms.

This pressure is a result of historical resistance to women's participation in the workforce and ongoing economic instability, leading many middle-class parents, in particular, to feel the need to secure their children's future economic success through intensive mothering practices. However, these standards often fail to consider the diverse circumstances of moms, including those from different racial, economic, and social backgrounds, further intensifying the pressure to conform to a single, often unattainable, model of motherhood (Newman & Nelson 2021).

All these pressures stemming from the possession of a mother role may result in increased alcohol consumption if women use alcohol as a means to overcome problems induced by childcare, such as tiredness or lack of sleep. This idea is supported by research showing that 27.3% of women living in Prague consider parenthood as a reason to start drinking alcohol (Vodičková 2016).

This reasoning suggests that alcohol might increase mothers' propensity to alcoholism and this hypothesis appears to be valid for American women as well.

While maternity leave is available in the Czech Republic, allowing mothers to adapt better to their role as a mother, in the United States, no maternal leave is guaranteed by law. Hence, women usually return much earlier to work which further fuels the stress and pressures originating from motherhood.

Newman & Nelson (2021) uncover a worrying societal shift. There has been a noticeable increase in heavy drinking and alcohol-related issues among women in the US, largely due to the powerful role of social media platforms and the online world in promoting and normalizing the 'winemom' lifestyle. They contend that this is neither a healthy nor a sustainable response. Moreover, it highlights how this trend inadvertently reinforces traditional gender norms, which may not be beneficial for women's overall well-being.

On the other hand, evidence exists that motherhood can turn out as protective for alcoholism, perhaps due to fewer opportunities to drink. Therefore, while women can succumb to alcoholism as a result of their acquired social roles, the opposite effect is also plausible. In addition, these effects vary across nations, thus we find it intriguing to inspect how this effect operates among Czech women.

In the Czech Republic, the implications of motherhood for women's drinking behavior is an understudied topic. Although studies have examined the effects of parenthood on alcoholism in some other countries, the evidence is often contradictory and the focus lies mostly on the simple condition of being a parent or not. In this thesis, we observe how each additional child affects women's drinking habits. To the best of our knowledge, no study has so far explored this phenomenon in the Czech Republic.

The object of this thesis is to identify the factors that shape alcohol consumption among Czech women. In particular, it intends to answer the question of whether mothers of more children are more prone to alcoholism and how the drinking habits of Czech mothers are influenced by their social roles.

In our thesis, we analyze a sample of Czech women by utilizing ordinal logistic regressions while controlling for multiple factors that are assumed to explain the studied relationship. We restrict our sample to women with up to three children to exclude individuals characterized by high numbers of children

and reliance on social benefits. To explore potential distinctions among different age groups, observations are also modeled for younger and older women separately. The analysis reveals that social roles do influence women's drinking habits, although not in the same way for women of all ages.

The thesis is structured as follows. Chapter 2 reviews the findings related to our topic that have been revealed by existing research, chapter 3 describes the dataset and variables used in the analysis and chapter 4 is devoted to the methodology applied in the analysis. Chapter 5 deals with presentation and interpretation of our results and finally chapter 6 summarizes the results and concludes.

Chapter 2

Literature review

2.1 Factors influencing maternal alcohol consumption

Alcohol use among mothers is influenced by multiple factors from which one of the most powerful is the position role (or social role) of a person which is characterized by societal expectations of traits that are gained through life (for example, being a parent, spouse or employee) resulting in extreme pressure to combine these multiple roles (Hajema & Knibbe 1998; Darrow *et al.* 1992; Gmel *et al.* 2000).

The concept of role theory describes everyday behavior as the enactment of predefined social categories, such as those of a mother, employee, or spouse. Each role comes with a specific set of responsibilities, obligations, social norms, and behaviors that are expected from a person. This concept stems from the perception that individuals tend to behave in consistent patterns, and that how they act is influenced by their social position and various contextual factors (Barnett 2014).

Acquiring a spouse role and a parental role are linked to a reduction in alcohol consumption or heavy drinking. Conversely, among women, the loss of a spouse role is associated with an increase in heavy drinking (Hajema & Knibbe 1998). These results suggest that role transitions, specifically in terms of acquiring or losing spouse and parental roles, may significantly influence drinking behavior.

In line with role theory, Temple *et al.* (1991) revealed that younger women increased their alcohol consumption after becoming unmarried. This might be due to the lost position role since it is anticipated that individuals having such position roles will consume less alcohol whereas those who are lacking the roles have less structure in their life, which might result in the use of alcohol consumption to make their life more structured or as a way to reduce tensions induced by lack of roles (Knibbe *et al.* 1987). Additionally, Temple *et al.* (1991) revealed a significant decrease in alcohol consumption for both younger and older women who became married.

Matusiewicz *et al.* (2016) examined the impact of motherhood on women's alcohol consumption over three years. The researchers found that women who became mothers showed significant reductions in alcohol use compared to women who did not become mothers. Specifically, in comparison to non-mothers, mothers evinced 31.8 fewer drinking days and 16.7 fewer heavy drinking days per year, as well as consumption of 0.6 fewer alcoholic drinks per occasion. The findings highlight the significant decrease in alcohol consumption associated with the transition to motherhood. This is in line with Power & Estaugh (1990) who also reported a decrease in consumption for young women who became mothers.

By contrast, in an investigation among white and African-American women, a positive effect of parental roles on heavy drinking was found among African American women (Darrow *et al.* 1992). Specifically, the findings suggested that the individual's multiple roles as an employee and parent created stress, which in turn contributed to increased alcohol consumption, in particular heavy drinking.

This corresponds to the role overload theory. Role overload is the feeling of being overwhelmed by a range of obligations and lacking time to fulfill them (Booth *et al.* 2005). Balancing the roles of wife, mother, and employee simultaneously tends to place significant demands on women's time, energy, and psychological well-being, resulting in feelings of distress (Wilsnack & Cheloha 1987). Moreover, studies suggest that women may resort to increased alcohol consumption in an effort to alleviate distress (Johnson 1982; Trice & Sonnenstuhl 1988; Brady & Sonne 1999; Müller *et al.* 2023). Thus, it seems reasonable to anticipate that women overwhelmed by the responsibilities of multiple roles

are more prone to develop heavy or problematic drinking habits (Guinle & Sinha 2020; Wilsnack & Cheloha 1987; Johnson 1982; Gmel *et al.* 2000). However, few researchers have explicitly articulated this expectation (Wilsnack & Cheloha 1987; Johnson 1982).

2.2 Social media influence on maternal drinking patterns

Bosma *et al.* (2022) point out that social media platforms are exploiting mothers by promoting alcohol consumption as a way to solve the challenges of parenting. They identify the existence of a "mummy drinking culture" on social media sites, where alcohol is portrayed as a means to counter stress and difficulties associated with motherhood. For example, Facebook pages with names like "Mummy Drinks Wine and Swears" or "Mummy Needs a Vodka" provide women with contact with other mothers who face the challenges of parenthood (Bosma *et al.* 2022).

Apart from offering a sense of connection and support among mothers, these platforms also normalize risky drinking behaviors and downplay the potential health risks (Bosma *et al.* 2022; Fitzsimmons 2018; MacArthur 2021), including fetal alcohol spectrum disorders which arise as a result of prenatal alcohol exposure. Once the disorders show in a person, behavioral, physical, and learning problems may follow (Centers for Disease Control and Prevention 2022).

