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1 Introduction

Philip Rathgeb and Tobias Wiß put it in a nutshell, "the division of gainful employment and family work is not a purely private and individual decision." (Rathgeb & Wiß, 2020). Childcare is predominantly women's work in Austrian households. This has an impact on gender inequalities in the labour market. Mothers in Austria reduce their labour market supply in favour of their care duties more than fathers. The problem of combining work and family life is to a large extent a female problem. Reducing working hours in favour of childcare results in lower earnings for women in the short term and low pension entitlements in the long term.

Kleven et al. (2020) show that in Austria the main share of the gender pay gap (the gap between men's and women's wages) can be traced back to women's loss of income in relation to motherhood. This phenomenon is called "child penalty". While the part of the gender pay gap that is not determined by the loss of income due to motherhood has decreased in Austria over the last 60 years, the part of the gender pay gap that can be attributed to the child penalty has remained constant. According to this, motherhood plays a major role in terms of the income gap between men and women in Austria. This raises the question of the role and effectiveness of family policies in terms of parental leave and institutional childcare.

Leitner (2010) shows how childcare policy has developed in Austria and Germany, two culturally and historically very similar countries, and how Germany has left Austria behind in childcare expansion since the 2000s. For example, since 2013 children in Germany who have reached the age of one year have a legal claim to a childcare place. This enables both parents to re-enter the labour market earlier. Starting from 2026, Germany will even go one step further with a legal claim to institutional afternoon childcare for children between 6 and 10 years old (see Bundesministerium für Familie, Senioren Frauen und Jugend, 2021). In Austria, such legal claims do not yet exist. However, it should be mentioned that in January 2022 the Social Democratic Party (SPÖ) has set the expansion of institutional childcare as one of its main topics. The SPÖ demands a legal claim to childcare throughout Austria (see SPÖ, 2022). This orientation of the SPÖ could be due to the fact that in autumn 2021, the issue of family policy and institutional childcare has increasingly become the focus of public attention, as accusations were made that former Federal Chancellor Sebastian Kurz (Austrian People's Party (ÖVP)), in his role as Foreign Minister at the time, exerted influence in 2016 to prevent a programme to expand institutional childcare due to power-political interests (see Anders, 2021).

The legal situation in Austria disadvantages parents compared to Germany when it comes to organising care and working time. This deficit is mostly at the expense of mothers. But back to the question of the effectiveness of institutional childcare on the child penalty.

Berghammer (2014) shows, how in the early 2000s couples with children under the age of three, whose mothers have a high level of education, increasingly turn away from the dual breadwinner model and opt for the male breadwinner model. Mothers reduce their labour market participation and employment intensity in favour of unpaid care work. According to Berghammer, this might be due to family policies which influence institutional factors like institutional childcare supply and parental leave regulations and cultural factors like traditional family values.

In their investigations on the effectiveness of family policy measures, Kleven et al. (2020) do not find a significant impact of the expansion of childcare provision for children under six years on the child penalty. The authors explain this by a substitution from private to public childcare as well as by gender norms, meaning that children who were previously cared for by relatives and acquaintances (while the mother was working) are now in institutional childcare. But Kleven et al. (2020) do not take childcare costs into account analyzing childcare policies and childcare supply.

However, it is conceivable that the privately borne childcare costs of a household have an impact on the decision of whether and how many hours of childcare are demanded. Not only the supply of childcare also the cost which comes with it, might affect its demand, parental labour market participation and parental employment intensity.

In my master's thesis, I address the question of the influence of institutional childcare costs on the demand for insititutional childcare and the labour market supply of parents. The overarching question is the same as in Kleven et al. (2020): What is the effect of family policy measures on maternal employment? In this thesis, I examine, first, the effect of childcare costs on childcare demand. In this context, childcare participation as well as intensity will be considered. As Kleven et al. (2020) show, an increase in childcare supply may have no impact on child penalty, but still an impact on the number of children in institutional childcare. I analyse in a second step the effect of childcare costs comparatively on the employment of mothers and fathers. In doing so, I examine labour market participation and labour intensity (hours worked).

In Austria, there are different institutional settings for children under three years and older than three years. While very young children are cared for in crèches, toddlers are cared for in nursery schools.[1] These institutional differences could have an influence. Crèche care in Austria is not offered to the same extent as nursery school care. It is often more expensive and less often offered in the afternoon. In addition, parents may have different preferences regarding childcare demand and intensity, depending on the age of the child. Therefore, children in crèches and children of nursery school age are considered separately.

In order to analyse these two steps, the European Union Statistics on Income and Living Conditions (EU-SILC) data set for the years 2008 to 2019 is used. The EU-SILC contains data on childcare at household and individual level as well as personal characteristics on income, education and employment. These data are merged with data from day care home statistics (Kindertagesheimstatistik) of Statistik Austria in order to take structural factors into account.

The thesis is structured as follows: The second chapter includes a literature review that focuses on the effect of childcare costs on female employment. Chapter three presents an overview of the situation and development of institutional childcare in Austria. The situation of parental employment is outlined in chapter four. The legal framework of childcare in Austria and the federal states is discussed in chapter five. Chapter six presents the data. Chapter seven deals with the econometric strategy, especially with regard to the prediction of wages of non-working parents and the childcare costs of children who are not in institutional childcare. Chapter eight is dedicated to presenting the findings related to the influence of childcare costs on childcare demand and parental employment. Moving on to chapter nine, it consists of a comprehensive discussion that summarizes the main discoveries and offers recommendations for further research. Finally, chapter 10 serves as the conclusion of the study.

[1] I will go into this in more detail in chapter 5 when discussing the legal framework.

2 Literature Review

James Heckman (1974) was one of the first to address the relationship between childcare costs and maternal employment. Heckman shows that both the price of childcare and the wage a mother receives have an impact on the decision whether a mother works or not.

Han and Waldfogel (2001) examine the effect of childcare costs on the employment of mothers with children under six. Their original data set does not contain information on childcare costs, therefore these parameters are estimated and imputed using another data set. The authors distinguish between married and unmarried mothers. The results show that childcare costs have a negative effect on the employment of mothers and that this effect is even stronger for unmarried mothers.

Connelly and Kimmel (2003) analyze the impact of childcare costs and wage on maternal employment and welfare recipiency of single mothers. As they are using survey data, they are facing a sample selection problem. Although the survey participants stated the childcare costs and wages, this information is only given, if child is in childcare or if the mother is employed. The authors predict the costs and wages for the sample using a bivariat probit model to create the selection terms in a first step and in a second step this terms are used for the linear estimation of childcare expenditure and wages. They do this in line with Heckman (1979). Connelly and Kimmel (2003) find a negative impact of childcare costs on female employment and a positive effect on welfare recipiency. In the case of wages it is the other way around.

These selection problems do not occur when structural childcare costs are used, which are based on legal regulations. For example, Abrassart and Bonoli (2015) used the structural childcare costs of the individual municipalities in the Swiss Canton Vaud and create model families that differ in income and family size. Childcare costs are municipality policy in Vaud. This data was supplemented with other variables from a questionnaire covering information on the use of childcare. The authors concluded that the cost of care for low-income families is a key factor in their use of institutional childcare. Municipalities with more progressive cost regimes (where fees are lower for low-income families) show higher participation of children from low-income families. In Austria, such an analysis using structural childcare costs based on legal regulations is unfortunately not possible, as the cost regimes are so different that they are not comparable.

Regarding Austria, Mahringer and Zulehner (2015) examine the impact of childcare costs and wages on the employment of mothers with children under the age of 12 years. The observation period is limited to the year 1995 and the year 2002, since Mahringer and Zulehner draw their data from extra survey modules of the Austrian microcensus. Using survey data, they face selection problems, which is why they predict childcare costs and wages. Mahninger and Zulehner find negative elasticities regarding the employment of mothers in connection with care costs and positive ones in connection with their wages.

Kleven et al. (2020) analyse the effect of family policies on the child penalty. The authors conclude that an increase in public childcare supply and the introducction of parental leave does not translate into a reduction of maternal income losses. However the authors do not take childcare costs into account. Interestingly, although the authors cannot prove a reduction in income losses, they do show that where childcare supply is expanded, it is also demanded. This might be a substitution effect: children previously in private care by relatives or childminders are now placed in public care facilities, or, this might be due to traditions, values and gender norms. Many mothers stay out of the labour market because they want to spend more time with their children and not because of a lack of childcare places. Kleven et al. (2020) show that an increased demand for care is not necessarily linked to a change in the employment behaviour of mothers. While Kleven et al. (2020) do not address the relationship between childcare costs and maternal employment, their findings suggest that childcare use should be considered in the context of childcare costs, not just employment. Costs may have a higher effect on the demand for childcare than on the employment of mothers due to substitution effects and traditional gender roles.

As Neuwirth et al. (2021) discuss, childcare costs will not directly influence the decision to provide labour supply, but rather, in a first step, the decision to use institutional childcare. They find a negative effect of childcare costs on the use of childcare and a negative effect of childcare costs on the employment of mothers. The effect on the use of childcare is stronger. The authors also show that informal childcare by relatives does not substitute formal childcare but complements it. Families which use informal childcare are 7% more likely to use formal childcare as well (Neuwirth et al., 2021). With regard to employment, the authors examine not only labour force participation but also work intensity, since care costs may not only affect whether a woman works, but also how much she works. Interestingly, the authors find that an elimination of parental contributions would lead to an increase in labour participation and to a reduction in labour intensity. This might be the case because with lower costs, mothers can reduce their working hours without reducing their net salary.

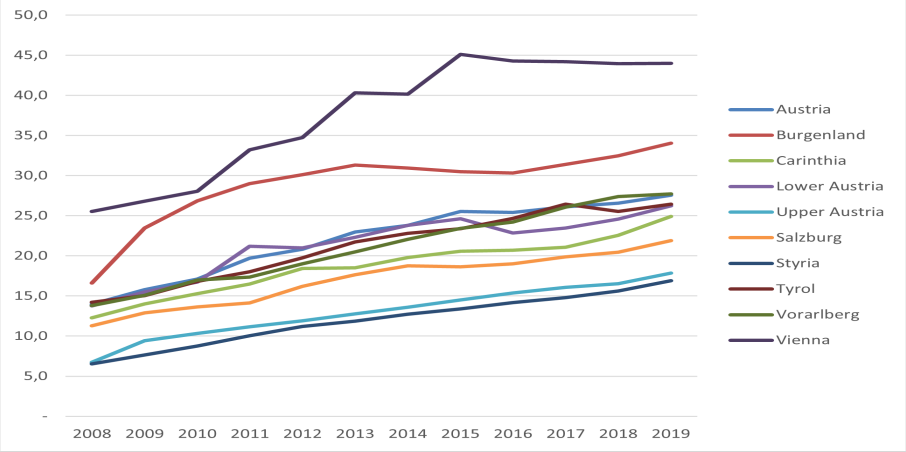
Grand and Fink (2021) examine the effect of childcare costs on employment intensity as well as on childcare use intensity. With regard to labour force participation and family arrangements depending on paid labour and care duties, they analyse mothers and fathers. As Kleven et al. (2021) note, family values and gender norms might have an impact. Fink and Grand (2021) estimate this factor by implementing a variable in the survey that indicates the extent to which respondents agree with the statement that a mother should stay with the child. As social norms play an important role in reconciling work and family life and the gender-specific patterns in this decision (see Barigozzi, Francesca et al. 2017). Grand and Fink (2021) find a positive impact of childcare costs on childcare use and female employment. Families who use child care pay for it and demanding more child care implies more costs. The same holds for employment. Women who pay for child care and use it, have more time to work. Higher childcare costs correlate with higher female employment intensity. For fathers, no effect of childcare costs on labour intensity is found.

Like Grand and Fink (2021), I compare mothers and fathers in my analyses regarding labour market participation and intensity. With regard to the use of childcare, I analyze crèche children and nursery school children separately. This is a new approach that I have not yet seen in articles on Austria. I think the factors that influence whether parents put their child in care are different for crèche and nursery school. For example, parents can take parental leave until their child is 2 years old, so their childcare responsibilities do not conflict with their employment. In addition, the prices for crèche care are often higher than those for nursery school care. In the following, I provide an overview of the situation of institutional childcare and parents' labour supply in Austria.

3 Development of Institutional Childcare in Austria

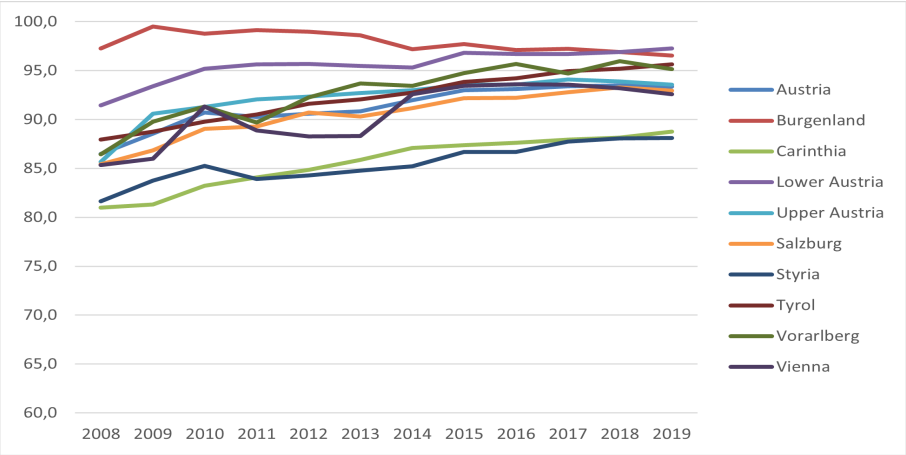
In this chapter, the situation of childcare facilities in Austria is presented. The annual statistics on day care centers published by Statistics Austria are used as the basis for the data. The analysis period corresponds to the years 2008 to 2019, as this time frame aligns with the scope of my research. In Austria, childcare for children under the age of six is divided into care for 0 to 2 year old children, who are generally cared for in crèches, and care for 3 to 5 year old children, who are cared for in nursery school. When a child turns three, he or she usually moves from the crèche to the nursery school within the next nursery school year. Later when they turn six, they move from nursery school to school.

Figure 1: Childcare rates 0-2years old; 2008 - 2019



Own Graph based on Statistik Austria: Child day care home statistics 1995-2019,

Figure 2: Childcare rates 3-5 years old; 2008 - 2019



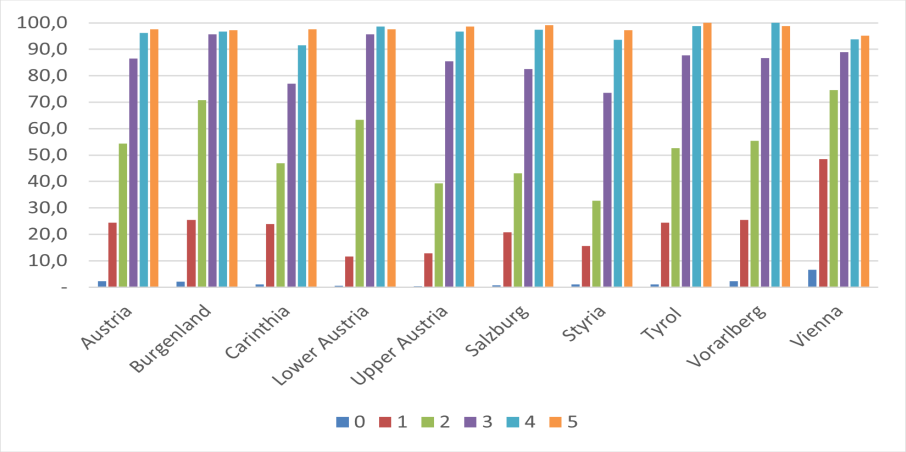
Own Graph based on Statistik Austria: Child day care home statistics 1995-2019

Figure 1 and figure 2 deal with the childcare rates of children attending institutional childcare. The data is presented separately for the age groups 0 to 2 years and 3 to 5 years. As figure 1 shows, childcare rates for 0 to 2 year old children increased sharply in all Austrian federal states between 2008 and 2019. On the cut-off date in October 2019, around 28% of children between 0 and 2 years of age in Austria attended institutional childcare (see figure 1). By contrast, in 2008 around 14% of the children in this age group attended childcare. Within 11 years, the childcare rate has doubled. The absolute leading federal states over all these years were Vienna and Burgenland. This may be related to the fact that these federal states are traditionally governed by the Social Democratic Party of Austria (SPÖ). In Vienna, about 25% of children between 0 and 2 years were already in childcare in 2008, in Burgenland around 17%. In 2019, 44% of Vienna's and 34% of Burgenland's children between 0 and 2 years of age attended institutional childcare. In the time frame between 2008 and 2019, Upper Austria and Styria have had the lowest childcare rates. In 2019, Upper Austria had a childcare rate of just about 18% and Styria about 17%. In the remaining federal states, between 22% and 28% of children are in childcare in 2019.

The childcare rate for 3 to 5 year old children has also increased from 2008 to 2019 (see figure 2), but noticeably weaker. In 2008, around 87% of children between the ages of 3 and 5 were in childcare throughout Austria. Thus, the childcare rate for this age group was already relatively high in 2008. Until 2019 the rate increased by 6 percentage points to a level of 93%. The lowest childcare rates in 2008 were in the federal states of Carinthia and Styria with around 81% and 82%, respectively. These federal states were also the federal states with the lowest childcare rates in 2019 (Carinthia: 89% and Styria: 88%). The other federal states had childcare rates between 93% and 97% in 2019.

There is a considerable difference in the care rates of these two age groups across all federal states. While in Austria as a whole 93% of 3 to 5 year old children attend childcare facilities in 2019, only 28% of 0 to 2 year old children do so. The difference in the childcare rates might have various reasons, like availability of crèches places for children younger than 3, preferences of parents, who do not want to put their very young children in childcare or also the fact that often at least one parent is on paid parental leave when the children are younger than 2. But also the fact that childcare for children under 3 is often much more expansive might have an impact. In addition, since 2010/11, children between the age of 5 and 6 have been required to attend half-day nursery school throughout Austria (in chapter 5, I will elaborate in detail on the legal framework). Therefore, the childcare rates for children age 5 are higher.

Figure 3: Childcare rates by age; 2019/2020



Own Graph based Statistik Austria: Child day care home statistics –2019/2020

To get a more accurate picture of the situation of the childcare rates, figure 3 shows the childcare rates for the year 2019/2020 broken down by age for each federal state. In each of the federal states the childcare rate increases with the age of the child, except Lower Austria and Vorarlberg. For these two federal states, the data indicates a decrease between children aged 4 and children aged 5 years. This might be explained by early school enrolment.

Attendance at institutional childcare facilities is compulsory from the age of 5, as a result the childcare rate for this age is almost 100% in all federal states. In overall Austria, the childcare rate for this age group is around 98%. The 4 year old children also have a very high childcare rate of 96%. This is reflected in the individual federal states, thus no federal state has a childcare rate below 92% for 4 year old children. The childcare rates for 3 year old children show a more differentiated picture across the federal states. On average, 87% of 3 year old children in Austria attend institutional childcare. Lower Austria and Burgenland also have very high childcare rates for this age group (at 96% each). However, the other federal states have childcare rates of less than 90%, with particularly low rates in Carinthia (77%) and Styria (74%).

Childcare rates for children between 0 and 2 are lower in Austria. Therefore, around 54% of 2-year-olds, 24% of 1-year-olds and 2% of newborns are cared for in an childcare facility in Austria. The jump between the childcare rate of 1 year old children and 2 year old children might be explained by the fact that parents are entitled to paid parental leave until their child's second birthday. The childcare rates for 2-year-old children vary strongly between the federal states (33% in Styria and 75% in Vienna). The same holds for children who are 1 year old (12% in Lower Austria and 49% in Vienna). For the age group of 0 year old children,

Vienna has the highest childcare rate with 7%, the other federal states have 2% or less. This may be due to the different coverage of crèche supply in the federal states.

Figure 4: Crèche groups, toddler care groups by length of attendance; 2019/2020 - in %

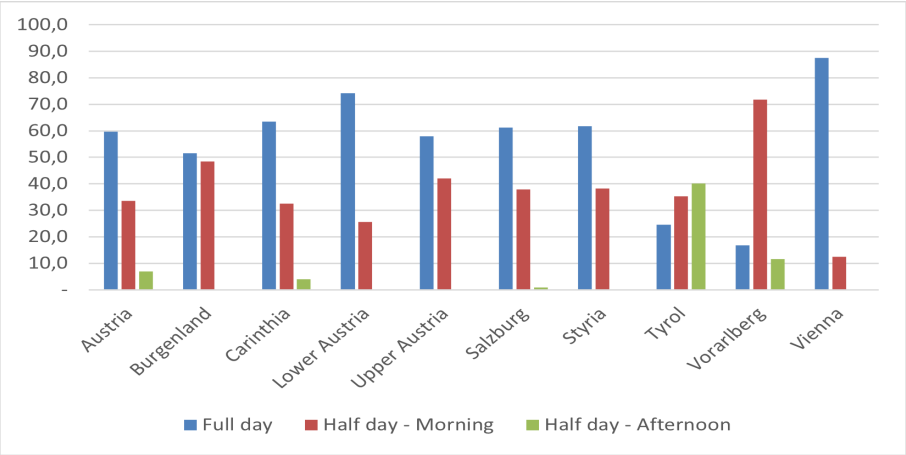


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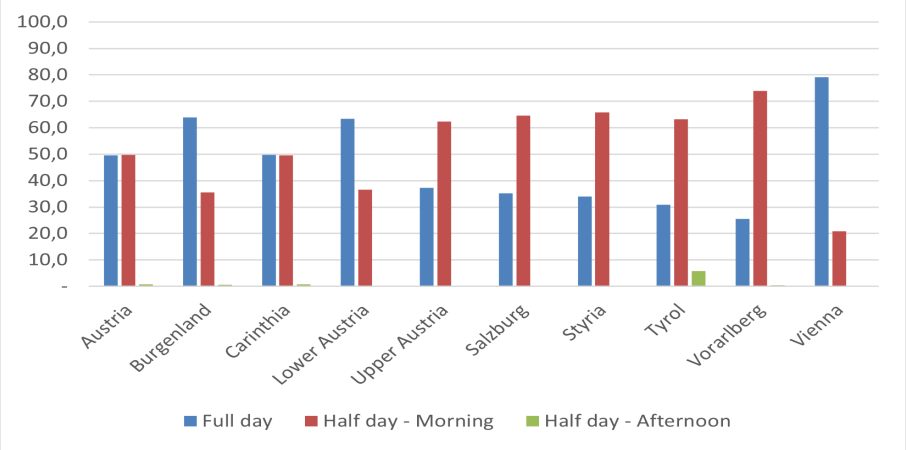
Figure 5: Nursery schools by length of attendance; 2019/2020 - in %



Own Graph based Statistik Austria: Child day care home statistics –2019/2020

Figures 4 and 5 present children in childcare centres by length of attendance in percentage for the year 2019, figure 4 for crèches and figure 5 for nursery schools. Figure 4 shows: 60% of the children in Austria who are registered in crèches attend them all day, about 34% attend the crèche only in the morning and about 7% in the afternoon (Figure 4). In most of the federal states the full-day care exceeds the half-day care. There are two exceptions in the west of Austria — Tyrol and Vorarlberg. In these federal states the half-day care is more requested than the full-day care: In Vorarlberg most of the children attend the crèche in the morning (72%), 12% join the childcare for the second half of the day and 17% attend

full-day care. Surprisingly, in Tyrol, most crèche children are in afternoon care (40%). In no other federal state this is the case. In most of the federal states full-day care is the most popular one, followed by morning half-day care and then afternoon half-day care. In the case of full-time care, Vienna is the frontrunner with 87%. The western federal states of Vorarlberg and Tyrol seem to be special cases in terms of childcare attendance.

In the case of the nursery schools, a different picture is presented (figure 5): 50% of children attending childcare are in full-day care and the other 50% attend half-day care in Austria. There is no federal state, in which the afternoon half-day care is most in demand. Vienna has the highest full-day childcare rate (79%). In Carinthia 50% of the children attend full-day care and 50% morning half day care. In Upper Austria, Salzburg, Styria, Tyrol and Vorarlberg most children attend half day care in the morning. The highest afternoon half-day care rate is in Tyrol with 6%. Tyrol and Vorarlberg have the lowest full-day care rates for crèche and nusery school children. In Tyrol, only 25% of the children attend the crèche and 31% the nursery school full-time. In Vorarlberg, the figures are 17% and 26%.

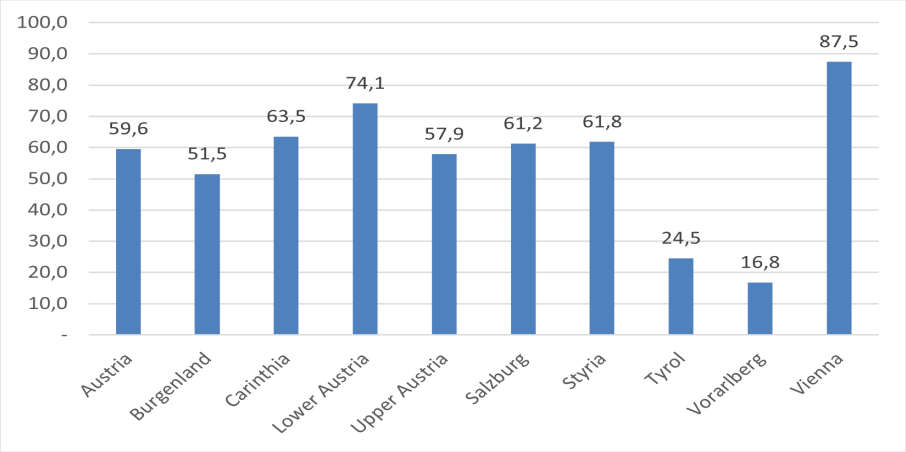
To complete the picture, figure 6 and figure 7 show the proportion of childcare facilities in Austria and the federal states that offer full-day care. These figures reflect the picture already given in figure 4 and figure 5. Around 60% of crèche facilities throughout Austria are open full-day (figure 6). Vienna has the highest rate of full-day facilities with about 88%, followed by Lower Austria with about 74%. The lowest rates are found in Tyrol (around 25%) and Vorarlberg (around 17%).

Figure 7 presents, information for nursery schools that are open full day for Austria and the individual federal states. In Austria, about 50% of nursery schools offer full-day care. Among the federal states, Vienna is the front-runner with about 79% of childcare facilities offering full-day care, followed by Lower Austria with 64%. Tyrol and Vorarlberg have the lowest percentage of childcare facilities with full-day care (T: 31%, V: 25%).

It is already evident that full-day childcare provision varies considerably between the federal states, both for crèche and nursery school supply. Next, I will take a look at the share of public providers in the federal states for crèches and for nursery schools. I do this because costs can vary between private and public care providers, and private providers are often more expensive than public providers.[2] Figure 8 and figure 9 present the share of children cared in public childcare facilities. Figure 8 shows that around 45% of children in Austria

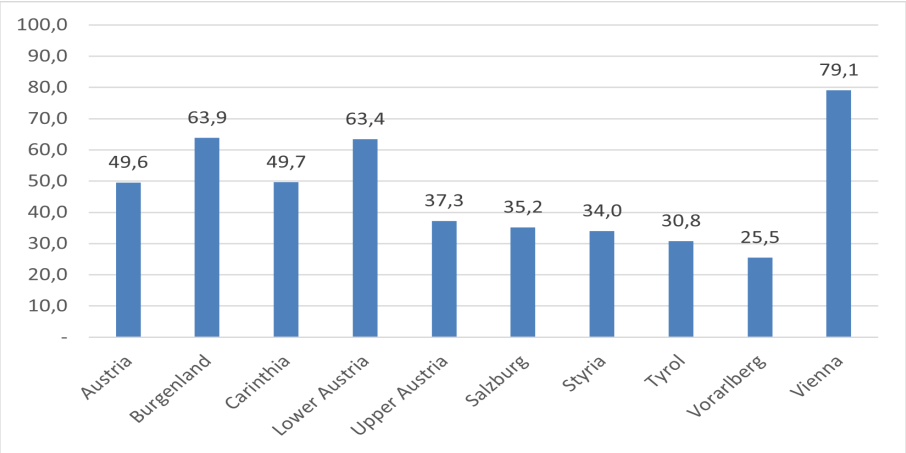
[2]I will show this in chapter 5. For example, in Vienna public institutional childcare is free of charge, but private childcare providers can charge parental contributions.

Figure 6: Proportion of créches with full-day care; 2019/2020 - in %



Own Graph based Statistik Austria: Child day care home statistics –2019/2020

Figure 7: Proportion of nursery schools with full-day care; 2019/2020 - in %

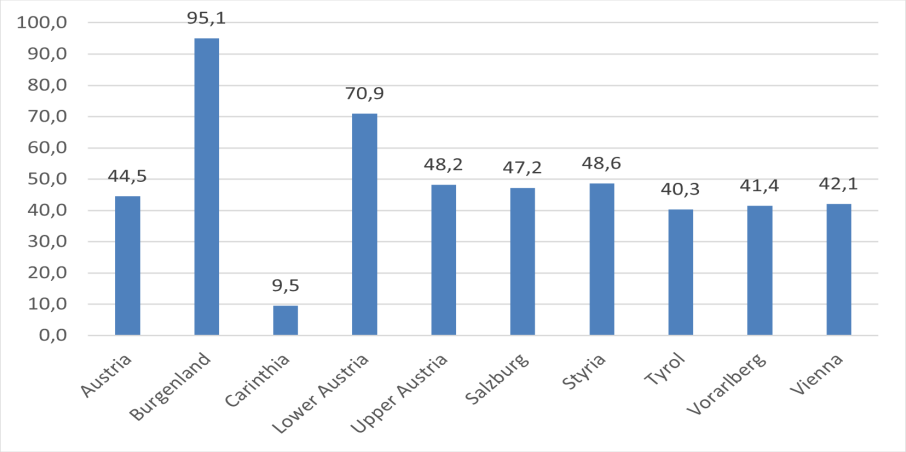


Own Graph based Statistik Austria: Child day care home statistics –2019/2020

who attend crèche are registered with a public provider. The absolute frontrunner here is Burgenland, where around 95% of children attend a public crèche, followed by Lower Austria with around 71%. The absolute taillight is Carinthia, where only 10% of the children attend a public crèche. In the remaining federal states, between 40% and 49% of the children attend public facilities.

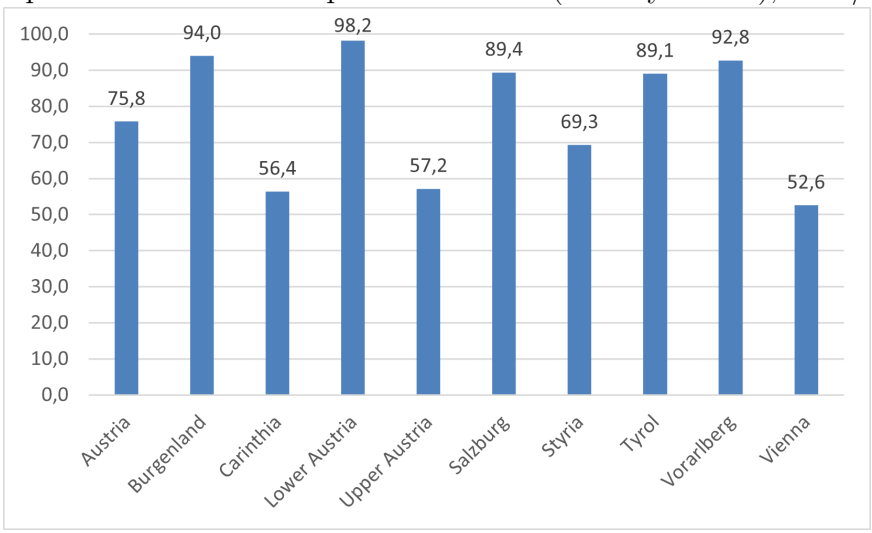
The proportion of children attending a public institution is considerably higher in the case of nursery schools, around 76% of children attending nursery schools are with a public provider (see figure 9). The federal states of Lower Austria is the leader with about 98% of children in public nursery schools, followed by Burgenland with 94% and in third place Vorarlberg with 93%. In Vienna only around 53% of children attend public nursery schools. In Carinthia and Upper Austria less than 60% of the children are in a public nursery school

Figure 8: Proportion of children in public childcare (créche); 2019/2020 - in %



Own Graph based Statistik Austria: Child day care home statistics –2019/2020

Figure 9: Proportion of children in public childcare (nursery school); 2019/2020 - in %



Own Graph based Statistik Austria: Child day care home statistics –2019/2020

(K: 56%, UA: 57%). What is interesting about the comparison between crèches and nursery schools is that in some states, the proportion of children in public crèches corresponds to that of children in public nursery schools, i.e. Burgenland. However, in many federal states, there is a significant gap between the ratio of children attending public crèches and the ratio of children attending public nursery schools, i.e. Carinthia, Salzburg, Tyrol and Vorarlberg. Since public providers, in contrast to private facilities, often have clear guidelines with regard to cost structure, opening hours, lunch offers, it makes a difference whether children are cared for privately or publicly.

Overall, the percentage of children in childcare has consistently increased since 2008, encompassing both those in crèches and those in nursery school age. There are substantial variations among the federal states, as well as in terms of children's age, full-time care, and the availability of private or public childcare services.

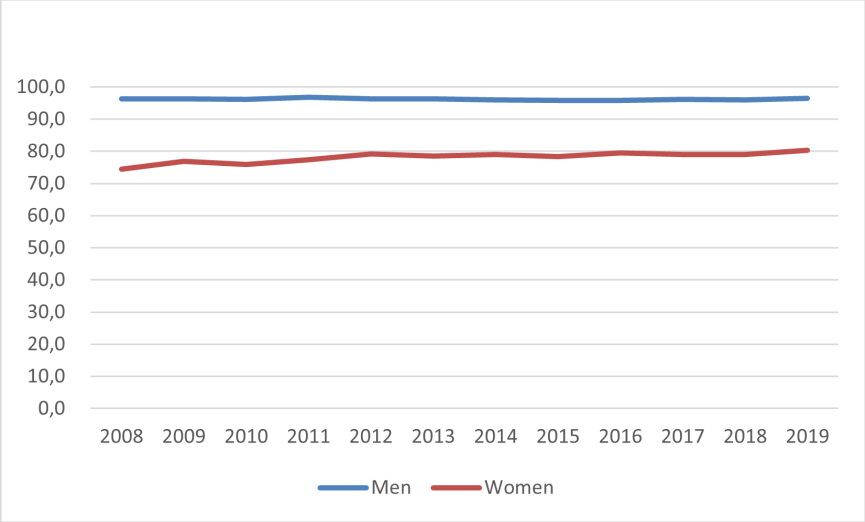
4 Parental Employment in Austria

In the following, I will examine the employment of mothers and fathers more closely using data from the Statistik Austria microcensus.

Figure 10 shows that the employment rates of men and women between 25 and 49 years old with children under 15 years have been relatively constant between 2008 and 2019 in Austria. In 2008 the employment rate of fathers was around 96% and for mothers around 74%. Eleven years later in 2019, the employment rate of father remained 96% and among mothers, the labour market participation rate increased to a level of around 80%. The employment rate of mothers increased by 6 percentage points.