Concerns are raised about the messaging that alcohol is essential for solving parenting problems, facilitating socializing, and providing a break from maternal responsibilities (Bosma *et al.* 2022; Paradis *et al.* 2011). Atkinson *et al.* (2019) emphasize that the alcohol-selling companies specifically target women, including mothers. This is done through advertising campaigns and specialty products (for instance, skinny rosé wine, light beers, and merchandise) while downplaying the stress experienced by parents as well as the dangers of alcohol consumption (Bosma *et al.* 2022).

Newman & Nelson (2021) criticize the 'winemom' trend, which is becoming more prominent. In this trend, moms seek support and connection in online communities, particularly on social media, to navigate the challenges of parenting and manage associated stress. A key part of this trend is moms using

alcohol to deal with the stress of motherhood. For example, a mother shared a post on a social site giving out that after a period of abstinence, she started drinking again after reading another post saying that being a parent makes drinking excusable since it is, in fact, self-care, and parenting is demanding (Newman & Nelson 2021). While the 'winemom' narrative might appear to advocate for self-acceptance, it ultimately leads to self-destructive behavior by encouraging women to rely on alcohol as a coping mechanism for the challenging aspects of motherhood (Newman & Nelson 2021).

Reisdorfer *et al.* (2023) investigated how social media affects mothers' alcohol consumption. Their research revealed that more mothers turned to alcohol during the pandemic, and social media played a role in this trend.

Through their study, they found that several factors contribute to mothers' alcohol use. These include the support they receive from their communities, how they cope with stress, societal expectations about motherhood, and the way alcohol is marketed to them.

Importantly, social media has emerged as a key influencer, normalizing alcohol use among mothers. This normalization is concerning because it can lead to various problems, including social, economic, and health issues tied to excessive drinking.

According to Reisdorfer *et al.* (2023), the role of social media in shaping mothers' drinking habits is significant. Harding *et al.* (2021) indicated that wine mom culture and social media posts tagged with #winemom were indicative of the struggles faced by women, with many turning to alcohol or online communities as coping mechanisms for poor mental health.

2.3 Socioeconomic determinants of drinking among women in Europe

Gmel *et al.* (2000) explored the influence of social roles on women's drinking behavior in four European countries. The findings shed light on the diverse role theories that operate across these nations.

Germany emerged as a unique case, where heavy drinking rates were notably high among single working women. This suggests that, in Germany, marital

status and employment play crucial roles in women's drinking habits. It was found that married women are less likely to drink heavily.

Switzerland exhibited interesting trends, indicating that roles that deviated from the traditional role of a housewife were linked to increased heavy drinking rates. In Switzerland, only employment showed a positive association with heavy drinking, while a decrease in the risk of heavy drinking was found for married women with children.

In contrast, Finland showcased the significance of the role accumulation theory. Here, the possession of multiple roles was linked to lower alcohol consumption. Specifically, younger Finnish women were 11.6% likely to drink heavily (older 4.9%) if they had children, were employed, and married. On the contrary, they were only 1.2% likely to drink heavily (older 0.5%) when possessing none of these roles. This supports the idea that women with more responsibilities and structured lives tend to drink less, possibly due to limited opportunities for alcohol consumption.

France, on the other hand, presented a more complex picture, with no consistent role patterns regarding heavy drinking. This suggests that French women's drinking behaviors may be influenced by a lot of other factors beyond traditional roles.

Gmel *et al.* (2000) moreover mentions these differences across countries are a result of different systems within countries where those such as Finland allowing for a more pleasant transition to roles evince lower inclinations to alcoholism among women, while others like Switzerland, where parenting puts much more strain on mothers since for example, children are coming home for lunch from school, thus making it increasingly stressful to have a job while caring for school-age children.

These insights emphasize the need to consider the unique sociocultural contexts and role dynamics within each country when exploring the relationship between social roles and women's alcohol consumption. It underscores that gender equity and cultural factors significantly shape drinking behaviors among women across different European nations (Gmel *et al.* 2000).

Chapter 3

Data description

3.1 Dataset

The thesis uses data from the 3rd wave of the European Health Interview Survey (EHIS) for the Czech Republic which have been provided by the Institute of Health Information and Statistics of the Czech Republic (ÚZIS ČR). EHIS is a survey of the general population with health variables describing population health, health determinants and use of health care services.

3.2 Adjustments to the dataset

To address the research question, data from the last survey year 2019 will be employed and only female respondents will be included. The study will focus on women aged 25-50 to capture a population that has likely completed their education and does not share a household with their parents. Observations with missing information on the examined outcome variables will be excluded from the analysis.

Descriptive statistics of the dataset revealed the presence of only a few mothers who have more than three children aged less than 13. Therefore, in order to avoid biased estimates, these women are not considered in the analysis. Additionally, by this adjustment, individuals characterized by high numbers of children and reliance on social benefits will be eliminated.

3.3 Characteristics of variables

This section describes the variables used in our models. Furthermore, it provides an introduction and justification of the expected effects of each independent variable on the dependent ones.

3.3.1 Dependent variables

- *alc_4* - is the frequency of consumption of an alcoholic drink of any kind during the past 12 months. This variable is scaled from 1 to 4 where 1 indicates "less than once a month" and 4 means "5 to 7 days a week". For the purpose of this thesis, the categories 1 to 4 of this variable will be called *infrequent, occasional, frequent* and *very frequent*, respectively.

  (1) less than once a month (*infrequent*)

  (2) 2 - 3 days in a month (*occasional*)

  (3) 1 - 4 days a week (*frequent*)

  (4) 5 - 7 days a week (*very frequent)*

- *alc_dummy* - is a dummy variable equal to one for women who have been consuming alcohol at least once a week during the past 12 months, and zero otherwise. This variable classifies women who drink at least once a week as *frequent* drinkers and the others as *infrequent* drinkers.

3.3.2 Independent variables

- *par* - is a dummy variable equal to one if a person lives with a legal or de facto partner.

  Observed correlations between alcohol consumption of women and their husbands indicate that women's drinking habits are influenced by those of their partner (Kubička *et al.* 1991; Reczek *et al.* 2012). Since men drink, on average, more than women (Reczek *et al.* 2012; World Health Organization 2018; Kuntsche *et al.* 2012), married women were found

to consume more alcohol compared to their single counterparts (Reczek *et al.* 2012). Therefore, a positive effect of this variable is anticipated.

On the other hand, having a partner might help divide some household- or children-related responsibilities, hence a negative effect on women's alcoholism is also feasible. Moreover, some studies pointed out that being married leads to decreased alcohol consumption (Hajema & Knibbe 1998; Temple *et al.* 1991; Leonard & Eiden 2007; Knibbe *et al.* 1987).

- *child* - indicates the number of children younger than 13 years old living in a person's household.

  With this variable, we would like to capture the effect of having a particular number of children on women's drinking habits. Although in fact, it is not specified if the children are own to a woman, it seems reasonable to expect that the number of children in a woman's household will mostly correspond to the number of her own children.