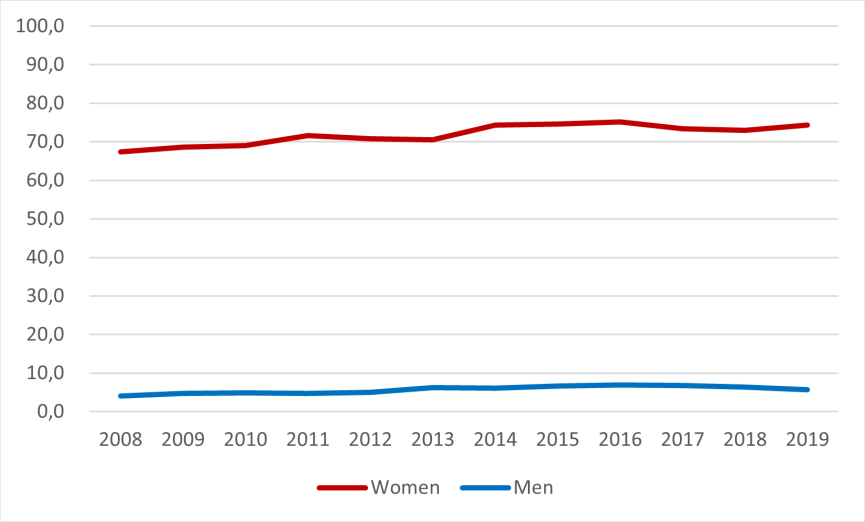
Figure 11 illustrates the part-time rates of employed mothers and fathers aged 25 to 49 with children under 15 years old during the period from 2008 to 2019. The part-time rates for mothers and fathers have increased slightly over this period: 4% of fathers and 67% of mothers worked half-time in 2008. In 2019, 6% of fathers and 74% of mothers were employed part-time. The two figures show that 24 percentage points more fathers than mothers were in employment in 2019 and that the vast majority of mothers who are in employment work part-time, while only a very small proportion of fathers are employed part-time. Thus, less mothers participate at the labour market and those who participate have often a lesser labour market intensity in terms of hours worked.

Figure 10: Employment rate: men and women (aged between 25 and 49) with children under 15 years of age; 2008 - 2019



Own Graph based Statistik Austria, Mikrozensus 2008-2019

Figure 11: Part-time rate: men and women (aged between 25 and 49) with children under 15 years of age; 2008 - 2019

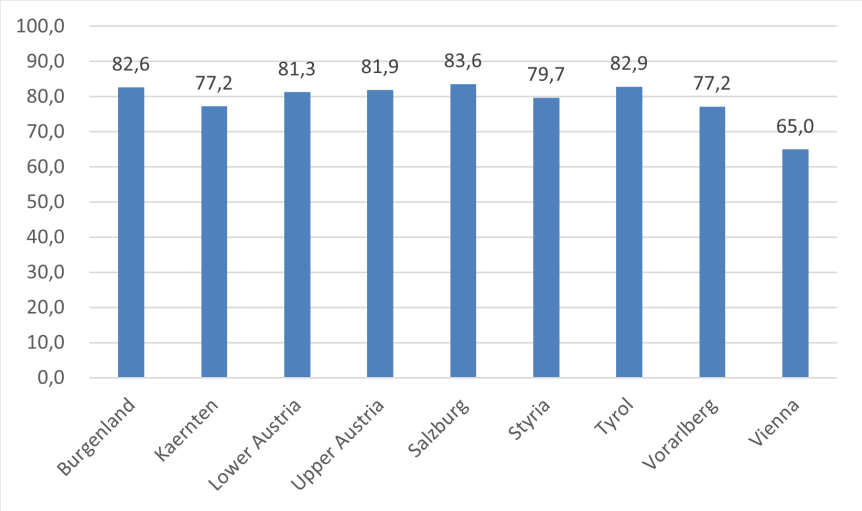


Own Graph based Statistik Austria, Mikrozensus 2008-2019

Figure 12 and figure 13 provide a more differentiated picture of the employment of mothers in the individual federal states for the year 2019. The highest employment rate of mothers is in Salzburg with 84%, followed by Tyrol and Burgenland with 83% each (see figure 12). The lowest employment rate of mothers is observed in Vienna with 65%. Otherwise, the employment rate in the remaining federal states is between 77% and 82%.
Figure 13 shows that Vienna has the lowest part-time rate at 63%. Thus, while fewer women are employed in Vienna, fewer of those who are employed work part-time. The highest part-

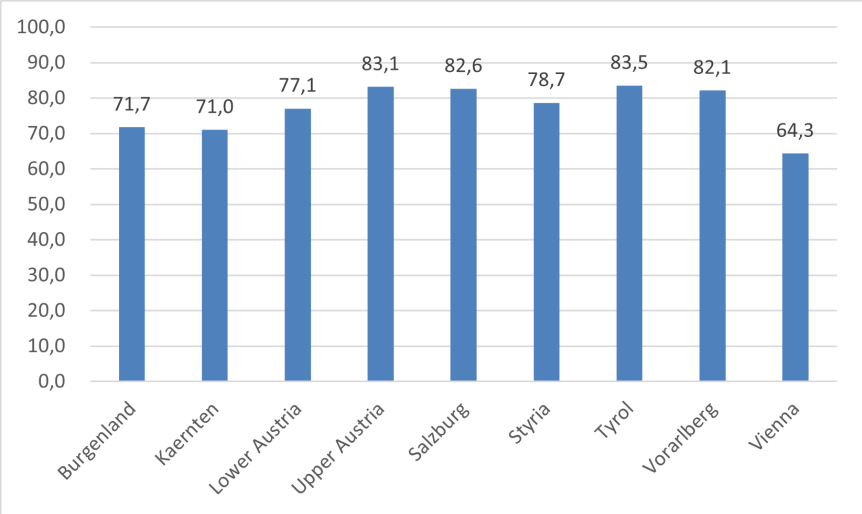
time rates are in Tyrol (84%), Upper Austria (83%) and Salzburg (83%). In the remaining federal rates, the part-time rate ranges between 71% and 82%. In federal states with high maternal employment rates, mothers often work part-time.

Figure 12: Employment rate: mothers by federal states; 2019



Own Graph based Statistik Austria, Mikrozensus 2019

Figure 13: Part-time rate: mothers by federal states; 2019



Own Graph based Statistik Austria, Mikrozensus 2019

5 Legal Institutional Context

In this chapter I examine the legal background of parental leave and institutional childcare in Austria. How parental leave is organized is interesting, as it allows parents to take time off work to care for their child without losing their job. The legal structure is the foundation upon which parents organize their work and family life.

5.1 Parental Leave in Austria

Parental leave is regulated in Austria for mothers in the Maternity Protection Act (Mutterschutzgesetz—BGBl. Nr. 221/1979) and for fathers in the Fathers' Leave Act (Väter-Karenzgesetz—BGBl. Nr. 651/1989). In both cases, this is federal law, which means that these regulations apply equally throughout the Austrian federal states. In Austria, there exists a legal right to parental leave. Only employees, who live in the same household as the newborn child, are entitled to paid parental leave, not self-employed persons, students or housewives. Employers cannot refuse this legal claim and the legal right to parental leave applies until the child is two years old.

The parental leave period begins for mothers and fathers after the expiry of the protection period. The protection period in this case, is the period in which a pregnant person is not allowed to work. This period starts eight weeks before the planned date of birth and ends usually eight weeks after the date of birth. The parent who did not give birth to the child is also entitled to parental leave only after the eight-week period has expired. During the protection period the employer is not allowed to let the person, who gave birth, work. These regulations are in place to protect the health of the woman giving birth.

The regulations in Austria do not allow parents to be on parental leave at the same time for a longer period. An exception is an overlapping period of one month when one parent ends parental leave and the other parent goes on parental leave. This one-month overlay is only allowed the first time, when parents change parental leave. Parents can only alternate parental leave twice within the two years following the birth of their child. Even if both parents take parental leave, they only have a total of 2 years to divide between them.

5.2 Institutional Childcare in Austria

In contrast to parental leave, childcare is not regulated by federal law but by federal state laws and therefore varies greatly throughout Austria. According to the Austrian Federal Constitution (Bundes-Verfassungsgesetz, Artikel 14 Absatz 4 B-VG), the legislation and implementation of nursery school and after-school care is a federal state matter. Although parents are entitled to parental leave, there is no legal entitlement to childcare. Only in the last year before primary school Austrian children are obliged to attend half-day nursery school. This applies to children between 5 and 6 years of age. Parents with children aged 2 to 5 are left on their own regarding the organisation of work and care time. On the one hand, they are no longer entitled to parental leave, and on the other hand, they have no legal entitlement to childcare places.

5.3 Compulsory Nursery School Year

With the beginning of the nursery school year 2009/2010, half-day nursery school attendance was made compulsory for children between the ages of 5 and 6 (see BGBl. I Nr. 99/2009). This requirement applies nationwide in Austria. The aim of compulsory nursery school is to provide all children, regardless of their socio-economic background, with an equal opportunity to start their education and prepare them for school through the pedagogical services offered in institutional childcare.

This last year of half-day nursery school is free of charge for parents. However, meal times and participation in special offers are not included and must be paid for by the parents. The child has to attend a care facility for at least four days per week and between 16 and 20 hours per week. The compulsory nursery school year guarantees parents a half-day (morning) free care place for their child in the last year of nursery school, for a total of 20 hours per week (Bundeskanzleramt, 2022).

5.4 Federal States

The legal basis regarding childcare differs across the federal states, therefore in the following I examine the legal context in each state.The focus is on the question of how the cost regimes in the individual federal states are regulated by law. The sources considered are mainly state laws and regulatory requirements.

5.4.1 Burgenland

Starting from November 2019 crèche as well as nursery school attendance are free of charge for parents in Burgenland. This applies to all public as well as private childcare facilities, as long as they fulfil a service mandate of the respective municipality. The vast majority of children in Burgenland attends a public childcare facility (around 95% attend crèche and around 94% attend nursery school), therefore, there is an enormous financial relief for parents since 2019. However, parents still have to bear the costs for additional services such as meals (lunch and snacks), handicraft fees and any additional educational services (Land Burgenland, 2023). With regard to the costs for lunch, there is a needs-based cost recovery for families (see Mittagessensförderung - Land Burgenland, 2023).

Prior to 2019, parental contributions were collected by the municipalities and therefore varied greatly. This means that for the study period between 2008 and 2019, parents in Burgenland had to pay parental contributions. Burgenland today has the most parent-friendly system and since the majority of children in Burgenland attends public childcare facilities, the majority of parents do not pay any fees.

5.4.2 Carinthia

In Carinthia, parental contributions for crèche and nursery school care are levied by the municipalities. As a result, there are considerable differences in childcare contributions between the municipalities. According to the state law, the municipalities do not have to implement a social staggering of the parental contributions (Volksanwaltschaft, 2018). But the municipalities have to ensure that there is a nursery school place for every child of nursery school age in the municipality or within a reasonable distance. This is not the case for crèches and might be the reason, why the share of children in public crèches was around 10% in 2019 – as shown above in chapter 3 figure 8.

In the nursery school year 2018/2019, the "Carinthian Child Scholarship" was launched. Within the framework of this scholarship, the state of Carinthia takes over part of the parental contributions that the municipalities usually charge the parents. Since September 2021 two third of the average parental contributions in the municipality are covered by the federal state. The scale was gradually adjusted. In 2022 100 % of the average parental contributions are taken over by Carinthia (Land Kärnten, 2023). The average cost in the year 2022 is (Land Kärnten, 2023):

- for half-day crèche care 162€ per month and 247€ per month for full-day care

- for half-day nursery school care 108€ per month and 147€ per month for full-day care

The cost coverage is directly transferred to the care facility. We need to keep in mind that the current system of cost coverage is oriented towards the average cost. Therefore, in individual cases, the costs for parents might be higher. Meal contributions have to be paid by the parents.

The amount of support in Carinthia depends on the type of care facility and the duration of care. Unfortunately, the data on costs that parents are required to pay in each municipality are not publicly available. The regulations and subsidies apply for public and private care institutions. Due to the fact that the subsidy is based on average costs, parental contributions continue to vary widely. The Carinthian child scholarship first came into effect in 2018, and therefore it was not relevant for the majority of the study period (2008-2019). Consequently, parental contributions in Carinthia were significantly higher during the study period.

5.4.3 Lower Austria

In Lower Austria the regulations and the cost regimes of crèches and nursery schools differ fundamentally.

Nursery school care is regulated in the Lower Austria Nursery School Act 2006 (NÖ Kindergartengesetz 2006). Childcare for nursery school children is free of charge during the morning hours. The regular care time is typically from Monday to Friday in the morning, usually for around 4-5 hours per day. However, it is important to note that additional services or extended care hours beyond the regular care time, such as extended opening hours (before 07:00) or afternoon care (from 13:00 onwards), may incur additional costs in some nursery schools or municipalities. These costs vary from municipality to municipality and from nursery school to nursery school. Municipalities and private providers set their own prices for afternoon care. For instance, there are municipalities such as Traiskirchen that offer public afternoon care free of charge (see Jandrinitsch, 2020). But it is up to the municipality, how much they want to charge and how or in what way the financial situation of the parents is taken into account. No scales or contribution corridors are prescribed by federal state legislation.

The regulation for children of crèche age is completely different and organised in the Lower Austrian Childcare Act. The law does not provide any guidelines for the levying of parental contributions (NÖ Kinderbetreuungsgesetz 1996 (NÖ KBG)). There is no general

regulation that childcare in crèches is free of charge in the mornings. The exact costs can vary from municipality to municipality and from facility to facility. However, this is set to change from September 2023: The state of Lower Austria plans to make morning care free of charge for children under the age of 3 (Land Niederösterreich, 2023).

Whereas the Lower Austrian nursery school Act assigns the responsibility to the municipalities to expand nursery school places when needed (§ 18 LGBl. 5060-0) this is not the case in the Lower Austrian Childcare Act. This means that the offer of places and the cost structure of parental contributions for very young children from 0 to 2,5 years is not prescribed by law yet. Nevertheless, as seen in chapter 3, about 71% of the children in this age group are cared for in public institutions.

Instead of imposing statutory regulations on parental contributions, working parents of very young children (aged 0 to 2.5) have the option to apply for childcare subsidies known as "NÖ Kleinstkinderbetreuungsförderung" in Lower Austria. Parents with children older than three years are also eligible to apply for this funding, known as "NÖ Kinderbetreuungsförderung". However, these subsidies are subject to certain conditions as set by the Lower Austria Provincial Government (Amt der NÖ Landesregierung, 2018).

- It applies only for working parents
- The maximum refunding per hour is 2.50 € for each child under 3 years of age and 2.10 € for older children
- The amount of the subsidy depends on the family income. The lower the family income, the higher the subsidy.
- At the same time, the maximum subsidized care time depends on the parental labpur intensity (working hours)

However, this funding must be applied for separately and is only available to some parents. Actual crèche and nursery school fees paid vary greatly between municipalities.

5.4.4 Upper Austria

Childcare in Upper Austria is regulated in the Upper Austrian Child Education and Care Act (Oö. KBBG). Nursery school care is free of charge in the mornings. Before 2018, also afternoon nursery school care was free of charge (see Kramesberger, 2017). Since 2018, afternoon fees have been charged for children aged 30 months and older, while morning care

remain free of charge. Childcare providers can independently set parental fees for afternoon care, but they must operate within a minimum and maximum rate (see LGBl.Nr. 1/2018). These cost structures apply for private and public care facilities. The exact amount of the childcare costs is income-based and depends on the age of the child (see LGBl. Nr. 1/2018 §2 Abs. 1) (see table 1). For nursery school children a minimum of 42€ to a maximum of 150€ can be charged. If more than one child of a family attends a childcare facility, a reduction of up to 50% is provided for the second child and a reduction of maximum 100% for each additional child. (The monthly minimum and maximum contributions are calculated on the basis of the consumer price index.)

Table 1: Parental contributions according to the Upper Austrian Parental Contribution Ordinance 2018

	Minimum contribution	Maximum contribution
Children under three	49 Euro	179 Euro
Children between three and six	42 Euro	111 Euro

Morning attendance in crèches is not provided free of charge. For children aged up to 3 years, the parental contribution ranges from a minimum of 49€ to a maximum of 179€ (see Table 1).

In addition to the minimum and maximum amounts, the contributions are tiered. For children under the age of three, the parental contribution is 3.6% of the family income for a maximum of 30 hours of care per week, and at least 4.8% for more than 30 hours per week. For children between 3 and 6 years of age, the parental contribution does not exceed 3% of the family's income for up to 30 hours per week, and is at least 4% for more than that. These regulations apply to both private and public childcare facilities.

5.4.5 Salzburg

In Salzburg, nursery school and crèche are regulated by the same law, the Salzburg Child Education and Care Act (Salzburger Kinderbildungs- und -betreuungsgesetz 2019 – S. KBBG). In 2021 the federal state of Salzburg prescribed a minimum monthly amount of 90€ for full-day care for children under 3 years, and for children between 3 and 6 years a minimum amount of 40€ for full-day care. The legal entities of the facilities can stagger the amounts according to income and assets, but this is voluntary. The maximum amount that can be

charged per month is 415€ (§ 45 Abs. 1 S. KBBG, 2021). This means that childcare providers can demand contributions of between 40€ or 90€ and 415 € to parents. This shows that the level of contributions in Salzburg can vary greatly depending on the operator.

Independent of the contributions, Salzburg grants subsidies to the parents (§ 46 Abs. 1 S. KBBG, 2021). These subsidies are independent of income. 25€ per child and month is paid to parents if the children are cared for 31 or more hours per week; 12.50€ per child and month if the children are looked after for less than 31 hours per week. Children who are in their last compulsory year of nursery school are excluded from these subsidies.

Since 2014, there has been a childcare fund that additionally supports parents who do not exceed certain income limits. For single parents with one child, this limit is 1,425.00€ net income per month and 1,852.50€ net income for a two parent household. For each additional child, this limit is raised by 456€. The amount of the subsidy is up to 400€ per nursery school year for a care time of up to 20 hours per week and up to 700€ for a care time of 21 to 40 hours per week. Accordingly, only households with relatively low incomes receive these subsidies.

The cost structure in Salzburg leads to a high variety of contributions. As a survey from 2018/2019 shows, parental rates vary greatly by region, by public and private provider, and by crèches and nursery schools (Mittendorfer, 2019).[3]

5.4.6 Styria

In Styria crèche and nursery school care are regulated by the same law, the Styrian Child Education and Care Act (Steiermärkisches Kinderbildungs- und –betreuungsgesetz 2019 – StKBBG 2019). This act applies for public and private childcare facilities. The parental contributions for children younger than 3 years and children older than 3 years are structured differently. While parental contributions are legally fixed for children between the ages of 3 and 6, this is not the case for younger children.

For children under the age of three, it is at the discretion of the provider which contributions are levied. However, parents can apply for a provincial childcare allowance for children under the age of three (Land Steiermark, 2023a). The amount of the subsidy depends on the income of the family and the number of children. Within the framework of the subsidy, the reasonable expense for childcare is levied. The childcare allowance is calculated from

[3]Salzburg changed its cost structure again at the end of 2022, beginning of 2023. The status presented here refers to 2021.

the difference between the childcare actually paid and the reasonable effort. The reasonable effort is given according to the household income and number of children. For example, with an annual income of 33.152,56€ and one child living in the household, the reasonable effort is 112,97€ per month. The parental contribution would not yet be subsidised for this household income group. The childcare allowance is capped at a maximum of 70.48€ per month. This amount is independent of the actual parental contribution. In order to be eligible for graduated support, families may not receive a monthly income higher than 2,368.04€ per month. For households with up to 959.79€ monthly income a reasonable expense for childcare of 0,00€ is assigned. These households receive the maximum amount of 70.48€.[4]

As the providers set the amounts independently and the funding is only available to families within certain income limits, the parental contributions for children under three years of age vary considerably in Styria.

For children between the ages of 3 and 6, childcare was free of charge between 2008 and 2011. After that, an income-based sliding scale system was introduced (see Der Standard, 2011). The sliding system takes the age of the child, the care duration and the number of children living in the household into account. This results in 21 levels of maximum parental contribution regarding to 21 household income levels.

The cost system in Styria is characterized by a high level of detail, and for this reason, the tables are provided in Appendix A with more comprehensive information.[5] For the 2021/2022 period, the first income threshold for families with was set at 1,804.93€ of net income. Families below this threshold are exempt from paying any parental contribution. The tenth level, on the other hand, was set at 3,008.30€, indicating that families with one child are required to pay the full parental contribution. The specific amount of the contribution depends on the child's age and the number of hours of childcare. Please refer to Appendix tables 24, 25, 26, 27, and 28 for more detailed information (Steiermark, 2022):[6]

A family with one child between three and four years pays a maximum of 144,42€ per month for up to 6 hours of childcare per day (five days a week) (Table 24), 192,56€ for up to 8 hours (Table 25) and a maximum of 240,70 for up to 10 hours (Table 26).
A family with one child between five and six years pays a maximum of 48,14€ per month

[4]For a detailed list by household income and number of children regarding reasonable efforts, see Land Steiermark (2023a).

[5]In the tables in Appenix A, only 10 levels are listed, as the amounts only increase up to the 10. level, if a family has only one child. The next 11 levels refer to the number of additional children in the household. Depending on how many children are living in the household, the contributions are downgraded. These tables refer to households with only one child

[6]The amounts are adjusted annually, the figures shown in the Appendix A refer to 2021/2022.

for up to 8 hours of childcare per day (five days a week) (Table 27), and 96,28€ for up to 10 hours (Table 28). Children in their last year of nursery school can attend nursery school for 30 hours per week free of charge (the Austrian government only provides 20 hours per week free of charge) (StKBBG §4 Abs.1).
The tables listed in appendix A show that in Styria there is a clearly defined cost regime for the care of children aged 3 to 6 years, in which the parental contribution is regulated by the amount of income, the number of children, the age of the child and the hours of care.

5.4.7 Tyrol

Childcare contributions in Tyrol are not regulated for children between 0 and 3 years of age. For crèches, there is no uniform regulation for costs. Prices vary depending on the facility and the region.

In Tyrolean nursery school morning care is already free for children from the age of four. This means that not only children in the compulsory last year of nursery school but also four to five year olds can attend the nursery school for 20 hours a week free of charge. This only applies to public institutions, while private nursery schools may require a contribution for this age group. Parents do not have to apply for this service, four year old children are automatically entitled to it as soon as they are enrolled in nursery school (see Land Tirol, 2023a).
Care fees are charged for afternoon care and should be staggered according to weekly opening hours and take into account the parents' financial situation (§39 Abs. 3 Tiroler Kinderbildungs- und Kinderbetreuungsgesetz). However, a precise scale has not been specified and is probably at the discretion of the municipalities as public operators.

For children aged two or three years who are not eligible to receive free morning care, Tyrol has the Tyrolean Child Benefit Plus (see Land Tirol, 2023b). This promotion is not linked to whether or not a child attends a childcare facility. As Table 2 shows, the subsidy depends on the monthly net household income of the previous year and the number of household members and children.
If the income is below income threshold I (see table 2) , the household receives 500.00€ per year and if the income is between the two income thresholds (see table 2), 300.00€ per year.[7]
This subsidy is awarded independently of attendance at childcare facilities, therefore, it does not set any incentives with regard to institutional childcare. However, the entitlement to this support ends as soon as the child can attend a half-day free nursery school at the age of four.

[7]These figures are adjusted on an ongoing basis. The values presented here refer to 2021.

Table 2: Tyrolean Child Benefit Plus income limits for the promotion of childcare costs for 2 to 3 year old children

Number of people	Income limit I	Income limit II
2	1,600.00 €	1,900.00 €
3	2,100.00 €	2,400.00 €
4	2,500.00 €	2,800.00 €
5	2,900.00 €	3,200.00 €
6	3,300.00 €	3,600.00 €
per additional child	400.00 €	400.00 €

An additional financial support for parents in Tyrol is the childcare subsidy (german: Kinderbetreuungszuschuss) for institutional childcare. This subsidy is directed to parents of children up to the age of fourteen. Thus, not only crèche and nursery school attendance is supported. In contrast to child benefit plus, this subsidy is linked to attendance at a childcare facility. However, as with child benefit plus, the same income limits for 2021/22 (see table 2) and number of persons and children in the household are used (see Land Tirol, 2023c). The amount of the subsidy is 60% of the childcare costs below income limit I and 40% of the childcare costs between income limits I and II. However, parents only receive the subsidy if they live in the same household as the child and cannot take care of the child themselves for the following reasons: an employment relationship, participation in vocational education and training or job search. Hence, this subsidy is applicable to employed parents rather than non-working parents, and it specifically targets parents with children starting from the age of 0.

The childcare cost structure outlined here suggests that the cost of childcare varies significantly depending on the age of the child and the type of provider. In particular, childcare for children under the age of four is relatively unregulated, but subsidised by the state, but only if the households are below a monthly net household income limit of 1,900.00€ for a two-person household (see Income Limit II - Table 2).

5.4.8 Vorarlberg

Since 2016, a new tariff system for affordable childcare has been implemented in Vorarlberg. This tariff system covers crèches as well as nursery schools. It regulates the care costs for children from 0 to 6 years of age. Before that, there were very large price differences between the providers.

For children between 0 and 2 years attending crèche, childcare providers charge a parental contribution within a tariff corridor (see Vorarlberg, 2021a). There is a fixed minimum and maximum tariff depending on attendance hours. Up to 25 hours of care, the minimum rate per hour is 1.99€ and the maximum rate is 2.58€ for children under 2 years of age. For children who are already 2 years old, the minimum rate is 1.38€ and the maximum rate is 2.58€. In table 3 the tariff corridor for children aged 0 or 1 year and children aged 2 years is presented. The corridor is defined for each hour between 10 and 45, but table 3 presents only the minimum and maximum tariff for 15, 25, 35 and 45 hours as examples. Public and private care givers are only allowed to charge parental contribution within these boundaries.

Table 3: Tariff corridor for children aged between 0, 1 and 2; 2021/2022

Hours per week	children aged 0 and 1		children aged 2	
	Minimum	Maximum	Minimum	Maximum
15 h	129.00	167.00	90.00	129.00
25h	215.00	279.00	149.00	215.00
35h	313.00	377.00	230.00	296.00
45h	410.00	474.00	311.00	377.00

Additional to the fixed price corridors, parental contribution is graduated for households which do not exceed a special income limit and have a certain household member combination. This financial support is graduated in the following way:

- Level 1: Minimum parental contribution of 20,00 € for a maximum of 25 hours a week. Every additional hours rises the contribution by one euro.
- Level 2: reduction of the parental contribution by 25% of the actual contribution—but at minimum 20,00 €
- Level 3: reduction of the parental contribution by 50% of the actual contribution—but at minimum 20,00 €
- Level 4: reduction of the parental contribution by 75% of the actual contribution—but at minimum 20,00 €

Due to this regulations, if a household with two parents and one child of the age of 1 year and a household income of 2.871,84 € demands 25 hours of childcare and the maintainer requests the maximum tariff of 279,00 € per month, the family has to pay 209,25 € (see in Appendix A table 29).

For children aged three, the rates are significantly lower. Table 4 shows the tariff corridor and the funding amount paid by the province of Vorarlberg for 15, 25, 35 and 45 hours (see Vorarlberg, 2021a). Up to 25hours parents in Vorarlberg pay a parental contribution of 38 € and for the maximum of 45 hours a week a maximum contribution of 204,00 €. Therefore, childcare cost for parents of a three year old are much cheaper than for younger children. As is the case for children up to three years of age, there is also a further subsidy for three-year-olds, which depends on their income. The same table 29 is applied, but only households in the lowest income group are eligible. The other three income levels receive no futher subsidy.

Table 4: Tariff corridor for children 3 years of age; 2021/2022

Weekly care	children aged 3		
	Minimum tariff	Maximum tariff	Funding amount
15 h	38.00 €	38.00 €	99.00 €
25h	38.00 €	38.00 €	164.00 €
35h	66.00 €	123.00 €	164.00 €
45h	95.00 €	204.00 €	164.00 €

To sum it up, for children who attend the crèche have different tariffs apply due to their age and due to the family income and family size.

From the third birthday on, children in Vorarlberg attend the nursery school. For children in nursery school, there is a normal tariff and a reduced tariff that applies (see Vorarlberg, 2021b). The reduced tariff applies to households receiving minimum income support or housing assistance. In addition, households that do not exceed a certain income and have a certain composition of household members can receive the reduced tariff, see table 5. Table 5 and table 6 show these rates for children aged three, four and five years. These tariffs are different because children aged five are in their last compulsory year of nursery school. The tariffs are set for the nursery school providers and, as can be seen from the two tables, the maximum monthly amount parents have to pay for a three-year-old child (for 45 hours of care) is 94.38 €(normal tariff) and for a five-year-old child it is 56.84€. This means that the childcare costs for parents are clearly defined and uniform in Vorarlberg (see Vorarlberg, 2021b).

In Vorarlberg parental contribution is strictly regulated for crèches as well as for nursery schools. There exit also reduction mechanisms for households which are within certain income boundaries. This support mechanism additionally takes into account whether it is a single or a two parent household and how many children are in the household.

Table 5: Tariffs for 3 and 4 year old children; 2021/2022

Weekly hours of care	Normal tariff	reduced tariff	Support per child max.
15h	37.54 €	21.45 €	16.09 €
25h	37.54 €	21.45 €	16.09 €
35h	65.96 €	32.17 €	33.79 €
45h	94.38 €	42.90 €	51.48 €

Table 6: Tariffs for 5 year old children; 2021/2022

Weekly hours of care	Normal tariff	reduced tariff	Support per child max.
15h	0.00 €	0.00 €	0.00 €
25h	0.00 €	0.00 €	0.00 €
35h	28.42 €	10.72 €	17.70 €
45h	56.84 €	21.45 €	35.39 €

Table 7: Net income limits for the reduced tariff for children between 3 and 5 years; 2021/2022

Persons in the household	Income in €	
	from	to
1 adult - 1 child	0.00	1,672.00
1 adult - 2 children	0.00	2,058.00
1 adult - 3 children	0.00	2,444.00
1 adult - 4 children	0.00	2,830.00
2 adults - 1 child	0.00	2,316.00
2 adults - 2 children	0.00	2,702.00
2 adults - 3 children	0.00	3,087.00
2 adults - 4 children	0.00	3,474.00

5.4.9 Vienna

In Vienna, there has been a non-contributory crèche and nursery school in the public sector since 2009/2010 (see Stadt Wien, 2023a). But also private childcare facilities receive financial support by the city of Vienna. As show in chapter 3, private childcare plays an important role in Vienna, due to the fact that only 42 % of children attending crèche are cared for in a public childcare facility and 53% of nursery school children (see chapter 3 figure 8 and figure 9).

The city of Vienna provides full funding to private childcare facilities, consisting of basic funding, basic contribution and administrative subsidy, if the provider is a non-profit organisation and if there is a need for childcare in the respective area (see Stadt Wien, 2023b). Table 8 shows the basic funding and basic contribution and its graduation according to the age of the child and the duration of childcare attendance. The administrative subsidy refers to the number of groups of the maintainer. Up to 49 groups the administrative subsidy

amounts to 601,34€, between 50 and 149 groups it is 1.202,01€and 1.804,05€for more than 150 groups.

Table 8: Support of childcare contributions of private institutions; 2021/2022

	Up to 3.5 -year-olds - full time / part time / half day	3.5 to 6 -year-olds - full day	3.5 to 6 -year-olds - part time	3.5 to 6 -year-olds - half day
basic funding	284.69 €	284.69 €	194.58 €	168.50 €
Basic contribution	392.68 €	170.63 €	170.63 €	102.91 €

If institutions are not awarded full funding, for example because no need is identified, the maintainers can still receive basic funding. The final parental fees charged by private facilities are up to the owners of the private institutions and can therefore vary considerably. In summary, it should be noted that in Vienna it is possible to place children in public childcare facilities free of charge, starting from the first year of life. However, a lot of children in Vienna are cared for in private institutions, which are subsidised but charge parental fees independently.

6 Data

The following chapter presents the dataset used for the regressions on childcare demand and parental employment, providing an overview of its composition and relevant variables.

6.1 Data Source

The data set used comes from the European Statistics on Income and Living Conditions (EU-SLIC). The EU-SILC is an annual survey collected on the living conditions of private households in the European Union. In Austria, this survey has been conducted since 2003. Around 6,000 households and their members are surveyed. Households are interviewed repeatedly in order to be able to determine changes in the living situation over time. But each year around one quarter of households are dropped, and new ones are added to the sample. The questionaire consists of modules that are asked every year and additional alternating modules that change annually and are dedicated to a specific topic.

I work with a pooled data set. In this thesis, the survey period is limited to the years 2008 to 2019. The lower boundary was chosen because of changes in the survey methods of the EU-SLIC in 2010 (Heuberger, Glaser, and Kafka, 2014). Among other variables, the changes relate to the variables for household income. Until 2009, the household incomes of Austrian private households were determined exclusively via voluntary data given by the survey participants. From 2010 onwards, more and more income components were gradually filled in from administrative data. Statistik Austria has retroactively adjusted the data up to the year 2008. Given that household income is likely to have an impact on the analysis of childcare demand and employment, and it is a key aspect of my study, I have set the lower limit for data comparability purposes to the year 2008. The upper limit was chosen because it can be assumed that the global Corona pandemic, which started in the early 2020s, has also affected childcare demand and parental employment. Many parents voluntarily chose to care for their children at home in order to reduce the risk of infection, and in many places childcare facilities were temporarily closed due to policies against the sprat of the pandemic.

Furthermore, the data set worked with, is limited to households with children and households with not more than two adults. This is due to the fact that I want to analyse the work care balance of parents. If more adults are living in the household, more care opportunities exist. Single parent households are considered in the sample. Additionally, the data set does not contain self-employed parents.

6.2 Descriptive Analysis

The whole sample contains 6,754 mothers and 5,907 fathers of 9,154 children up to the age of six. Among these mothers 1,776 are out of work and 4,978 participate in the labour market (see table 9). 448 fathers are not in the labour force, while 5,459 work (see table 9).

Table 9: Parental labour market participation

work	female	male
out work	1,776	448
in work	4,978	5,459

Figure 14: Distribution of hours worked per week by sex

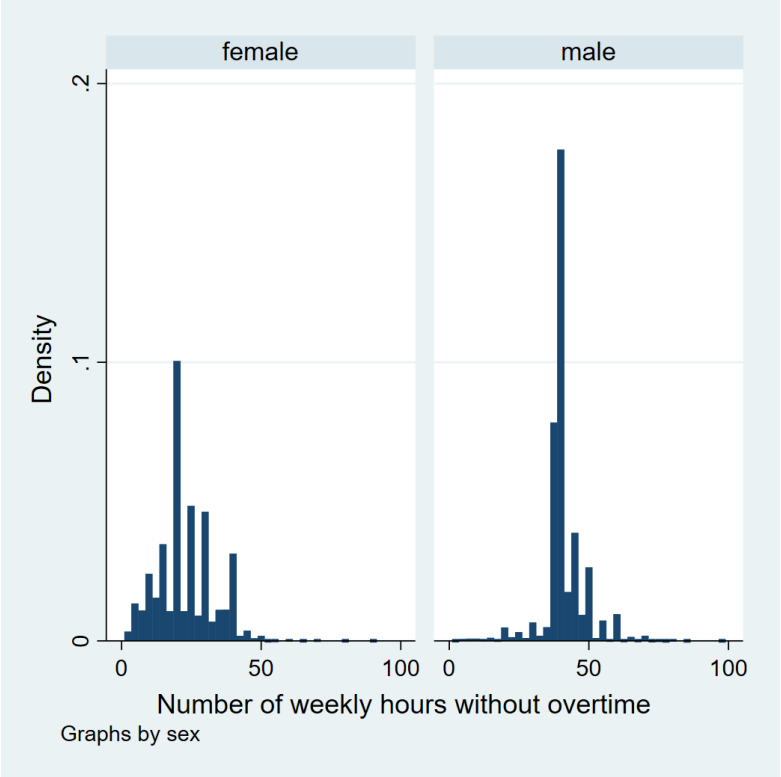


Table 10: Summary statistics hours worked per week

	N	mean	min	max
female	3,291	23.6533	1	90
male	5,326	41.32213	1	99

Figure 14 shows the distribution of hours worked per week by mothers and fathers. The histogram shows that mothers particularly often work around 20 hours a week. For fathers, most of them work full time, i.e. about 38 to 50 hours. Mothers hardly work more than 40 hours. The summary statistics in table 10 confirm this picture. While fathers work on average 41 hours per week, women work on average 24 hours, which is notably less.