  Moreover, the effects on alcoholism of living with children who are or are not own to a woman are likely to be highly similar since the level of care provided to these children is unlikely to differ.

  We expect the effect of this variable on alcoholism to be positive which would be the case if women start drinking as a result of being overloaded by their responsibilities (Ahlström *et al.* 2001; Darrow *et al.* 1992; Vodičková 2016; Paradis *et al.* 2011). However, it can also have a negative effect as suggested by Matusiewicz *et al.* (2016); Wilsnack & Cheloha (1987); Hajema & Knibbe (1998) and Power & Estaugh (1990).

- *empl* - is a dummy variable equal to one for employed persons and zero otherwise. In the sense of the EHIS survey in the Czech Republic, employed means working, i.e. it includes self-employed persons as well.

  Since attending work might create more opportunities for drinking (Hajema & Knibbe 1998), employment is expected to positively influence the frequency of drinking also because alcoholism can be a result of possible workplace stress, peer pressure or job dissatisfaction (Trice & Sonnenstuhl 1988; Frone 1999).

- *age* - is the age of a respondent in completed years at the time of the interview.

We suppose that age will affect the drinking frequency negatively since older women are likely to be more experienced in life and thus unlikely to succumb to alcoholism due to some potential difficulties they might face.

- *inc* - is the net monthly equivalised income of a household. It is measured on a 1 - 5 scale ranging from "below 1st quintile" to "between 4th quintile and 5th quintile".

  It is anticipated that income level can affect alcohol consumption in the way that higher-income people might buy and therefore consume more alcohol. However, we do not expect income to have large effects on alcoholism.

- *educ* - is the educational attainment level, i.e. the highest level of education completed. It is scaled from 1 to 9 where 1 represents "first stage of primary school" and 9 means "doctoral".

  Research has shown that more educated women generally consume more alcohol (Ahlström *et al.* 2001). Moreover, a positive association between educational level and alcohol consumption in Prague women was revealed (Kubička *et al.* 1991), thus we expect to observe the same direction of the relationship in our sample of Czech women.

- $par \cdot child$ - is an interaction term measuring the effect of having an additional child and living with a partner.

  The effect of this interaction will depend on which role theory will emerge as significant among Czech women. If the acquisition of roles as a wife and mother of an additional child leads to role overload among women, the effect should be positive. Conversely, it is also feasible that gaining these roles is protective for alcoholism, which would imply a negative effect on drinking frequency. Such effect would confirm the role accumulation theory claiming that multiple roles are associated with lower alcohol consumption.

- $empl \cdot child$ - is an interaction term measuring the effect of having an additional child and being employed.

This is supposed to affect the drinking frequency positively (Kuntsche *et al.* 2012) and even more than the variables *empl* and *child* individually. This expectation is also in line with the finding by Darrow *et al.* (1992) that stress stemming from these multiple roles fuelled heavy drinking among women.

Note that table A.1 summarizing the description of variables is available in appendix A.

3.4 Preliminary analysis

In order to set suitable boundaries on the age of the female respondents, the number of children versus respondent's age was plotted as shown in figure 3.1.

The plot illustrates that most women have children under the age of 13 between the ages of 25 and 50. However, even for fifteen and sixty year old women, a possession of multiple children can be observed.

This is due to the fact that the variable *child* indicates the number of children living in a woman's household implying that, for women under 25 and over 50, the value of *child* presumably stands for children who are not theirs. Specifically, for younger women, it might capture the number of their siblings and number of grandchildren for elderly women.

Based on this, we decide to work with women aged between 25 and 50 years old.

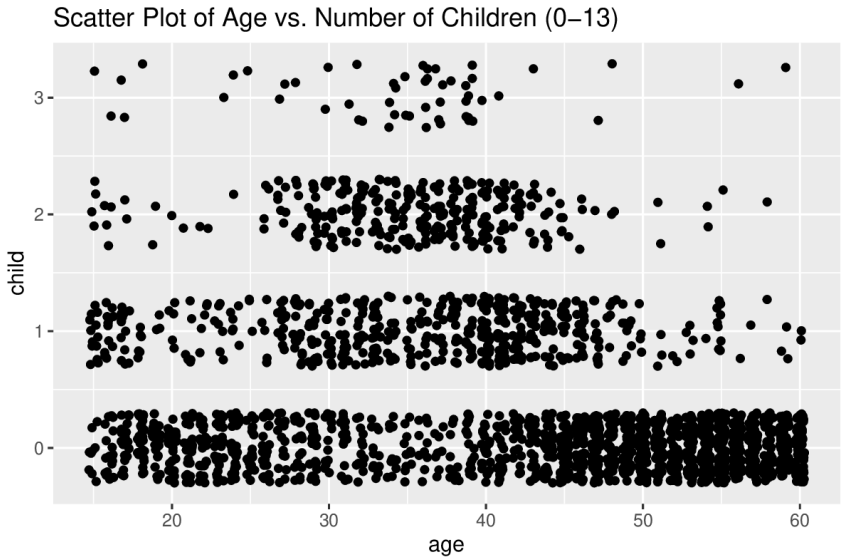

Figure 3.1: Scatter Plot of Age vs. Number of Children (0-13)

Correlation matrix in table B.1 in appendix B checks for correlation among variables. As none of the variables exhibit correlation exceeding 0.5 in absolute terms excluding any of the variables is not needed.

Table B.2 in appendix B displays the descriptive statistics of the examined variables. All values seem to be reasonable, hence there is no need for deleting any of them from the dataset.

Chapter 4

Methodology

4.1 Ordinal logistic regression methodology

Our dependent variable consists of 4 categories of frequency of consumption of an alcoholic drink and these categories are ordered (from *infrequent* to *very frequent*), thus an ordinal logit model will be used for the empirical analysis.

Ordered (or ordinal) logistic regression is specifically designed for ordinal dependent variables with categories that have a natural order, however, the intervals between them are not necessarily equal. Unlike linear regression, ordinal logistic regression does not assume normality of the dependent variable or residuals, which makes it robust to potential violations of normality assumptions.

While in linear regression, coefficients represent the change in the average value of the dependent variable that is associated with a one-unit change in the independent variable, in ordinal logistic regression, coefficients represent the change in the log-odds of moving to a higher category of the dependent variable associated with a one-unit change in the independent variable, where odds is the probability of an event happening against its probability of not happening.

4.1.1 Ordinal logistic regression model

Let Y be an ordinal outcome with J categories. In ordinal logistic regression, we model the probability that an outcome variable Y falls into a specific category

j ($j = 1, \ldots, J-1$) or lower. The model can be defined as

$$\text{logit}(\Pr(Y \leq j)) = \beta_0 + \beta_1 x_1 + \cdots + \beta_p x_p$$

where $\beta_0, \beta_1, \ldots, \beta_p$ are the coefficients for parameters (i.e., intercept and slopes) with p predictors for $j = 1, \cdots, J-1$.

The logit is another word for the log odds which means that

$$\text{logit}(\Pr(Y \leq j)) = \log\left(\frac{\Pr(Y \leq j)}{\Pr(Y > j)}\right).$$

Since $\Pr(Y > J) = 0$, the above equation illustrates the reason why the model is defined for $j = 1, \ldots, J-1$ which is to avoid dividing by zero (Statistical Methods and Data Analytics n.d.).