In terms of children, 575 are in the crèche, while 3,554 do not attend crèche (see table 11). There are 4,130 in nursery school children and 895 do not attend nursery school (see table 12). This shows that more children attend the nursery school than the crèche.[8]

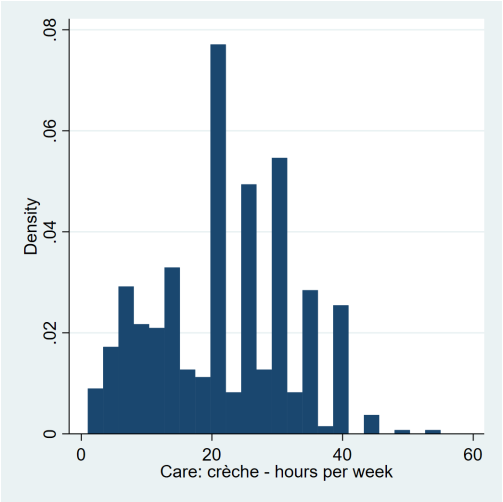
Table 11: Number of children attending crèche

crèche	Freq
No	3,554
Yes	575

Table 12: Number of children attending nursery school

nursery school	Freq
No	895
Yes	4,130

Figure 15: Distribution of hours attended crèche per week



[8]In this dataset, the category of crèche children encompasses only those aged 0 to 3. However, regarding nursery school attendance, it is worth noting that not only 3 to 6 year olds are enrolled. According to the survey responses, some parents reported that their 1 and 2 year old children also attended nursery school, with 22 one-year-olds and 285 two-year-olds included in the sample.

Figure 15 shows the distribution of the number of hours per week that children spend in the crèche. Most of the children spend about 22 hours a week in the crèche. However, fewer hours are also frequently used. There is hardly any demand for more than 40 hours, which could be due to the opening hours. As table 13 shows, the children spend an average of 22 hours in the crèche per week. In the data set a minimum of 1 hour and a maximum of 55 hours per week are demanded.

In relation to the weekly hours of care in the nursery school, few children spend less than 20 hours a week in the nursery school (see figure 16). This is related to the compulsory nursery school year for 5 to 6 year old children. Again, only a few children spend more than 40 hours in care. Table 13 shows, children spend from 1 to 60 hours a week in nursery school. On average, a child attends around 25 hours nursery school.

Figure 16: Distribution of hours attended nursery school per week

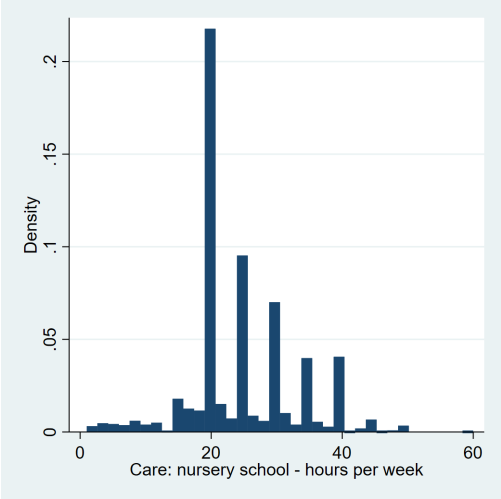


Table 13: Summary statistics: hours in care

	N	mean	min	max
crèche	569	21.68	1	55
nursery school	4,117	24.63	1	60

In the next chapter, I discuss the regression models used to determine the effect of childcare costs on childcare use and parental employment. Predictors are also modeled to determine wages for parents who do not work and care costs for children who are not in childcare.

7 Econometric Strategy

The econometric analysis in this study focuses on examining the effect of childcare costs on childcare participation and childcare intensity of children as well as labour market participation, and labour intensity of parents. The dependent variables, childcare participation and labour market participation, are discrete variables, which require the use of a probit model. Childcare intensity and labour intensity are continuous variables with a lower bound, as children cannot demand less than 1 hour of childcare and parents cannot work negative hours. Therefore, a tobit model is employed to account for this boundedness in the data.[9] Therefore, I use the Tobit model for these dependent variables. As I work with a pooled data set, I cluster by year in all analyses.[10]

In this chapter, apart from a detailed presentation of the Probit and Tobit models, I will predict two variables, which are later used as independent variables. I do this predictions using the Heckman procedure. These variables have to be estimated due to sample selection problems. Childcare costs are not reported for children not in care and wages of parents who do not work are also not reported, thus, I will estimate these two variables.

7.1 Regression Models

Firstly, the factors that influence childcare participation and intensity will be investigated. Depending on the age of the child, children join crèche or nursery school. In general children under the age of three attend crèche, while older children join nursery school. Furthermore, depending on the different institutional settings of crèche and nursery school, parents decide differently regarding childcare participation and intensity. For that reason, the analyses are performed separately for crèche and nursery school attendance. The supply of childcare in Austria for children aged three and older is higher than that for younger children. Very young children are more likely to be cared for by their parents and paid parental leave offers the possibility to do so without high financial losses or job loss. Therefore, it is assumed that the cost effect for childcare participation and intensity is stronger for children under the age of three.

[9] Additionally, I tested alternative models such as the negative binomial model, Poisson model, and ordinary least squares (OLS). However, no significant differences were observed among these models, further supporting the use of the Tobit model in this analysis. Grand and Fink (2021) also use the Tobit model

[10] When using clustering by year, it is assumed that observations within each year may be correlated. This can be helpful to account for possible dependencies or similarities between observations within the same year.

Secondly, the factors which influence labour market participation and intensity will be analysed. This is done separately for women and men. The separation of male and female labour market participation as well as employment intensity is carried out for reasons of comparability. In Austria women bear the main burden of raising children. The responsibility of care is attributed to them. Therefore, I assume that the cost of childcare has a stronger effect on maternal labour market participation as well as labour intensity.

Childcare participation of the child as well as labour market participation of the parents are analysed using a probit model. Childcare intensity as well as labour intensity are carried out using a Tobit model. In the next two chapters, I present these models in more detail.

7.1.1 Probit Model

The Probit model is used as binary response model, meaning the dependent variable has the value 1 or 0 depending on whether a certain event has occured or not. In the given cases, childcare participation and labour market participation are binary dependent variables being 1 if the child is in childcare or the parents works and 0 otherwise. The Probit model determines the response probability that an item or event falls into one of several categories by estimating the likelihood that an observation with certain characteristics belongs to a particular category (see Wooldridge, 2010, pp. 561).

The probit regression model can be represented by the following formula:

$$Pr(Y = 1|X) = \Phi(X'\beta + \epsilon) \tag{1}$$

Y is the dependent variable and represents the probability that the event will occur (hence, $Y = 1$) given the variables or characteristics X. Φ is the standard normal density. The inverse function Φ^{-1} is called the probit function, which takes the form of

$$\Phi^{-1} = X\beta + \epsilon \tag{2}$$

The parameters β are estimated by likelihood (equation 3).

$$\mathcal{L}(\beta) = \prod_{i=1}^{n} [\Phi(x_i'\beta)]^{y_i} [1 - \Phi(x_i'\beta)]^{1-y_i} \tag{3}$$

The estimator which maximizes this function will be consistent, asymptotically normal and efficient. This is the model used for the binary dependent variables.

Due to the nonlinearity of the models, it is not feasible to linearly account for interaction

coefficients. Consequently, interpreting an interaction coefficient in isolation is not straightforward. Therefore, in the probit model, the results are presented as marginal effects to provide a more meaningful interpretation.

7.1.2 Tobit Model

Tobit regression is used for care intensity as well as work intensity. Tobit concept represents a model for the limited observable dependent variable. Due to the opening hours of care facilities and hours agreed in the employment contract, care intensity and work intensity are censored responses. The following presents the Tobit model with an upper and lower bound. An independent variable y_i is observed on a certain scale bounded by C_1 and C_2. Thus, if y_i^* is outside C_1 and C_2, it is observed as C_1 or C_2 (see Wooldridge, 2010, pp. 703).

$$y_i^* = \begin{cases} C_2, if y_i^* > C_2 \\ y_i^*, if C_1 < y_i^* \leq C_2 \\ C_1, if y_i^* \leq C_1 \end{cases} \tag{4}$$

For y_i within the thresholds applies:

$$y_i^* = x_i'\beta + \epsilon_i \tag{5}$$

Assuming normal distribution for the disturbance term, the conditional probabilities are $Pr(y_i^* \leq C_1)$ and $Pr(y_i^* > C_2)$.

$$Pr(y_i^* \leq C_1|x_i) = Pr(x_i'\beta + \epsilon_i \leq C_1) = Pr(\epsilon_i \leq C_1 - x_i'\beta) = \Phi(\frac{C_1 - x_i'\beta}{\sigma}) \tag{6}$$

$$\begin{aligned} Pr(y_i^* > C_2|x_i) &= 1 - Pr(y_i^* \leq C_2|x_i) = 1 - Pr(x_i'\beta + \epsilon_i \leq C_2) \\ &= 1 - Pr(\epsilon_i \leq C_2 - x_i'\beta) = 1 - \Phi(\frac{C_2 - x_i'\beta}{\sigma}) \\ &= \Phi(-\frac{C_2 - x_i'\beta}{\sigma}) \end{aligned} \tag{7}$$

where Φ is the cumulative distribution function.

Using two dummy variables $d_{1,i} = 1$ if $y_i^* \leq C_1$ ($d_{1,i} = 0$ otherwise) and $d_{2,i} = 1$, if $y_i^* > C_2$ ($d_{2,i} = 0$ otherwise), one writes the likelihood function of the coefficients for this model as

$$\mathcal{L}(\beta) = \prod_{i=1}^{n} \Phi(\frac{C_1 - x_i'\beta)}{\sigma})^{d_{1,i}} [\frac{1}{\sigma}\phi(\frac{y_i - x_i'\beta}{\sigma})]^{1-(d_{1,i}+d_{2,i})} \Phi(-\frac{C_2 - x_i'\beta)}{\sigma})^{d_{2,i}} \tag{8}$$

In the application of probit as well as tobit regression for labour participation and labour intensity, I follow the strategy of Neuwirth et al. (2021) and apply this models also on the childcare demand. Outcomes for childcare participation and intensity as well as labour market participation and intensity are reported in the chapter 8.

7.2 Prediction of Wage

To analyse the employment participation and intensity equations – for fathers and mothers – as well as the childcare participation and intensity – for crèche and nursery school – with childcare costs and wages as explanatory variables, it is necessary to run predictions for wage and childcare cost in a first step. This is done to estimate potential wages from parents who do not work and identify potential costs from households that do not use childcare services.

To estimate the wage of fathers and mother the sample includes information of working parents to estimate a wage equation and predict expected wages for non-working parents. Wage is measured as the natural logarithm for wage per hour.[11] Selection in non-working parents and working parents is not random, it might be driven by factors like number of children, age of children and education. This leads to a selection problem. For non-working parents, their hourly wage achievable on the labour market is determined using the so-called Heckman method (Heckman, 1979). This procedure is applied in line with Neuwirth et al. (2021).

7.2.1 Heckman Sample Selection Model

The Heckman method is a two-step process. First, the selection into the treatment group is estimated using a probit model. In a second step, the regression analysis is expanded to incorporate the probability of an observation being selected into the sample, allowing for estimation of the relationship of interest (Hicks, 2023).

Equation 9 shows the regression model for wage, which leads to y_i^* if parents are working and for non-working parents estimated wage is not answered (n.a.). Thus, s_i is 1 if parents are employed and 0 if not (see equation 10).

[11] The natural logarithm of wages is often used in econometrics because the distribution of wages is often skewed and not normal. Taking the logarithm of wages can reduce the skewness of the distribution and create a distribution that is closer to normal. Additionally, the natural logarithm can be used as a measure of relative changes. Taking the logarithm of wages allows changes to be represented in percentage terms, rather than absolute changes. This can be useful when analyzing changes in wages relative to other variables. The same holds for care costs.

$$y_i = \begin{cases} y_i^*, if s_i = 1 \\ n.a., if s_i = 0 \end{cases} \tag{9}$$

$$s_i = \begin{cases} 1 \\ 0 \end{cases} \tag{10}$$

The Heckman method helps to get rid of this selection problem. The first step of the Heckman method is determined in the estimation of the selection model (see equation 11). In this case the selection is in working or non-working parents. The individual, household and regional characteristics which lead to employment are represented by the vector z_i. The unobserved variation is given by η_i.

$$s_i^* = z_i\gamma' + \eta_i \tag{11}$$

Due to the regression of equation 11 a new variable λ (Mills ratio[12]) is formed to be included in the wage ordinary least squares estimation (see equation 12).

$$y_i^* = x_i\beta' + \beta_\lambda\lambda + \varepsilon_i \tag{12}$$

The given model results in a prediction of wage. The resulting values are used for potential wages of non-working parents.

7.2.2 Model Identification

In the selection model (see equation 11), the dependent variable is employment, which is 1 if the person is employed and 0 otherwise. The independent variables spilt in two groups: in independent variables which are only part of the selection-model (equation 11) and independent variables which are also in the OLS-model (equation 12). The first group variables are:

- A dummy variable for single parent household, which is 1 if the household is a single parent houshold and 0 otherwise
- The number of children between 0 and 2 years old living in the household
- The number of children between 3 and 5 years old living in the household

[12]The Mills Ratio is the ratio of the probability density function of the standard normal distribution (which results from standardizing a normally distributed random variable) to its cumulative distribution function. In practice, the Mills Ratio is used to compute a weighting function that is used in applying the Heckman correction to regression models.

- The number of all children living in the household
- The disposable household income measured as natural logarithm

These variables are evaluated as influencing whether parents are employed or not. In households where there is only one parent, the one person has to earn the household income alone. Therefore, it is assumed that single parents are more likely to be employed. The number of children in the household may have a negative effect on labour market participation. More children mean a higher care burden. Especially raising very young children is very time-consuming, so it is assumed that the number of young children in the household has a negative impact on the labour market participation of parents. The disposable household income, also has an effect on employment. I assume that these factors only affect labour market participation, but not the wage itself.

The second group of variables, that have an impact on both labour market participation and wages, are

- The place of origin measured as Austrian, European or non-European
- The educational level measured as primary, secondary and tertiary
- The age measured as age squared[13]
- Urbanization as categorical variable measuring whether the person lives in Vienna, a municipality with more than 100.000 inhabitants, a municipality with less than 100.000 and more than 10.000 inhabitants or a municipality with less than 10.000 inhabitants
- dummy variable for Western Austria (Tyrol and Vorarlberg)
- The years employed
- A dummy variable for manager position
- A dummy variable for firm size, which is one if more than 10 persons are employed and zero otherwise
- A dummy variable for sex, which is zero for female and one for male

[13]By including the squared age in the regression model, a nonlinear relationship between age and wage as well as age and employment is allowed. Age is squared because the relationship between age and wage is often not linear. Typically, wages increase with age but at a decreasing rate. This means that the rate of increase in wages for each additional year of age decreases as workers get older. In other words, the slope of the relationship between age and wage decreases as age increases.

A person's origin can influence both their employment and their wages. It is expected that Austrians have better opportunities in the Austrian labour market and thus have a better starting position in salary negotiations. Educational status also plays an important role in both recruitment and wages. People with a higher level of education have better chances to get well-paid jobs or to get hired at all. In terms of age, the older a person is, the higher their salary is expected to be. However, when it comes to employment, age might have a negative impact on the likelihood of being employed. Regional factors can also have an impact on whether a person is employed or not. In larger communities, there are usually more companies and thus more jobs in different sectors and areas which might affect the probability of being employed. In addition, larger communities may have a higher demand for labour, especially in urban areas. This can lead to a higher wage level and thus be more attractive to job seekers. In Western Austria, it is assumed that there is a strong labour market participation, as these provinces are very strong in tourism. This could also have a positive effect on the salary. People in managerial positions are highly qualified, which might have a positive effect on both the probability of being employed and the salary. The size of a company plays a role insofar as larger companies often have more jobs to offer and also career paths that allow more opportunities for expansion and thus a higher salary. Being a woman in this data set has a negative impact on both salary and employment. Mothers have care responsibilities and therefore often do not work or work part-time.

7.2.3 Estimation and Results

In this chapter, I present the results obtained from the application of the Heckman model to the OLS wage equation and the probit participation model.[14] This means it is about which factors have an effect on the probability that a person participates in the labour market and which factors influence the amount of wage. Table 14 presents the results. The inverse Mills ratio (lambda) is statistically significant which implies the presence of sample selection bias. The Mills ratio has a negative coefficient, this means that negative selection has occurred. Without the correction, the results would tend to be lower (see Setzler, 2023).

In the given model, the place of origin has no significant effect on a 10% significance level on labour market participation. A higher level of education has a positive significant effect on whether a person works or not compared to a primary level of education (and this at a 1% significance level). Age squared has a small but significantly negative effect. The variable urbanization referring to the size of the municipality has significant positive effect

[14] I do ot interpret the probit-participation model in detail, since the results are not given in marginal effects, which is necessary for a straightforward interpretation of probit models.

on a 1% significance level: People who live in a city that is smaller than Vienna but has more than 100,000 inhabitants are more likely to participate in the labour market than those who live in Vienna, and people living in a city with less than 100,000 inhabitants but more than 10,000 inhabitants are also more likely to work than people living in Vienna. The dummy controlling for Western Austria has no significant effect on labour market participation at a 10% level of significance. The number of years a person has been employed has a significant positive effect. There is no significant effect of manager position regarding labour market participation. A firm size of more than 10 employees has a positive significant effect on labour market participation at a 1% significance level as well as the fact of being a single parent household. The number of children between 0 and 2 years in the household has a highly significant negative effect, probably due to care duties. For the number of children between 3 and 5 years of age there is no significant effect at a 10% level. The number of all children in the household has a negative effect on the employment of parents. The more children in the house, the higher the probability that the parents do not work. Household income has a positive effect on the labour force participation which is due to the fact that parents contribute to the household income via their labour market participation. Being male has a highly significant positive effect on the fact whether a parent works or not. This is due to the fact that in most families the care responsibilities lie with the mother.