The model assumes that the coefficient for each predictor variable x is the same for all j. The assumption is referred to as proportional odds assumption as it means that the odds ratio for a predictor variable x is equal at each level of Y i.e. regardless of where Y is split into $Y > j$ and $Y \leq j$, the resultant odds at any two values of x have the same ratio (i.e., are proportional).

Specifically, in our case, this assumption means that the odds of drinking *infrequently* versus *occasionally, frequently* or *very frequently* ($j = 1$) is the same as the odds of drinking *infrequently* or *occasionally* versus *frequently* or *very frequently* ($j = 2$). In our analysis, this assumption is tested along with other goodness-of-fit measures of the model.

4.1.2 Marginal effects

As the ordinal logit model's coefficients are not directly interpretable due to the non-linear nature of the model, interpretation in marginal effects is more reasonable. The marginal effects represent the partial derivative of the probability of a particular outcome, with respect to the predictor variable of interest x_k. This can be expressed as

$$\frac{\partial \Pr(Y = j)}{\partial x_k} = \frac{\partial F(\hat{\alpha}_j - X\hat{\beta})}{\partial x_k} - \frac{\partial F(\hat{\alpha}_{j-1} - X\hat{\beta})}{\partial x_k}$$

where F is the logistic cumulative distribution function and it holds

$$F(z) = \frac{exp(z)}{1 + exp(z)}.$$

This definition ensures that the values of the function are between 0 and 1 for all real numbers z.

4.1.3 Predicted probabilities

To predict the probability for an individual of falling into a particular category of outcome variable given a set of individual characteristics, the probabilities are estimated with the formula

$$\hat{\Pr}(Y = j|X) = F(\hat{\alpha}_j - X\hat{\beta}) - F(\hat{\alpha}_{j-1} - X\hat{\beta}).$$

4.1.4 Model specification

To capture the analyzed relationship, the following equation (model 1) is considered:

$$\begin{aligned} alc\_4_i = &\beta_0 + \beta_1 \cdot par_i + \beta_2 \cdot child_i + \beta_3 \cdot empl_i \\ &+ \beta_4 \cdot educ_i + \beta_5 \cdot inc_i + \beta_6 \cdot age_i \\ &+ \beta_7 \cdot empl_i \cdot child_i + \beta_8 \cdot par_i \cdot child_i + \epsilon_i \end{aligned}$$

and for the computation of predicted probabilities, the following ordinal

logit model (model 2) is used:

$$\begin{aligned} alc\_4_i = &\beta_0 + \beta_1 \cdot par_i + \beta_2 \cdot child_i + \beta_3 \cdot empl_i \\ &+ \beta_4 \cdot educ_i + \beta_5 \cdot inc_i + \beta_6 \cdot age_i + \nu_i. \end{aligned}$$

4.2 Binary logistic regression methodology

To check the robustness of the ordinal logit model, binary logit model is employed. Binary logistic regression is used for estimating the relationship between a set of independent variables and a binary dependent variable and can be defined as

$$P(Y = 1 \,|\, X) = F(\beta_0 + \beta_1 x_1 + \cdots + \beta_p x_p)$$

where Y is a binary outcome variable and X is a vector of predictor variables $x_1, \cdots, x_p$ with coefficients $\beta_1, \cdots, \beta_p$ and F is the logistic function defined as

$$F(z) = \frac{exp(z)}{1 + exp(z)}$$

(Wooldridge 2012).
Using this regression, we will model the probabilities of drinking frequently for women, given their individual characteristics.

4.2.1 Average marginal effects (AME)

Since even the estimates of binary logistic regression are not directly interpretable, we compute the average marginal effects of each independent variable on the dependent variable. For a continuous independent variable x_j, the average marginal effect is

$$n^{-1} \sum_{i=1}^{n} [f(\hat{\beta}_0 + \hat{\beta}_1 x_{i1} + \cdots + \hat{\beta}_k x_{ik}) \hat{\beta}_j]$$

where n is the number of observations and f is defined as

$$f(z) = \frac{exp(z)}{[1 + exp(z)]^2}$$

and for a change from c_k to $c_k + 1$ in a discrete independent variable x_k, the average marginal effect is

$$n^{-1} \sum_{i=1}^{n} \left\{ F\left[\hat{\beta}_0 + \hat{\beta}_1 x_{i1} + \ldots + \hat{\beta}_{k-1} x_{ik-1} + \hat{\beta}_k (c_k + 1)\right] - F\left(\hat{\beta}_0 + \hat{\beta}_1 x_{i1} + \ldots + \hat{\beta}_{k-1} x_{ik-1} + \hat{\beta}_k c_k\right) \right\}$$

(Wooldridge 2012).

4.2.2 Model specification

Similarly to the ordinal logit model, the binary logit regression in our case (model 3) is given by the equation:

$$\begin{aligned} alc\_dummy_i = &\beta_0 + \beta_1 \cdot par_i + \beta_2 \cdot child_i + \beta_3 \cdot empl_i \\ &+ \beta_4 \cdot educ_i + \beta_5 \cdot inc_i + \beta_6 \cdot age_i \\ &+ \beta_7 \cdot empl_i \cdot child_i + \beta_8 \cdot par_i \cdot child_i + \epsilon_i. \end{aligned}$$

4.3 Assessing the goodness of fit

For the purpose of evaluating the goodness of fit of the ordinal logit model, all the following tests are run which is recommended since each detects a different type of lack of fit (Fagerland & Hosmer 2016). As a goodness-of-fit measure for the binary logistic model, binary version of the Hosmer-Lemeshow test will be applied.

4.3.1 The Lipsitz test

This test divides the data into g groups based on the ordinal response score which is computed by summing the predicted probabilities of each subject (observation) for each outcome category, multiplied by evenly spaced integer weights. After that, dummy variables I are created such that, for each group, $I = 1$ if the subject is in region g and $I = 0$ otherwise. The model is then

re-fit with these dummies and the fit is compared to the original model using a likelihood-ratio test.

If the coefficients for the dummy variables are all zero, the model has a good fit, which is what the null hypothesis states (Fagerland & Hosmer 2017).

4.3.2 The Hosmer-Lemeshow test

In this test, the expected and observed frequencies of the outcome are compared and a chi-squared distributed test statistic is computed. Specifically, the predicted probabilities derived from fitting the model are used to assign each observation an ordinal score, and using these scores, similar-sized groups of observations are created. The test statistic is computed from the differences between expected and observed frequencies in each group and the statistic is chi-squared distributed with degrees of freedom based on the number of groups and response categories.

Under the null hypothesis, the expected and observed frequencies do not differ significantly, which indicates a good model fit (Fagerland & Hosmer 2017).

4.3.3 The Pulkstenis-Robinson test

This test divides the data based on observed patterns of predictor variables using only categorical predictors to avoid excessive partitioning. Continuous predictor variable patterns are split into two subgroups based on their median ordinal score. The ordinal score is assigned to each subject by summing predicted probabilities for each outcome category, multiplied by evenly spaced integer weights. Observed and expected frequencies are then computed, and chi-squared distributed test statistics are derived. The degrees of freedom depend on the number of predictor variable patterns, response categories, and categorical variables in the model.

Under the null hypothesis, the observed and expected frequencies within each predictor variable pattern do not differ significantly, which indicates a good fit of the model (Fagerland & Hosmer 2017).

Chapter 5

Results

In this chapter, the results of the analysis are presented. First, the goodness-of-fit measures are summarized and subsequently, the models are interpreted.

Table 5.1 reports the summary of the ordinal logistic model, however, the magnitude of the relationships cannot be directly interpreted since the coefficient values are expressed in log odds of moving into a higher category of outcome variable. Therefore, to assess the magnitude of the effects, marginal effects of each predictor variable on alcoholism have been computed and are displayed in the right part of table 5.1.

To check the model's robustness, the average marginal effects derived from the binary logistic regression are interpreted and reported in table 5.2.

Additionally, the predicted probabilities of being in each category of the outcome variable are summarized in section 5.3.1. The predicted probabilities were derived from modeling two age groups separately in order to evaluate differences in younger and older women.

5.1 Goodness of fit

Tests assessing the goodness of fit were run on our models and the results, reported in appendix D, can be summarized as follows.

For the ordinal models, all three goodness-of-fit tests resulted in p-values

higher than 0.028, suggesting that there is not enough evidence to reject the null hypothesis at 1% significance level, thus indicating a good fit of the models.

Similarly, the binary version of the Hosmer-Lemeshow test signified a good fit of the binary logit model at 1% significance level.

To verify if the proportional odds assumption of the ordinal logit models holds, the Brant test was employed. For all ordinal models, the p-value of the test implies that we cannot reject the null hypothesis that the assumption holds at 1% significance level, hence it can be claimed that the assumption is satisfied.

Therefore, our models can be considered a good choice for analyzing the data since they proved to fit the data well.

5.2 Ordinal logit model interpretation

The value of *McFadden's* R^2, which is 0.0202 in the ordinal logit model, indicates that the model's ability to explain the variance in dependent variable is not ideal. However, it is recommended not to rely solely on the pseudo-R^2 measures in logistic regressions but use it along with other goodness of fit measures (Hagle & Mitchell 1992).

Table 5.1: Ordinal Logit Model Results (model 1)

		Marginal effect			
	alc_4	(1)	(2)	(3)	(4)
		infrequent	*occasional*	*frequent*	*very frequent*
par	0.442***	−0.100***	0.007	0.079***	0.013**
	(0.143)	(0.033)	(0.005)	(0.025)	(0.004)
empl	0.752***	−0.175***	0.027*	0.128***	0.020***
	(0.237)	(0.057)	(0.016)	(0.037)	(0.006)
child	0.293*	−0.065	0.002	0.054***	0.009
	(0.172)	(0.038)	(0.002)	(0.032)	(0.006)
age	0.018**	−0.004	0.000	0.003**	0.001
	(0.008)	(0.002)	(0.000)	(0.001)	(0.000)
educ	0.078***	−0.017***	0.000	0.014***	0.002
	(0.027)	(0.006)	(0.001)	(0.005)	(0.001)
inc	0.076*	−0.017**	0.000	0.014***	0.002
	(0.042)	(0.009)	(0.001)	(0.008)	(0.001)
child · par	−0.283**	0.063*	−0.001	−0.052***	−0.009**
	(0.138)	(0.030)	(0.002)	(0.025)	(0.005)
child · empl	−0.162	0.036	−0.001	−0.030**	−0.005
	(0.150)	(0.033)	(0.002)	(0.027)	(0.005)
Observations	1,347	1,347	1,347	1,347	1,347
McFadden's R^2	0.0202				
AIC	3,216.613				
Log-Likelihood	−1,597.307				
LR Chi^2	65.907				
Prob > Chi^2	0.000				
Note:					*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

5.2.1 Marginal effects

As suggested by the results, women living with a partner have 1.3 pp (percentage points[1]) higher probability of being among the most frequent drinkers, 7.9 pp higher probability of drinking frequently and they are 10 pp less likely to drink infrequently. This positive relationship between having a partner and alcohol consumption is consistent with findings by Reczek *et al.* (2012) and

[1]Marginal effects provide an additive approximation in models where relationships are not strictly linear. They present results as differences in probabilities and thus, values of marginal effects are expressed in percentage points.

Gmel *et al.* (2000) on Swiss women.

Having an additional child proved to increase the probability of falling into the category of frequent drinking by 5.4 pp while the effect is not significant for other frequencies of drinking. Since having an extra child seems to increase the drinking frequency, our result confirms the finding by Kuntsche *et al.* (2012) on working women.

On the other hand, the effect of having a partner and an additional child is statistically significant for three frequency levels and suggests that a one-unit increase in both variables *par* and *child* decreases the probability of being among the most frequent drinkers by 0.9 pp and the probability of frequent drinking by 5.2 pp, while it raises the probability of infrequent drinking by 6.3 pp. These estimates indicate that the acquisition of roles as a partner and as a mother of an additional child leads to less frequent drinking.

Since the effects of the individual variables *par* and *child* have an opposite direction than their interaction, our results are consistent with those by Gmel *et al.* (2000) on Swiss women, and signify that the transition into roles as a mother and partner is protective for alcoholism among Czech women, indicating a significance of role accumulation theory[2]. From this point of view, our findings are consistent with those by Gmel *et al.* (2000) on Finnish women, whose drinking behavior can be explained by this theory as well. This finding could be also explained by our assumption that having a partner might alleviate stress induced by children-related responsibilities or lack of financial resources.

The largest and most significant effects shows the variable *empl* which indicates that working women are 2 pp more likely to drink very frequently, 12.8 pp more likely to drink frequently, and 17.5 pp less likely to drink infrequently. This confirms our assumption and the hypothesis suggested by Hajema & Knibbe (1998) that employed women are more frequent drinkers.

Similar to the aforementioned interaction term, the joint effect of having

[2]The accumulation theory assumes that an individual's well-being increases with acquisition of each additional social role (Gmel *et al.* 2000). It points out that the accumulation of social roles creates more structure in life, thus reducing the number of drinking occasions. It is contradictory to the role overload theory (Kuntsche *et al.* 2012).

an extra child and being employed has an opposite sign than the individual variables in terms of predicting frequent drinking. While women with a job or an extra child are, ceteris paribus, more likely to drink frequently, those who are employed and, at the same time, get an additional child are 3 pp less likely to be frequent drinkers.

We assumed that the pressure stemming from the simultaneous possession of these two roles would lead to considerable pressure fuelling the need for alcohol. However, the values suggest that these multiple roles result in the reverse effect, confirming the role accumulation theory.

5.3 Binary logit model interpretation

While the binary logistic model evinces a slight improvement in the $McFadden's$ pseudo-R^2 in comparison to the ordinal version, its value (0.0281) remains quite low. However, we believe that the model can still be useful based on other goodness-of-fit measures. Besides the test mentioned in section 5.1, the percentage correctly predicted (67.409) and the resulting significant p-value of the LR test suggest a good fit of the model.

In this model, a negative effect of the interaction term $child{\cdot}par$ is reported. This suggests that the average joint effect of living with a partner and having one additional child reduces the probability of being a frequent drinker by 8.6 pp. The individual effect of living with a partner is also significant, and indicates, that living with a partner increases the probability of frequent drinking by 11.1 pp on average.