The dependent variable hourly net wage of the OLS regression is given as natural logarithm. Origin and education has no significant effect at a 10% significance level. Age squared has a positive effect on wage at a 1% significance level. This is because with age, the salary increases, as people have already received promotions. The regional characteristics have no significant effect at a 10% level. Years employed has a significant negative effect on the wage at a 1% level of significance. Whether the person was or is in a manager position has a positive effect on the level of wage at a 5% significance level. Sex has a no significant effect at a 10% level.

Table 14: Heckman wage prediction

	Wage	**Work**	**/mills**
2. Origin: European	-0.0968	-0.0189	
	(0.0634)	(0.0561)	
3. Origin: non-European	-0.126	0.0125	
	(0.0891)	(0.0707)	
2. Edu	-0.0306	0.216***	
	(0.0730)	(0.0551)	
3. Edu	-0.128	0.779***	
	(0.0950)	(0.0713)	
Age^2	0.000846***	-0.00129***	
	(9.16e-05)	(6.50e-05)	
2.Urbanization	-0.0956	0.260***	
	(0.0786)	(0.0738)	
3.Urbanization	-0.0361	0.189***	
	(0.0663)	(0.0620)	
4.Urbanization	0.0171	0.0777	
	(0.0540)	(0.0500)	
West	0.0687	-0.0725	
	(0.0546)	(0.0518)	
Years employed	-0.0462***	0.0912***	
	(0.00666)	(0.00441)	
Manager position	0.0879**	0.00223	
	(0.0401)	(0.0398)	
Firm size	0.0286	0.202***	
	(0.0460)	(0.0392)	
One parent		0.554***	
		(0.0722)	
No. child 0-2		-0.295***	
		(0.0360)	
No. child 3-5		-0.0215	
		(0.0352)	
No. child		-0.163***	
		(0.0220)	

Continued on next page

ln HH income		0.901***	
		(0.0485)	
Sex	-0.0383	0.922***	
	(0.0492)	(0.0450)	
lambda			-1.757***
			(0.124)
Constant	2.500***	-6.514***	
	(0.129)	(0.389)	
Observations	9,646	9,646	9,646
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

7.3 Prediction of Childcare Costs

In addition to wage, I estimate the childcare costs for households which are not using childcare. There are two ways of estimating childcare cost: Firstly, by regulations, meaning that in some cases countries and federal states apply strict regulations on the amount of childcare costs which parents have to bear (see Abrassart and Bonoli, 2015). In Austria, childcare costs differ greatly through the federal states and in some states even through the municipalities (as shown in chapter 5). Therefore, I have to predict the childcare costs, which is the second way.

Individual, household and regional characteristics are taken into account by running this prediction. In the data set, childcare costs are given as costs per month for the whole household. Therefore, unfortunately costs are not given for each and every child in the household separately, which makes it more difficult to estimate institutional childcare costs for children under the age of six. I estimate costs exclusively for institutional childcare, since I am interested in the effect of institutional childcare cost. In order to do this, I predict in a first step the cost of childcare for single children between 0 and 6 years of age using institutional childcare and in second step I apply the results on families with more children. Then, within families, individual child care costs of all children are added. This gives me the institutional care costs per child and per family. The first variable is interesting because of the regressions related to childcare participation and intensity on child level. The second variable is of interest in terms of labour market participation and intensity of parents.

The estimation is performed using a Heckman model (see chapter 7.2.1). As before with wages, it is the same with institutional childcare costs: If the parents have decided not to have their children cared for, no costs are reported. In the following chapter I present the

dependent and independent variables for the care cost prediction.

7.3.1 Model Identification

The dependent variable is expressed as household care costs per month of all children living in the household. In my data set, I used the household care cost of of single children who attend institutional childcare. I do this to extract institutional childcare cost from overall household childcare cost. In this chapter I examine which factors might have an impact on the amount of institutional childcare cost.

Figure 17 to 19 show the mean values of childcare costs for households with only one child. The mean values are given by type of care facility (figure 17), federal state (figure 18) and age of the child (figure 19).

Figure 17: Mean institutional childcare costs by facility

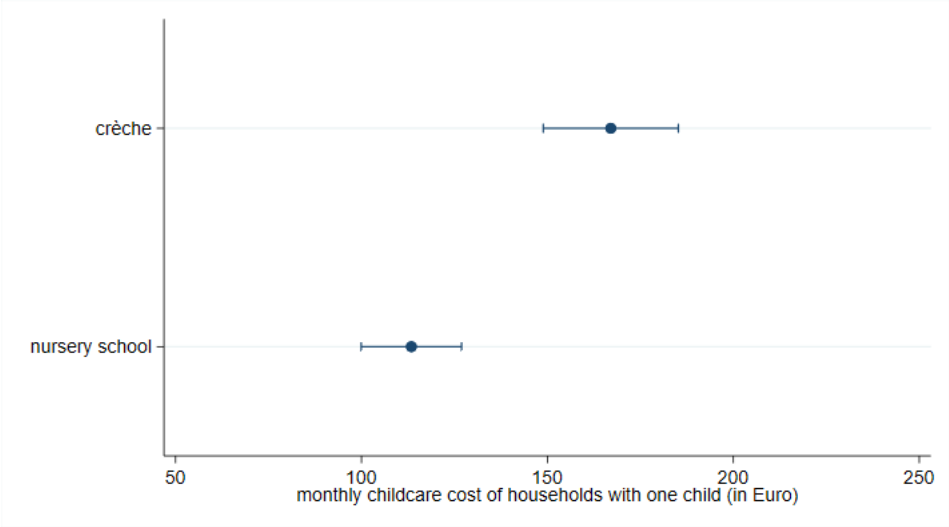


Figure 18: Mean institutional childcare costs by federal state

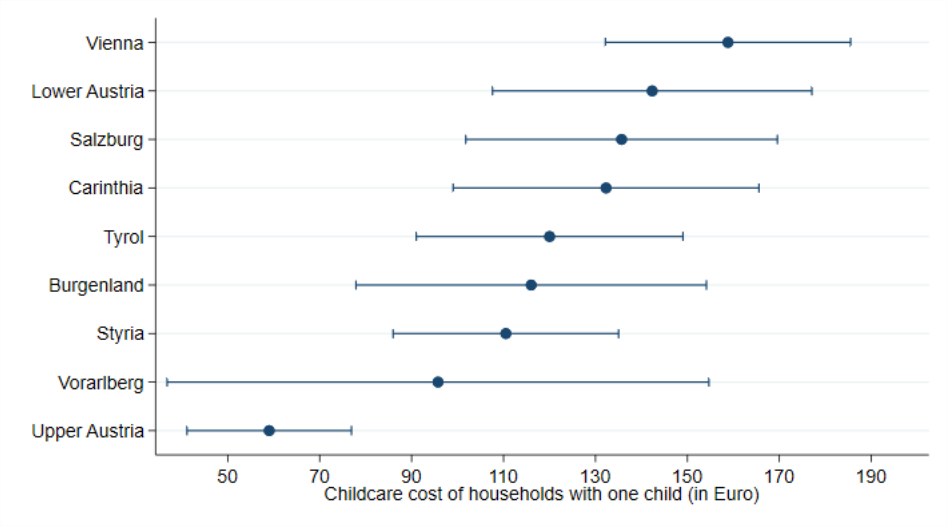


Figure 19: Mean institutional childcare costs by age of the child

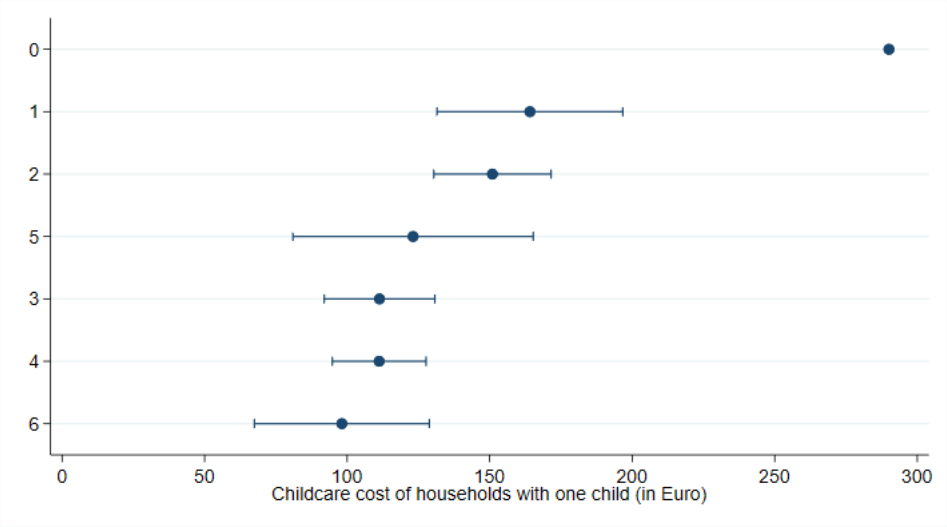


Figure 17 shows the mean cost of households with one child attending crèche is 167€ per month, while the mean care cost of households with one child attending nursery school 113€ per month. As mentioned in chapter 5.4 childcare costs vary greatly with the type of care facility. In many federal states costs for nursery schools have an upper limit, whereas crèches are often less regulated.

Figure 18 presents the mean cost for households with one child in each federal state. As mentioned in chapter 5.4 the childcare system is regulated by each federal state individually. Therefore, prices vary along federal states. With a mean cost of 159€, households in Vienna spent most on childcare cost. This might be due to the fact that in Vienna a lot of children attend private childcare facilities. The least is spent in Upper Austria with a mean cost of

59€ per month. For each of the federal state, there is quite a large dispersion (especially Vorarlberg). This could be due to cost differences between private and public facilities. Unfortunately, the differentiation between private and public institutional childcare is not listed in the EU-SILC.

In figure 19 mean costs depending on the age of the child are given. There is only one household with a single child which is under the age of 1 and already in institutional childcare. This household spends 290€ on childcare. Households with children who are 1 year old, bear a mean cost of 164€ per month, households with 2 year old children spent a mean care cost of 151€ per month, parents of 3 year old children spent a mean cost of 111€ as well as parents of 4 year old children, households with a 5 year old child spent a mean cost of 123€ and parents of 6 year old children spent 98€ per month on childcare. The younger the child the more the household spends on institutional childcare. This might be linked to the type of childcare facility which the child attends. The fact that the costs for 6 year old children are the lowest is influenced by the fact that half-day nursery school attendance is free of charge for this age group.

Type of care facility, federal state and the age of a child seem to be related to how much the household spends on childcare. In the following prediction, the federal states in which the children live and the age of the children are taken into account. Unfortunately, due to the estimation procedure and the amount of data, it is not possible to differentiate between crèche and nursery school. However, this is covered by the age of the child.

In the selection model (see equation 11, chapter 7.2.1), the dependent variable is institutional childcare use, which is 1 if the child attends institutional childcare and 0 otherwise. Again, the independent variables spilt in two groups: in independent variables which are only part of the selection-model (equation 11) and independent variables which are also in the OLS-model (equation 12). The first group variables are:

- Urbanization as categorical variable measuring whether the person lives in Vienna, a municipality with more than 100.000 inhabitants, a municipality with less than 100.000 and more than 10.000 inhabitants or a municipality with less than 10.000 inhabitants
- A dummy variable for single parent household
- A dummy variable which is 1 if all parents living in the household have Austrian citizenship

- A dummy variable that is 1 if the household receives free help from friends and family to provide childcare

The region has an influence on whether a child is in care to the extent that the nearest child care facilities are less distant in more urban areas. Single parents are often solely responsible for the income of the household. Therefore, they have to work and put the child in care. Whether a child is in care or not may depend on the nationality of the parents and their trust in Austrian childcare system. Therefore, the dummy Austrian parent is introduced. I assume that children of Austrian parents are more likely to be in care.

The second group variables are

- A dummy variable for each federal state [15]
- Year as a categorical variable
- Age of the child

The regulations in the federal states have an influence on the offer of care facilities and on their price. Therefore, the individual dummy variables in the selection model are related to care as well as to costs in the OLS model. Since the cost structures in the federal states have changed over the years, it is assumed that years have an influence on the costs and on the fact whether someone is in care. The age of the children is included in both Heckman equations, as children attend either a crèche or a nursery school depending on their age, and the expansion and costs of these two forms of care differ across the federal states.

7.3.2 Estimation and Results

In this chapter, the results of the Heckman model for the OLS-carecost equation and the probit-participation model are presented.[16] Table 15 displays the findings of the childcare cost prediction. The statistically significant inverse Mills ratio (lambda) indicates the existence of sample selection bias. The Mills ratio has a negative coefficient, this means that negative selection has occurred. Without the correction, the results would tend to be lower (see Setzler, 2023).

[15] Vienna is listed only for the OLS regression, since it is already included in the variable for urbanization in the selection regression

[16] I do not interpret the probit-participation model in detail, since the results are not given in marginal effects, which is necessary for a straightforward interpretation of probit models.

In the selection regression of the Heckman-model, the categorical variable urbanization has a significant negative effect. Vienna is the base category and it shows that compared to children in Vienna, children from smaller municipalities and cities are less likely to be in childcare. With respect to the federal states, Vorarlberg serves as a reference category. In every federal state, children are significantly more likely to be in childcare than in Vorarlberg. For the variable year, 2008 serves as the reference category: Apart from 2009, in the following years the probability that a child is in childcare is significantly higher than in 2008. Older children (in the range of 0 to 6 years) and children living with only one parent are significantly more likely to be in childcare. The fact that all parents in the household have Austrian citizenship is not significantly related to the demand for institutional childcare at a 10% significance level. Children who are cared for for free by family members or family friends are significantly less likely to be in institutional childcare.

Regarding the OLS-regression of the Heckman-model: of all the federal federal states, only Upper Austria has a significant correlation with the institutional care cost of single children on a 5% significance level. Childcare for single children costs around 73 € per month less in Upper Austria than in Vorarlberg. Regarding the years, 2008 serves as reference category: this model shows that costs decrease significantly compared to 2008. The years 2009, 2015 and 2018 show no significant effect at a 10% level of significance compared to 2008. The age of the child is highly significant. The older the child, the lower the childcare costs. This is due to the cost difference between crèche and nursery school as well as the mandatory free half-day care for children between the ages of 5 and 6. The model allows only an approximate estimation on costs for only children in institutional childcare. This is due to the fact that there are not as many households that have only one child. In addition, sibling discounts occur in many institutions, which cannot be represented by this model once the costs are transferred to households with more than one child.

Table 15: Heckman childcare cost prediction

	Cost	**Care Use**	**/mills**
2.Urbanization		-0.797***	
		(0.188)	
3.Urbanization		-0.759***	
		(0.160)	
4.Urbanization		-0.899***	
		(0.164)	
Burgenland	-18.16	0.886***	
	(46.41)	(0.220)	
Carinthia	-2.128	0.518***	
	(42.89)	(0.192)	
Lower Austria	17.88	0.479***	
	(38.07)	(0.168)	
Upper Austria	-73.57**	0.609***	
	(37.46)	(0.164)	
Salzburg	-5.660	0.692***	
	(40.59)	(0.182)	
Styria	-17.29	0.664***	
	(38.02)	(0.169)	
Tyrol	-12.85	0.512***	
	(39.87)	(0.180)	
Vienna	15.23		
	(38.51)		
o.Vorarlberg	-	-	
2009.year	-17.47	0.167	
	(29.61)	(0.138)	
2010.year	-76.65***	0.316**	
	(29.53)	(0.134)	
2011.year	-104.7***	0.446***	
	(29.86)	(0.136)	
2012.year	-105.5***	0.484***	
	(29.57)	(0.135)	

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2013.year	-79.80**	0.589***	
	(31.10)	(0.140)	
2014.year	-84.20***	0.611***	
	(30.68)	(0.139)	
2015.year	-48.41	0.400***	
	(30.78)	(0.141)	
2016.year	-89.10***	0.517***	
	(31.73)	(0.145)	
2017.year	-69.05**	0.699***	
	(32.55)	(0.145)	
2018.year	-44.74	0.856***	
	(32.63)	(0.141)	
2019.year	-54.31*	0.852***	
	(31.23)	(0.140)	
Child age	-18.75***	0.221***	
	(5.872)	(0.0134)	
One parent		0.414***	
		(0.0814)	
AT parents		0.0155	
		(0.0636)	
Family help		-1.938***	
		(0.169)	
lambda			-47.74*
			(25.82)
Constant	330.1***	-1.941***	
	(83.88)	(0.123)	
Observations	4,937	4,937	4,937
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

8 Results

This chapter showcases the findings regarding the impact of childcare costs on childcare participation, childcare intensity, labour market participation, and labour intensity. The results are based on probit and tobit regressions.

8.1 Childcare Participation

Childcare is composed of two decisions, first whether to put the child in childcare, and second, how many hours to put the child in care.

Childcare participation is represented as a binary variable for both crèche and nursery school. Consequently, the regressions are conducted using a probit model, and the provided tables display the marginal effects.[17] The regressions regarding childcare are run on child level. Table 16 presents the three models of childcare participation for children of crèche age (age 0 to 2). Table 17 presents the results for nursery school children (age 3 to 6).[18] The models for children in crèche and children in ursery school use the same variables for the sake of comparability. In both regression tables the first model serves as base model.

8.1.1 Crèche Participation

Model 1 in table 16 represents a base model which attributes crèche participation to the following characteristics of the region and household:

- A variable non-institutional childcare hours indicating the number of hours per week the child is in non-institutional childcare (e.g., with a childminder).
- Household income group: This categorical variable divides households into different income groups. The first group includes households with an annual income up to 19,000€. The second group comprises households with an annual income between 19,000€ and 46,000€ . The third group encompasses households with an income ranging from 46,000€ to 64,000€ , while the fourth group represents households with an annual income of 64,000€ and above.

[17] Marginal effects are easier to interpret because they directly express the change in probability, rather than indicating the change in the dependent variable with respect to a change in the independent variables as is the case with regression coefficients.

[18] Nursery schools are often open not only to children between the ages of 3 and 6 but also to younger children depending on the provider. Therefore, there are also children aged 1 and 2 (22 and 285) who report being in nursery school. The analyses are nevertheless carried out separately, since nursery schools in most federal states are subject to more price and organizational regulations.

- Number of all children living in the household
- Number of children between 0 and 2 years old living in the household
- Number of children between 3 and 5 years old living in the household
- The variable urbanization is a categorical variable indicating the residential location of the person. The categories include living in Vienna, living in a municipality with more than 100,000 inhabitants, living in a municipality with less than 100,000 but more than 10,000 inhabitants, and living in a municipality with less than 10,000 inhabitants.
- A dummy variable "west" for the western states of Vorarlberg and Tyrol
- A dummy variable which is 1 if the child is living in a household with a single parent and 0 otherwise

Model 1 acts as the base model, and in the subsequent discussion, the focus will primarily be on the coefficients from this model. The other models will be taken into account to analyze additional variables and any resulting alterations.[19]

Hourly demand of non-institutional childcare has no significant effect at a 10% level of significance (in the base model). This changes in the third model where parental education is included and suggests that the educational level of parents can be an important influencing factor in the decision regarding the type of childcare.

In terms of household income, the lowest income group is used as the reference category. Children from the two highest income groups are significantly more likely to attend crèche care (at a 1% significance level). Children living in households with an annual income between 46,000€ and 64,000€ have a 5.2 percentage point higher likelihood of attending crèche care compared to children in households with an income below 19,000€. Children living in households in the highest income group have a 7.2 percentage point higher likelihood of being in daycare compared to children in the lowest income group. Household income plays a role in the affordability of childcare for parents. Alternatively, household income may indicate that both parents are actively working and, therefore, utilize childcare services. However, this seems less plausible in the case of crèche children, as parents of children up to two years old can take parental leave and care for the children themselves. In the third model, when parental education is included, these effects lose their significance at a 10 % significance level. This could be related to the correlation between the financial capital of the household and

[19]This holds also for the following regression tables

the educational level of the parents.

The number of children residing in the household has a highly significant negative effect. Each additional child in the household decreases the probability of a child being in childcare by approximately 2.9 percentage points. Furthermore, an additional child between 0 and 2 years old reduces the probability by 4.8 percentage points. Both of these effects are statistically significant at a 1% level. On the other hand, additional children in the age group of 3 to 5 years old living in the household do not have a significant effect (at a 10% level of significance). It is plausible that as the number of children in a household increases, parents are more inclined to personally care for their children and are less likely to opt for childcare services. This is particularly true for parents with children under the age of two, as working parents can take advantage of paid parental leave until their child turns two. Consequently, they have both the time and financial means to personally care for their children.

In relation to the urbanization variable, Vienna is used as the reference category. The more rural the child's living environment, the less likely they are to attend crèche compared to children in Vienna. A child residing in a municipality with over 100,000 inhabitants is 5.4 percentage points less likely to attend crèche compared to children in Vienna. Children in municipalities with populations between 100,000 and 10,000 are approximately 11.4 percentage points less likely to attend daycare, while children in municipalities with fewer than 10,000 inhabitants are 14.7 percentage points less likely to attend crèche compared to children in Vienna. The effect of living in more rural areas is not only stronger but also statistically significant at a higher level of significance.

Children residing in the western federal states of Austria (Tyrol and Vorarlberg) have a higher likelihood of attending crèche, with an increase of 10.6 percentage points compared to children in eastern Austria.

Children in single-parent households are more likely to be in childcare than children in two-parent households (by approximately around 7.9 percentage points at a 1% significance level). Given that parents of children in crèches have the opportunity to take parental leave, the decision to enroll their children in crèches may not solely be driven by the necessity to work. Single parents, in particular, may have a higher inclination towards redistributing childcare responsibilities.

In model 2, the potential logarithmized institutional care costs (per month) of childcare attendance are included. A 1 percent increase in childcare costs results in a 2.9 percentage

point decrease in the probability of a child being enrolled in childcare. This coefficient remains significant at a 1% level of significance even when parental education is added in model 3. These findings suggest that childcare costs play a significant role in determining whether or not a child attends crèche.

Model 3 builds upon model 2, but replaces the variable indicating whether the child lives in a one-parent household with a variable indicating the highest educational degree of the mothers and fathers in the household. The educational degrees include primary, secondary, and tertiary education, with primary education serving as the reference category. Children of mothers with secondary or tertiary education have a significantly higher likelihood of attending crèche compared to children of mothers with primary education. The results are highly significant at a 1% level of significance. Specifically, a child of a mother with a secondary degree has a 9.2 percentage point higher probability of attending crèche compared to a child of a mother with a primary degree, and a child of a mother with a tertiary degree has a 9.5 percentage point higher probability. The effect is slightly smaller for fathers, with a 4.1 percentage point increase in the probability of attending crèche for children of fathers with secondary education compared to fathers with primary education, and a 6.8 percentage point increase for children of fathers with tertiary education. These findings indicate that parents' education plays an important role, as educated parents may be more knowledgeable about childcare options and potential financial subsidies. As discussed in Chapter 5, crèche childcare can be more expensive and less regulated, but parents can independently apply for subsidies, as seen in the case of Tyrol (see Chapter 5.4.7.).[20]

[20]In terms of model fit, all three models have relatively low pseudo R-squared values, indicating that childcare participation is influenced by additional factors not accounted for in these models. Model 1 has a pseudo R-squared of 0.065, model 2 of 0.0713, and model 3 of 0.0890.

Table 16: Créche Particpation: Probit-Model marginal effects

Variables	**1.Model**	**2.Model**	**3.Model**
Potential childcare cost (ln)		-0.0289***	-0.0294***
		(0.00751)	(0.00875)
Non-institutional childcare hour	-0.000418	-0.00123	-0.00184**
	(0.000593)	(0.000762)	(0.000771)
2. Household income group	0.0169	0.00920	-0.0112
	(0.0161)	(0.0169)	(0.0184)
3. Household income group	0.0523***	0.0519***	0.0114
	(0.0123)	(0.0122)	(0.0178)
4. Household income group	0.0723***	0.0590***	0.00281
	(0.0140)	(0.0126)	(0.0189)
No. child	-0.0288***	-0.0268***	-0.0143*
	(0.00891)	(0.00852)	(0.00787)
No. child 0-2	-0.0477***	-0.0438***	-0.0474***
	(0.0110)	(0.0104)	(0.0107)
No. child 3-5	0.0135	0.0128	0.00982
	(0.0129)	(0.0124)	(0.0105)
2. Urbanization	-0.0541*	-0.0804***	-0.0957***
	(0.0283)	(0.0306)	(0.0275)
3. Urbanization	-0.114***	-0.130***	-0.142***
	(0.0170)	(0.0191)	(0.0244)
4. Urbanization	-0.147***	-0.168***	-0.185***
	(0.0178)	(0.0176)	(0.0216)
West	0.106***	0.103***	0.101***
	(0.0161)	(0.0187)	(0.0190)
One parent	0.0794***	0.0776***	
	(0.0193)	(0.0211)	
2. Edu mother			0.0916***
			(0.0167)
3. Edu mother			0.0955***
			(0.0246)
2. Edu father			0.0414*

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			(0.0244)
3. Edu father			0.0676***
			(0.0244)
Observations	4,118	3,964	3,605
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

8.1.2 Nursery School Participation

Regarding childcare use table 17 provides the results for nursery school attendance using the same models as for crèche attendance (see Chapter 8.1.1). Model 1 serves as the base model.

The variable representing the demand for non-institutional childcare hours is not statistically significant at a 10% level of significance in any of the three models. Similarly, the coefficients of the household income group variable are not statistically significant at a 10% level in the first model. However, in the second model, where the potential childcare cost of the child (as natural logarithm) is added, the third income group becomes significant compared to the first income group at a 10% level of significance. This significance diminishes again in model 3, which controlls for parental education.

The number of children in the household has a significant negative effect on the likelihood of a child attending nursery school. Each additional child in the household reduces the probability by 6.9 percentage points, which is statistically significant at a 1% level. However, having one more child in the household between 0 and 2 years old increases the probability of a child attending nursery school by 10.5 percentage points. It is possible that parents who are currently on parental leave seek to alleviate their childcare responsibilities by sending the older child to nursery school. Additionally, having another child between the ages of 3 and 5 significantly increases the probability of a child being in nursery school by 25.7 percentage points.

The variable urbanization has no statistical significance at a 10% level in any of the three models. This could be because there is a sufficient availability of nursery school places even in more rural areas.

The region of residence in Austria, specifically Western or Eastern Austria, significantly affects the likelihood of attending nursery school. Children residing in Western Austria are

4.2 percentage points less likely to attend nursery school compared to their counterparts in Eastern Austria.

The fact, whether the parents of a child are single parents, does not have a statistically significant effect on the probability of the child attending nursery school at a 10% level of significance.

As indicated by the second model, the estimated childcare costs of the child (as natural logarithm) also do not have a statistical significant effect at a 10% level. This suggests that for nursery school attendance, costs play a minor role. In the third model the educational status of the father and the mother is added. Parental education has no significant effect for nursery school children at a 10% significance level.[21]

[21]The pseudo R-squared values indicate that the Probit regressions perform better for nursery school children compared to crèche children (as shown in Chapter 8.1.1). Model 1 has a pseudo R-squared of 0.226, Model 2 has a pseudo R-squared of 0.2239, and Model 3 has a pseudo R-squared of 0.2178. These higher values suggest that the Probit models explain a larger proportion of the variation in childcare participation for nursery school children compared to crèche children.
It is indeed observed that the base model exhibits the best fit and that the variables included in the base model for nursery school children provide the best explanatory power. The pseudo R-squared reflects that potential childcare costs and parental education do not have a significant effect on the likelihood of participation in nursery school.

Table 17: Nursery School Particpation: Probit-Model marginal effects

Variables	**1.Model**	**2.Model**	**3. Model**
Potential childcare cost (ln)		0.0118	0.00937
		(0.0119)	(0.0126)
Non-institutional childcare hour	0.000426	0.00111	0.000940
	(0.000723)	(0.000985)	(0.00138)
2. Household income group	0.0104	0.0208	0.00988
	(0.0213)	(0.0217)	(0.0293)
3. Household income group	0.0392	0.0571*	0.0394
	(0.0295)	(0.0310)	(0.0369)
4. Household income group	0.0404	0.0566*	0.0363
	(0.0327)	(0.0337)	(0.0382)
No. child	-0.0688***	-0.0644***	-0.0593***
	(0.00545)	(0.00541)	(0.00476)
No. child 0-2	0.105***	0.102***	0.0994***
	(0.0129)	(0.0135)	(0.0146)
No. child 3-5	0.257***	0.253***	0.244***
	(0.0189)	(0.0206)	(0.0216)
2. Urbanization	0.0123	0.0209	0.0304
	(0.0224)	(0.0248)	(0.0308)
3. Urbanization	0.0102	0.0158	0.0334
	(0.0158)	(0.0208)	(0.0222)
4. Urbanization	0.0141	0.0208	0.0271
	(0.00972)	(0.0155)	(0.0186)
West	-0.0425**	-0.0380**	-0.0513**
	(0.0176)	(0.0194)	(0.0216)
One parent	0.00518	0.00374	
	(0.0188)	(0.0218)	
2. Edu mother			0.0161
			(0.0170)
3. Edu mother			0.0433
			(0.0290)
2. Edu father			-0.0126

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			(0.0187)
3. Edu father			-0.0170
			(0.0172)
Observations	5,008	4,455	3,727
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

8.2 Childcare Intensity

In the next step, a tobit model is employed to analyze the impact of childcare costs on childcare intensity. Childcare costs not only determine whether a child is in childcare, but also how many hours are demanded. My hypothesis is that childcare costs have a positive effect on the demand for hours of childcare, and this effect is stronger for children attending crèche. The intensity of care is measured in terms of the number of hours per week. Only children who report childcare hours are included in the analysis. A tobit model is chosen due to the presence of many households utilizing care for a range of 1 to 40 hours per week, reflecting the working hours of parents and the opening hours of childcare facilities. Therefore, the lower bound for the model is set at 1 hour, while the upper bound is set at 40 hours. Once again, the regressions are conducted at the individual child level and separately for crèche and nursery school. Table 18 presents the results for children who attend crèche and table 19 for children who attend nursery school. The models cover the same dependent variables as the probit regressions in chapter 8.1.

8.2.1 Crèche Intensity

The first model in table 18 is the base model. The same variables used in the probit regressions are employed for the tobit regression models:

The hourly demand of non-institutional childcare has no statistical significant effect at a 10% level of significance on the hours a child spends in crèche.

Regarding the effect of household income the lowest household income group serves as the reference category. The model indicates a statistically significant positive effect, at a 10% significance level, only for the highest income group compared to the lowest. Children living in households with an annual income of more than 64,000€ spend 3.2 hours more in crèche than children living in households with an annual income of less than 19,000€. This effect

becomes insignificant in model 3, where parental education is included. The other categories do not show a statistical significant effect at a 10% significance level.

The number of all children living in the household has no significant effect (at 10% significance level) on the amount of hours a child spends in crèche. The number of children between 0 and 2 years has a negative significant effect on the hours a child spends in crèche. One more child of this age group in the household reduces demand by about 3.1h. This effect is significant at a 1% significance level. The number of children between 3 and 5 years has again no significant effect at a 10% level of significance.

Less urbanized regions have a significantly negative effect on crèche intensity. Vienna serves as the reference category for this categorical variable. Children living in communities with fewer than 10,000 inhabitants spend approximately 6.1 hours less in crèche care compared to children living in Vienna. Children from municipalities with populations between 10,000 and 100,000 spend 4.4 hours less in care than children from Vienna. This observation could be attributed to the lower availability of all-day care options for children under the age of three in more rural areas.

Children living in the western part of Austria spend significantly fewer hours in crèche care, approximately 7.7 hours less. As mentioned in Chapter 3, there are few children under the age of three in all-day care in the western regions.

Whether the child lives in a household with one or both parents does not have a significant effect on the hours the child spends in crèche care at a 10% level of significance.

In the second model, the potential childcare costs, represented as the natural logarithm, are introduced. The costs exhibit a significant effect on crèche intensity at a 5% level of significance. An increase of 1% in childcare costs corresponds to an increase of 1.2 hours spent in crèche care. The more hours requested, the higher the monthly costs. In the third model, the educational level of the parents is included. However, in this model, education does not have a significant effect at a 10% level of significance on the childcare intensity. [22]

[22]Again, the models for crèche children exhibit relatively low pseudo R-squared values: Model 1 has a pseudo R-squared of 0.0355, model 2 has 0.0384, and model 3 has 0.0458. However, the explanatory power of the models increases after childcare costs are included.

Table 18: Crèche Intensity: Tobit-Model

Variables	**1.Model**	**2. Model**	**3.Model**
Potential childcare cost (ln)		1.170**	1.247*
		(0.575)	(0.748)
Non-institutional childcare hours	-0.0291	0.0219	-0.0189
	(0.0624)	(0.0727)	(0.0815)
2. Household income group	1.918	1.664	-0.0922
	(1.976)	(1.796)	(2.968)
3. Household income group	1.068	1.011	-0.0762
	(2.272)	(2.278)	(2.601)
4. Household income group	3.167*	3.462*	2.943
	(1.735)	(2.015)	(2.826)
No. child	0.853	0.674	0.682
	(0.630)	(0.501)	(0.416)
No. child 0-2	-3.124***	-3.440***	-2.827***
	(0.731)	(0.842)	(0.873)
No. child 3-5	-0.202	-0.200	-0.469
	(0.498)	(0.568)	(0.458)
2. Urbanization	0.408	1.250	-0.691
	(2.238)	(2.258)	(2.149)
3. Urbanization	-4.436**	-3.995**	-4.832**
	(1.782)	(1.781)	(1.873)
4. Urbanization	-6.096***	-5.246***	-6.285***
	(1.183)	(1.302)	(1.357)
West	-7.666***	-8.043***	-8.396***
	(0.782)	(0.752)	(0.926)
One parent	1.914	1.523	
	(1.201)	(1.266)	
2. Edu mother			0.125
			(2.504)
3. Edu mother			0.270
			(2.793)
2. Edu father			0.494
			(1.595)

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3. Edu father			-0.967
			(1.958)
var(e.crC(che_hour)	89.36***	87.06***	79.62***
	(7.566)	(7.540)	(7.924)
Constant	26.92***	21.83***	22.93***
	(1.993)	(3.057)	(3.915)
Observations	569	537	468
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

8.2.2 Nursery School Intensity

The same models were used for nursery school children as for crèche children. Model 1 (the base model) in table 19 shows the hours a child spends in non-institutional childcare have a negative significant effect on the hours a child attends nursery school. A child who uses one additional hour of non-institutional care spends 0.07 hours less in nursery school. In model 1, this coefficient is significant at a 1% level of significance.

Each category of the categorical variable household income group has a positive and significant coefficient in model 1 and 2. The lowest income category serves as the reference category: A child from a household with an annual income between 19,000€ and 46,000€ spends additional 1.4 hours in care, a child from a household between 46,000€ and 64,000€ spends an additional 1.7 hours, and a child from the highest household income group spends an additional 2.2 hours in nursery school compared to children from households with an annual income of less than 19,000€. In model 3, only the comparison between the highest and lowest income groups is significant.