The average marginal effect of being employed is 0.118 implying that employed women have, on average, 11.8 pp higher probability of drinking frequently.

Moreover, the model reveals a significant positive effect of age, specifically, becoming one year older increases, on average, the probability of being a frequent drinker by 0.5 pp.

All these estimates confirm those from the ordinal logit model suggesting a

decent robustness of our ordinal logit model.

Table 5.2: Binary Logit Model Results (model 3)

	dependent variable	
	alc_dummy	AME
par	0.543**	0.111***
	(0.167)	(0.033)
empl	0.591*	0.118*
	(0.293)	(0.054)
child	0.355	0.075
	(0.212)	(0.045)
age	0.025**	0.005**
	(0.009)	(0.002)
educ	0.062	0.013
	(0.032)	(0.007)
inc	0.067	0.014
	(0.049)	(0.010)
child · par	−0.409*	−0.086*
	(0.165)	(0.035)
child · empl	−0.162	−0.034
	(0.185)	(0.039)
intercept	−3.019***	
	(0.485)	
Observations	1,347	1,347
McFadden's R^2	0.0281	
AIC	1663.705	
Log-Likelihood	−822.8523	
LR Chi^2	47.514	
Prob > Chi^2	0.000	
Percentage correctly predicted	67.409	
Note:	*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$	

5.3.1 Predicted probabilities

In order to evaluate the effect of role theory on women in the Czech Republic, the probabilities of falling into each category of drinking frequency have been predicted. The data were modeled separately for two age categories, 25-35 and 36-50, which in this thesis, are named younger and older, respectively. The

cutoff point of 35 years was chosen in order to ensure best-fitting models with significant coefficients. Moreover, such age division was applied by Wilsnack & Cheloha (1987).

In this section, the predicted probabilities are interpreted based on the results that are presented in tables C.1 and C.2 and visualized in figures 5.1 and 5.2.

The plots depict the predicted probabilities of each drinking frequency for each combination of being employed, living with a partner and having a particular number of children. Different lines within each of the four graphs represent different frequencies of drinking, i.e. *infrequent*, *occasional*, *frequent* and *very frequent*.

5.3.2 Results for younger women

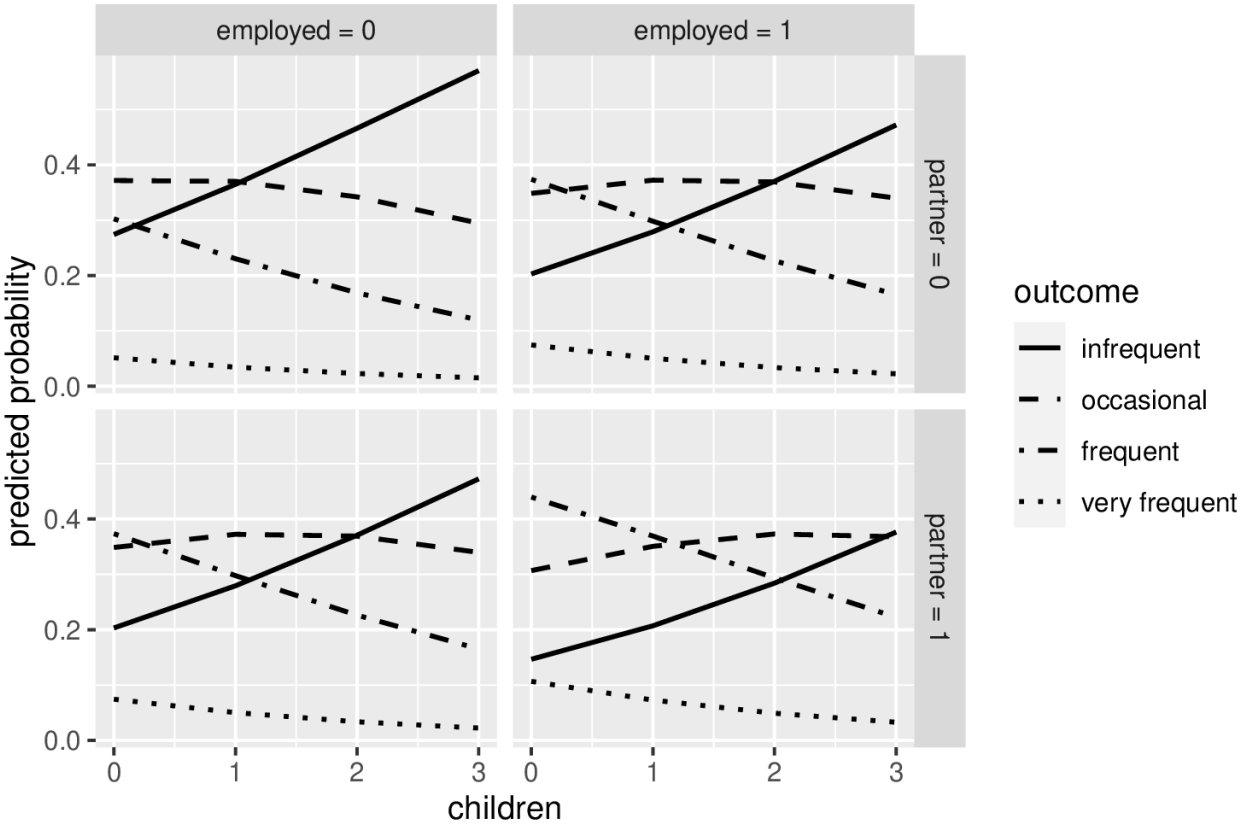

Figure 5.1: Predicted Probabilities (younger women)

The results suggest that, for younger women, the probability of drinking very frequently decreases with the growing number of children. The largest decrease is observed for employed women living with a partner who also evince the highest probability of drinking very frequently if they do not have any children. This trend suggests that possession of roles as a partner and employee increases their probability of very frequent drinking while having each extra child has a reverse effect.

The predicted probabilities of drinking frequently (as illustrated by the dot-dashed line) differ more substantially across combinations of employment and partnership than those for the previous outcome category. While having a decreasing tendency for all examined women, the relatively largest decrease in probability with the growing number of children can be observed for employed women who live with a partner and the lowest one for unemployed women without a partner. Similar to very frequent drinking, this means that working women with a partner show the relatively largest decreases in probabilities of frequent drinking with each extra child.

In terms of predicting infrequent drinking, as the number of children increases, the probability appears to increase most distinctively among single unemployed women and least among those who are employed and live with a partner, yet still substantially. This trend indicates that, for younger women, possession of a role as a multiple mother encourages them to give up on alcohol consumption, regardless of other social roles. This finding is consistent with those by Matusiewicz *et al.* (2016).

Interestingly, the values for women who are either employed or have a partner are very similar for younger women (they differ if rounded to more decimals), which signifies that employment influences the relationship between the number of children and alcoholism in the same way as partnership.

The results (in table C.1) reveal that the highest predicted probability of drinking frequently, 44%, is for working women with a partner and no children followed by 36.9% for working women with a partner and 1 child and, at the same time, women with these characteristics are least likely to drink infrequently. On the contrary, unemployed women with three children and without a partner are only 12% likely to be frequent drinkers.

Hence, it appears that younger women's drinking frequency decreases with the growing number of their children and increases with the possession of a role as a partner or employee. This signifies that, unlike roles as a partner and employee, motherhood is protective for alcoholism among younger women.

5.3.3 Results for older women

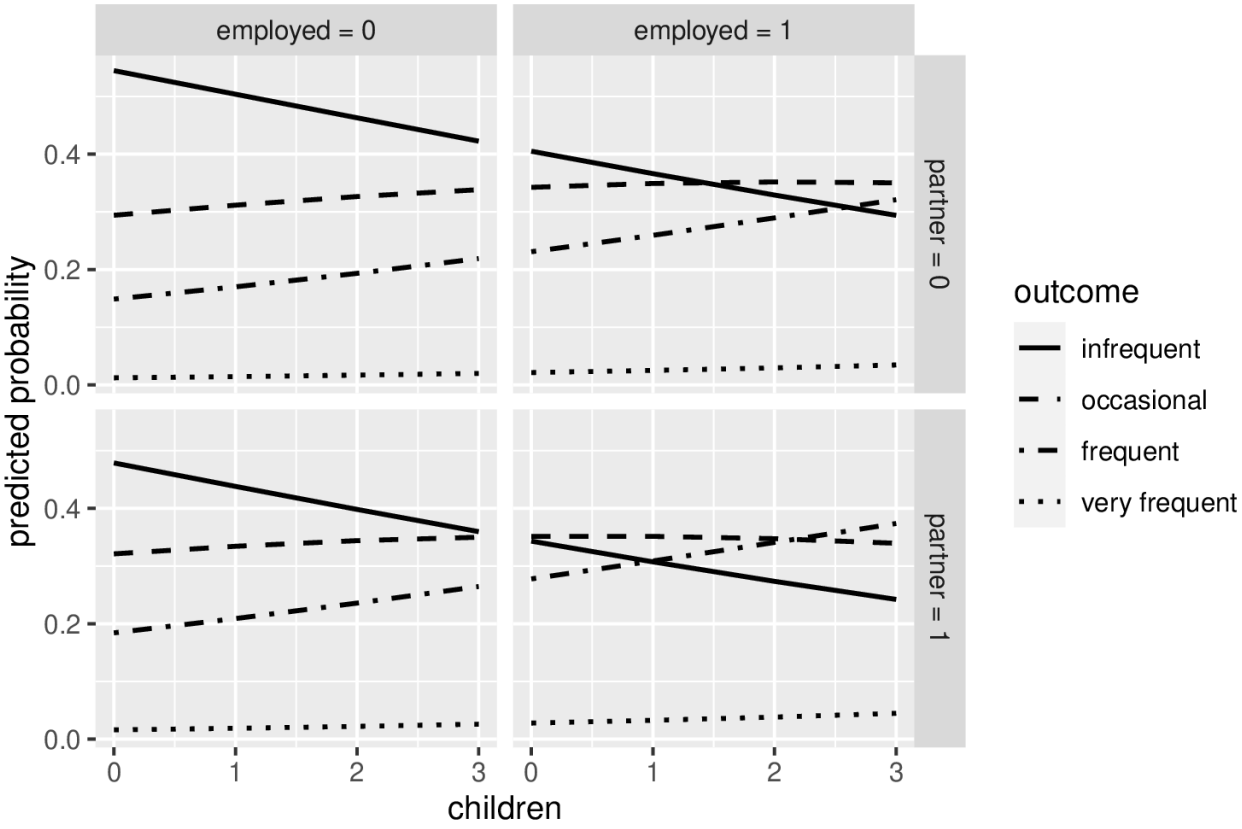

Figure 5.2: Predicted Probabilities (older women)

The results for older women show somewhat lower dynamics in terms of changes in women's drinking habits with respect to the number of their children which might be due to our assumption that older women are more resistant to potential challenges in life.

The probability for older women of falling into the very frequent drinking group shows a different pattern compared to younger women, in that it is generally very low and implies that very frequent drinking is not much influenced

by the number of children. Moreover, a slight increase in the probability with the growing number of children can be observed.

Similar to younger women, older women's probability of drinking frequently (dot-dashed line) increases with both employment and partnership. However, unlike their younger counterparts, older women are more likely to be frequent drinkers with each additional child. Similar to Gmel *et al.* (2000), we could argue that motherhood puts a substantial strain on women and combination with other roles leads to even greater stress.

Consistent with the finding discussed above, the predicted probabilities of infrequent drinking have a decreasing tendency as the number of children increases, and thus, older women with more children are less likely to be infrequent drinkers than those with fewer or no children. Unlike younger women, who are inclined to give up on alcohol when being multiple mothers, older women seem to have a reverse tendency.

Table C.2 shows that, among older women, the highest predicted probability of drinking infrequently, 54.5%, is for single unemployed women without children followed by 50.4% for single unemployed women with one child, while it is the lowest for employed women who live with a partner and 3 children (24.2%). At the same time, women with these characteristics (i.e. employed, having a partner and 3 children) are most likely to drink frequently (37.4%) as well as very frequently (4.5%).

The findings confirm the role overload theory for the sample of older women and are in line with a finding by Darrow *et al.* (1992). Since women in this age group seem to consume alcohol more often when possessing multiple social roles, it is likely that they turn to alcohol use as a coping mechanism to alleviate pressures stemming from multiple obligations.

Chapter 6

Conclusion

This thesis aimed to uncover the patterns of drinking behavior among mothers in the Czech Republic. It intended to answer the question of whether mothers of more children are more prone to alcoholism and it assessed the importance of women's social roles in shaping their drinking habits.

To address the research questions, data from EHIS 2019 were analyzed using ordinal logistic regression models and for interpretation of the results, marginal effects and predicted probabilities were computed. To investigate whether differences across age groups are present, observations were split into two subgroups based on the age of the respondents and modeled for younger and older women separately. The sample was restricted to women with up to three children to exclude women with social benefits dependency.

The results revealed that the number of children has a significant positive effect on women's alcohol consumption, specifically, having one additional child increases the probability of frequent drinking by 5.4 pp which corresponds to the findings of Kuntsche *et al.* (2012) on working women.

However, women who have a partner and become mothers of an additional child, are 6.3 pp more likely to drink infrequently, implying that being a partner and mother simultaneously leads to a shift towards less frequent drinking, confirming the role accumulation hypothesis.

The finding that both of the above-mentioned conditions influence alcoholism in opposite directions suggests that, whether a mother will succumb to

alcoholism as a result of motherhood is influenced by her other social roles and we cannot confirm that the same effect applies to all women. Furthermore, this finding is in line with those by Gmel *et al.* (2000) on Swiss women.

Moreover, women's age plays a crucial role in determining their drinking behavior. Among older women, a role overload effect was found meaning that the more roles such as an employee, partner, and mother, women have, the more they incline to a more frequent alcohol consumption. Moreover, motherhood is a risk factor, in that each extra child increases women's drinking frequency.

On the contrary, motherhood is protective for younger women. They tend to decrease or give up on alcohol consumption when acquiring a role as a mother of an additional child, but roles as a partner and employee mean a shift towards more frequent drinking. In other words, for younger women, the effect of motherhood on alcoholism is opposite to that for older women, however, being employed or having a partner is linked to more frequent drinking among both age groups.

This thesis contributes to a better understanding of how alcohol consumption patterns are being shaped among women in the Czech Republic. The findings revealed by this thesis could help inform public policies aimed at promoting healthier behaviors and reducing alcohol-related harm among women, particularly mothers.

These policies may include initiatives to raise awareness about the risks linked to maternal alcohol consumption and provide accessible resources for mothers who seek support. Additionally, social support systems that address other societal factors contributing to maternal stress can help alleviate the pressures faced by mothers and reduce reliance on alcohol as a coping mechanism.

A possible limitation of this research arises from the fact that the EHIS 2019 data provide information about the number of children aged less than 13 years. However, for our analysis, it would be beneficial to have a variable measuring the number of even younger children for comparison and a possibly better explanation of the studied relationship. Alternatively, information on the age of the youngest child could be valuable as well.

We utilized a cross-sectional dataset, however, in further studies, the use of longitudinal data could provide more insight into the mechanisms behind the

relationship between motherhood and women's drinking habits.

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Appendix A

Description of Variables

Table A.1: Description of Variables

variable	**meaning**	**variable type**	**values**
alc_4	alcohol	numeric	values 1-4, 4 is the highest (*very frequent*)
alc_dummy	alcohol	factor	= 1 if drinks at least once a week
child	children	numeric	number of children aged 0-13 in household
age	age	numeric	age in completed years
par	partner	factor	= 1 if lives with a partner
empl	employment	factor	= 1 if employed
inc	income	numeric	values 1-5, 5 is the highest quantile
educ	education	numeric	values 1-9, 9 is the highest level

Appendix B

Descriptive Statistics

Table B.1: Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)
child (1)	1					
par (2)	0.276	1				
age (3)	-0.285	0.063	1			
empl (4)	-0.382	-0.137	0.336	1		
inc (5)	-0.250	0.148	0.044	0.270	1	
educ (6)	0.132	0.035	-0.161	-0.097	0.242	1

Table B.2: Descriptive statistics

	Mean	St. Dev.	Min	Max
alc_dummy	0.32	0.47	0.00	1.00
alc_4	2.98	0.87	1.00	4.00
child	0.80	0.87	0.00	3.00
par	0.66	0.47	0.00	1.00
age	38.83	7.22	25.00	50.00
empl	0.77	0.42	0.00	1.00
inc	3.09	1.38	1.00	5.00
educ	4.70	1.99	2.00	9.00

Table B.1 was generated in R using the "stargazer" package created by (Hlavac 2022).

Appendix C

Predicted Probabilities

Table C.1: Predicted Probabilities (model 2, younger women)

	dependent variable				*predicted probability*			
	alc_4	*par*	*empl*	*child*	(1)	(2)	(3)	(4)
child	-0.419**	0	0	0	0.274	0.372	0.302	0.052
	(0.138)	0	0	1	0.365	0.370	0.230	0.035
par	0.393	0	0	2	0.466	0.342	0.169	0.023
	(0.212)	0	0	3	0.570	0.295	0.120	0.015
empl	0.395	1	0	0	0.203	0.349	0.374	0.075
	(0.220)	1	0	1	0.279	0.372	0.298	0.050
age	0.064*	1	0	2	0.370	0.369	0.227	0.034
	(0.031)	1	0	3	0.473	0.340	0.166	0.022
educ	0.077	0	1	0	0.203	0.349	0.374	0.075
	(0.045)	0	1	1	0.279	0.372	0.298	0.050
inc	-0.020	0	1	2	0.370	0.369	0.227	0.034
	(0.077)	0	1	3	0.473	0.340	0.166	0.022
		1	1	0	0.147	0.307	0.440	0.107
		1	1	1	0.207	0.351	0.369	0.073
		1	1	2	0.284	0.373	0.294	0.049
		1	1	3	0.376	0.368	0.223	0.033
Observations	460							
McFadden's R^2	0.026							
AIC	1089.643							
Log-Likelihood	−535.822							
LR Chi^2	29.038							
Prob $> Chi^2$	0.000							

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

(1) *infrequent*, (2) *occasional*,
(3) *frequent*, (4) *very frequent*

Table C.2: Predicted Probabilities (model 2, older women)

	dependent variable				*predicted probability*			
	alc_4	*par*	*empl*	*child*	(1)	(2)	(3)	(4)
child	0.164	0	0	0	0.545	0.294	0.149	0.012
	(0.093)	0	0	1	0.504	0.312	0.170	0.015
par	0.265	0	0	2	0.463	0.327	0.193	0.017
	(0.143)	0	0	3	0.423	0.339	0.219	0.020
empl	0.564**	1	0	0	0.479	0.321	0.184	0.016
	(0.200)	1	0	1	0.438	0.334	0.209	0.019
age	0.050**	1	0	2	0.398	0.344	0.236	0.022
	(0.018)	1	0	3	0.360	0.350	0.265	0.026
educ	0.063	0	1	0	0.405	0.343	0.231	0.021
	(0.035)	0	1	1	0.366	0.349	0.259	0.025
inc	0.094	0	1	2	0.329	0.352	0.290	0.030
	(0.050)	0	1	3	0.294	0.350	0.321	0.035
		1	1	0	0.343	0.351	0.278	0.028
		1	1	1	0.307	0.351	0.309	0.033
		1	1	2	0.273	0.347	0.341	0.038
		1	1	3	0.242	0.339	0.374	0.045
Observations	887							
McFadden's R^2	0.017							
AIC	2129.274							
Log-Likelihood	−1055.637							
LR Chi^2	36.918							
Prob $> Chi^2$	0.000							

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

(1) *infrequent*, (2) *occasional*,
(3) *frequent*, (4) *very frequent*

Appendix D

Statistical Tests

Table D.1: Lipsitz Test (Ordinal Logit)

Lipsitz goodness of fit test for ordinal response models

	(model 1)	(model 2, younger women)	(model 2, older women)
LR statistic	4.437	5.200	18.015
df	9	9	9
p-value	0.880	0.817	0.035

H_0: The model has a good fit

Table D.2: Hosmer and Lemeshow Test (Ordinal Logit)

Hosmer and Lemeshow test (ordinal model)

	(model 1)	(model 2, younger women)	(model 2, older women)
χ^2	30.159	27.291	41.498
df	26	26	26
p-value	0.261	0.394	0.028

H_0: The model has a good fit

Table D.3: Hosmer and Lemeshow Test (Binary Logit)

Hosmer and Lemeshow test (binary model)	
	(model 3)
χ^2	16.383
df	8
p-value	0.037
H_0: The model has a good fit	

Table D.4: Pulkstenis-Robinson χ^2 Test (Ordinal Logit)

Pulkstenis-Robinson chi-squared test			
	(model 1)	(model 2, younger women)	(model 2, older women)
χ^2	30.815	26.046	27.323
df	18	18	18
p-value	0.030	0.099	0.073
H_0: The model has a good fit			

Table D.5: Brant Test (Ordinal Logit)

Omnibus Test			
	(model 1)	(model 2, younger women)	(model 2, older women)
χ^2	27.22	19.42	16.10
df	16	12	6
p-value	0.04	0.08	0.19
H_0: The model has a good fit			