Regarding the number of children living in the household, only the presence of additional children between the ages of 0 and 2 has a significant effect (at a 1% level). Each additional child in this age group decreases the number of hours spent in nursery school by approximately 1 hour.

Regarding urbanization: Living in a municipality with more than 100,000 inhabitants reduces the time a child spends in nursery school by 3.2 hours compared to Viennese children. Children who live in a municipality of 10,000 to 100,000 inhabitants, spend significantly 6.9 hours less in nursery school than Viennese children. Children from municipalities with fewer

than 10,000 inhabitants attend 7.6 hours less childcare than children in Vienna. This may be due to the coverage of afternoon care in rural areas.

Children residing in Western Austria exhibit significantly lower nursery school intensity, with a reduction of approximately 3.6 hours per week (at a 1% level of significance). This finding aligns with the data presented by Statistics Austria in Chapter 3, which indicates a relatively lower proportion of children enrolled in all-day care in Tyrol and Vorarlberg (refer to Figure 5, chapter 3).

Children living in a household with only one parent spend significantly more hours in nursery school than children with both parents living in the household. Living in a single parent household increases the demanded hours by 2.6 hours a week.

Model 2 adds the institutional childcare cost per month as natural logarithm for the nursery school: this variable has a significant positive coefficient at a 10% level of significance. An increase of 1% in childcare costs results in an increase of 0.3 hours in the demanded hours of care. More care is associated with higher costs, as many states and regions do not offer free childcare services. In model 3, the significance disappears at a 10% level of significance, suggesting that the costs a household is willing to incur may be influenced by the educational level of the parents. The mother's education level in model 3 does not have a significant effect on the hours a child spends in nursery school. However, the father's education level has a significant negative effect at a 1% level. A child with a father who has a secondary education spends 1.2 hours less in nursery school compared to a child with a father who has a primary education. If the father has a tertiary education, the child spends 2.3 hours less in nursery school.[23]

[23]The Pseudo R-squared for these models are as follows: Model 1: 0.0294, Model 2: 0.0305, Model 3: 0.0312.

Table 19: Nursery School Intensity: Tobit-Model

Variables	**1.Model**	**2. Model**	**3.Model**
Potential childcare cost (ln)		0.292*	0.173
		(0.170)	(0.154)
Non-institutional childcare hours	-0.0674***	-0.0478*	-0.0792***
	(0.0211)	(0.0249)	(0.0217)
2. Household income group	1.410**	1.473**	0.834
	(0.625)	(0.735)	(0.926)
3. Household income group	1.657**	1.922**	1.567
	(0.728)	(0.858)	(1.136)
4. Household income group	2.199***	2.326***	2.438**
	(0.680)	(0.790)	(1.158)
No. child	-0.303	-0.284	-0.204
	(0.264)	(0.259)	(0.324)
No. child 0-2	-0.996***	-1.139***	-1.229***
	(0.243)	(0.252)	(0.283)
No. child 3-5	0.227	-0.0698	0.00228
	(0.325)	(0.351)	(0.348)
2. Urbanization	-3.228***	-3.154***	-3.544***
	(0.736)	(0.703)	(0.717)
3. Urbanization	-6.911***	-6.712***	-6.812***
	(0.844)	(0.813)	(0.746)
4. Urbanization	-7.590***	-7.352***	-7.483***
	(0.608)	(0.599)	(0.498)
West	-3.564***	-3.715***	-3.666***
	(0.384)	(0.471)	(0.449)
One parent	2.633***	2.597***	
	(0.442)	(0.470)	
2. Edu mother			-0.114
			(0.583)
3. Edu mother			0.310
			(0.631)
2.Edu father			-1.213***
			(0.421)

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3. Edu father			-2.320***
			(0.385)
var(e.nursery_hour)	61.64***	62.64***	56.35***
	(2.444)	(2.279)	(2.199)
Constant	30.04***	28.91***	31.02***
	(0.636)	(1.205)	(1.159)
Observations	4,106	3,668	3,097
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

8.3 Labour Market Participation

In this chapter, I examine the correlation between the costs of institutional care (for all children residing in the household) and the labour market participation of mothers and fathers. Labour market participation is measured using a binary variable: 1 indicates employment and 0 represents non-employment. Parents who are on parental leave are classified as employed. To investigate the impact of potential childcare costs on parents' labour market participation, a probit regression is used.

The institutional childcare costs considered in this analysis pertain to all children in the household who are up to 6 years old. These costs are derived by aggregating the estimated childcare expenses for each child living in the household at the household and annual level. My hypothesis is that the influence of costs on labour market participation is more pronounced for mothers than for fathers, given the traditional role of mothers in the upbringing of children.

The results for the probit regressions are presented as marginal effects. Marginal effects allow me to quantify the change in the probability of employment as childcare costs vary, while controlling for other relevant factors such as education, income, and more.

8.3.1 Maternal Labour Market Participation

Table 20 presents the findings regarding maternal labour market participation, encompassing four models. The first model serves as the base model, excluding the predicted variables of institutional childcare cost and potential wage. The second model includes potential institutional household childcare cost, while the third model incorporates the age of the youngest child living in the household. In the fourth model potential wage as natural logarithm (which was estimated in chapter 7.2) is added. The base model covers the following variables:

- Institutional care hours: This variable represents the total hours of institutional childcare that the household demands per week
- Non-institutional care hours: This variable represents the total hours of informal childcare that the household demands per week (e.g. childminders)
- Household income group: This categorical variable divides households into different income groups. The first group includes households with an annual income up to 19,000€. The second group comprises households with an annual income between 19,000€ and 46,000€ . The third group encompasses households with an income rang-

ing from 46,000€ to 64,000€ , while the fourth group represents households with an annual income of 64,000€ and above.

- Number of children living in the household: This variable indicates the total number of children residing in the household
- Number of children between 0 and 2 years old: This variable captures the number of children between the ages of 0 and 2 years living in the household
- Number of children between 3 and 5 years old: This variable represents the number of children between the ages of 3 and 5 years living in the household
- Contribution to household income through one's own salary as natural logarithm: This variable quantifies the individual's contribution to the household income through their own salary. This variable is calculated by subtracting the salary from the household income and then taking the natural logarithm
- Level of education: This categorical variable classifies education into primary, secondary, and tertiary levels
- Age of individual
- Age square: This variable represents the square of the individual's age[24]
- Urbanization: This categorical variable classifies the person's residential region into Vienna, a municipality with more than 100,000 inhabitants, a municipality with less than 100,000 and more than 10,000 inhabitants, or a municipality with less than 10,000 inhabitants
- Dummy variable for Western Austria: This variable is a binary indicator, taking the value 1 if the person lives in Vorarlberg or Tyrol and 0 otherwise
- One parent: A dummy variable that takes the value 1 if the household is headed by a single parent, and 0 otherwise.

The findings of the base model reveal a significant positive effect of institutional childcare hours on the probability of maternal employment. Each additional hour per week increases the likelihood by approximately 0.2 percentage points at a significance level of 1%. This suggests that as households utilize more childcare services, mothers have greater opportunities

[24]Including the age squared term allows the model to capture potential non-linear patterns that may emerge in the work participation of parents as they navigate different stages of parenting and career development.

to engage in employment.

Informal care hours per week also have a positive and significant effect on maternal employment at a significance level of 1%. An additional hour per week increases the probability that a mother works by around 0.4 percentage points. It appears that working mothers are more likely to rely on private childcare options.

Household income also demonstrates a highly significant positive impact on maternal employment: If a mother resides in a household with an annual income between 19,000€ and 46,000€, the probability of employment increases by 28.7 percentage points compared to mothers in households with less than 19,000€. For mothers in households with an income between 46,000€ and 64,000€, the probability increases by 48.3 percentage points, and for mothers in households earning more than 64,000€, the probability rises by 54.1 percentage points compared to mothers living in households of the lowest income group. This effect cannot simply be explained by the fact that working mothers contribute to the household income, as this is controlled for by the variable 'income contribution'.

The presence of additional children in the household has a highly significant negative impact on a mother's employment probability. Each additional child reduces the probability by approximately 8 percentage points at a significance level of 1%. This can be attributed to the increased caregiving responsibilities that are related with having more children. However, having additional children between 0 and 2 years old has a positive effect of 5.7 percentage points on the likelihood of maternal employment. This may be because mothers with children in this age range can take advantage of paid parental leave and fulfill their caregiving duties without sacrificing their employment. Having an additional child between 3 and 5 years old has a negative effect of 4.3 percentage points on a mother's likelihood of participating in the labour market. This is likely due to the fact that parents no longer have a legal entitlement to paid parental leave for children in this age group, which may result in parents exiting the labour market to fulfill their caregiving responsibilities.
After the inclusion of the age of the youngest child in model 3 and model 4, the variable "no. child 0-2" loses its significance at a 10% level. This may be because an additional child in this age group often is the youngest child in the household.

The contribution of income has a highly significant effect on the likelihood of maternal employment. The effect is negative, as it is calculated by subtracting the mother's labour income from the household income. An increase of 1% in household income, excluding the mother's own income, reduces the probability of maternal employment by 13.3 percentage

points (in the first model).

Education has a significantly positive effect on the likelihood of maternal employment at a 1% level of significance. The higher the level of education, the more likely a mother is to be employed. For mothers with a secondary educational degree, the probability of being employed increases by 10.4 percentage points compared to mothers with a primary educational degree. For mothers with a tertiary educational degree, the probability increases by 11.2 percentage points.

The age of a mother has a significantly positive effect on the probability of her employment. With increasing age by one year, the likelihood of the mother being employed increases by 2.2 percentage points. Age square has a significantly negative coefficient, indicating that the increase in the probability of employment decreases with increasing age. In the base model, both coefficientes are significant at a 1% level of significance. In model four, which introduces the variable wage, the significance weakens.

Urbanization significantly affects the probability of maternal employment. This categorical variable, with Vienna as the reference category, indicate that non-Vienna residents have a higher likelihood of being employed. This finding aligns with the microcensus data presented in Chapter 4, which illustrates that Vienna has the lowest maternal employment rate among all federal states (see figure 12 in chapter 4). Compared to women in Vienna, the probability of being employed is 6.9 percentage points higher for women living in municipalities with more than 100,000 inhabitants, 10.3 percentage points higher for women from municipalities with 10,000 to 100,000 inhabitants, and 8.3 percentage points higher for women from municipalities with less than 10,000 inhabitants. In the base model, these results are significant at a 1% level of significance. When potential wage is added in the fourth model, the significance weakens. To estimate the potential wage, the variable urbanization was used, assuming that the wages mothers can earn in rural areas differ from those in urban areas. This could be the reason why the variable urbanization loses significance in the fourth model.

The dummy variable for Western Austria has a significant negative effect on maternal employment at a 1% significance level. Women living in Tyrol or Vorarlberg have a lower probability of being employed (with a decrease of 4.7 percentage points) compared to women from the other federal states. This could be related to more traditional gender roles in Western Austria.

In model 1, 2 and 3, being a single parent has no statistically significant effect at a 10% level of significance. In the fourth model, when potential wage is added, it has a significant negative effect on the employment of mothers: the probability of a mother being employed decreases by 8.4 percentage points if she is a single mother.

In model 2, potential institutional care costs are included. However, the analysis reveales that these costs do not have a statistically significant effect on maternal employment at a 10% significance level. Therefore, it cannot be concluded that institutional care costs impact the decision of mothers to work or not. It is important to note that this result may be influenced by the fact that many mothers with children between 0 and 2 years of age incur high potential childcare costs, as the children may be attending a crèche. Despite these costs, these mothers are often classified as employed because they are on parental leave, which allows them to maintain employment while assuming full caregiving responsibilities. Therefore, these mothers do not need to withdraw from employment to fulfill their caregiving responsibilities, despite the high potential costs involved. The potential costs simply do not become relevant for these mothers, as they do not have to put their children in care to stay employed.

This explanation seems to be confirmed in model 3: In this model, the age of the youngest child in the household is added as a categorical variable. The reference category is the youngest children aged six years. Firstly, the addition of this variable reveals that potential institutional childcare costs become significantly negative at a 5% level of significance. When childcare costs increase by one percent, the probability of a mother being employed decreases by 2 percentage points. Secondly, it shows that in households where the youngest child is 0 or 1 year old (and therefore, the parents are entitled to parental leave,) there is a positive significant effect on the likelihood of maternal employment compared to mothers whose youngest child is 6 years old. If the youngest child is 0 years old, the probability of the mother being employed is 20.1 percentage points higher than for children who are six years old. For children who are one year old, the probability is 15.7 percentage points higher. This indicates that the legal entitlement to parental leave also has an effect on employment, as it allows mothers to fulfill their caregiving responsibilities without loosing their jobs. The other age groups of the youngest child in the household do not have a significant effect compared to the youngest child aged six years.

In model 4, the potential wage, represented by its natural logarithm, is included and demonstrates a significant positive effect at a 1% level of significance. An increase of 1% in potential wage leads to a 6.4 percentage point increase in the probability of a mother being employed. Moreover, the inclusion of wage in the model amplifies the negative effect

of potential childcare costs. The potential wage plays a crucial role for mothers as it enables them to afford childcare while they work. Generally, the potential wage holds a central position by providing individuals with an incentive to enter the workforce or increase their working hours.[25]

Table 20: Maternal Labour Market Participation: Probit-Model Marginal Effects

Variables	**1.Model**	**2. Model**	**3. Model**	**4. Model**
Potential care cost (ln)		-0.0138	-0.0199**	-0.0234***
		(0.00907)	(0.00816)	(0.00862)
Potential wage (ln)				0.0640***
				(0.00868)
Institutional care hour	0.00167***	0.00164***	0.00291***	0.00263***
	(0.000517)	(0.000499)	(0.000426)	(0.000476)
Non-institutional care hour	0.00439***	0.00412***	0.00471***	0.00412***
	(0.000518)	(0.000496)	(0.000445)	(0.000464)
2. Household income group	0.287***	0.272***	0.270***	0.202***
	(0.0257)	(0.0285)	(0.0292)	(0.0464)
3. Household income group	0.483***	0.466***	0.457***	0.343***
	(0.0317)	(0.0360)	(0.0367)	(0.0531)
4. Household income group	0.541***	0.521***	0.509***	0.397***
	(0.0399)	(0.0443)	(0.0457)	(0.0650)
No. child	-0.0799***	-0.0799***	-0.0766***	-0.0431***
	(0.00591)	(0.00528)	(0.00628)	(0.00620)
No. child 0-2	0.0572***	0.0653***	-0.0261	-0.0154
	(0.0115)	(0.0151)	(0.0220)	(0.0210)
No. child 3-5	-0.0432***	-0.0405***	-0.0664***	-0.0580***
	(0.0126)	(0.0109)	(0.0153)	(0.0156)
Income contribution (ln)	-0.133***	-0.121***	-0.120***	-0.154***
	(0.0211)	(0.0212)	(0.0212)	(0.0242)
2. Edu	0.104***	0.102***	0.0957***	0.0490***

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[25]According to the pseudo R-squared values of the models, model 4 has the highest goodness of fit with a value of 0.1700, model 3 has a pseudo R-squared of 0.1671, model 2 has a value of 0.1447, and model 1 has a value of 0.1452. A higher value of the pseudo R-squared indicates that the model is better suited for explaining the variation of the dependent variable. Therefore according to the pseudo R-squared model 4 has the best fit.

	(0.0129)	(0.0130)	(0.0118)	(0.0146)
3. Edu	0.112***	0.108***	0.0890***	0.0386***
	(0.0120)	(0.0110)	(0.0104)	(0.0118)
Age	0.0217***	0.0249***	0.0312***	0.0119
	(0.00772)	(0.00660)	(0.00649)	(0.00751)
Age^2	-0.000324***	-0.000373***	-0.000440***	-0.000190*
	(0.000112)	(9.63e-05)	(9.30e-05)	(0.000107)
2. Urbanization	0.0694***	0.0469**	0.0520***	0.0324
	(0.0200)	(0.0217)	(0.0202)	(0.0203)
3. Urbanization	0.103***	0.0933***	0.102***	0.0621***
	(0.0160)	(0.0171)	(0.0174)	(0.0155)
4. Urbanization	0.0826***	0.0698***	0.0800***	0.0332
	(0.0186)	(0.0221)	(0.0218)	(0.0208)
West	-0.0468***	-0.0415***	-0.0353***	-0.0299**
	(0.0121)	(0.00955)	(0.0101)	(0.0123)
One parent	-0.00307	0.000688	0.000848	-0.0843***
	(0.0201)	(0.0210)	(0.0210)	(0.0179)
Age youngest: 0			0.201***	0.186***
			(0.0205)	(0.0242)
Age youngest: 1			0.157***	0.166***
			(0.0248)	(0.0269)
Age youngest: 2			-0.0166	0.0122
			(0.0148)	(0.0217)
Age youngest: 3			0.00307	0.0171
			(0.0290)	(0.0352)
Age youngest: 4			0.0230	0.0159
			(0.0263)	(0.0303)
Age youngest: 5			0.0238	0.0275
			(0.0306)	(0.0360)
Observations	6,562	6,022	6,022	5,386
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

8.3.2 Paternal Labour Market Participation

The same four labour market participation models are used for fathers and are presented in table 21.

The base model (model 1) shows that the hours of institutional childcare demanded in the household have no statistically significant effect at a 10% level of significance on the employment probability of fathers. In model 3 and 4, this coefficient is significantly positive at a 10% and 5% significance level. In model 3, one additional hour increases the probability of being employed by 0.06 percentage points.

There is a significant relationship between non-institutional childcare hours and the probability of a father being employed or not at a 1% significance level in the base model. An additional hour of private childcare increases the probability of a father being employed by 0.1 percentage points. Compared with mothers this effect is smaller in the case of paternal employment. The effect loses its significance when potential institutional childcare costs and potential wage are added to model 2 and 4.

Household income plays an important role in the likelihood of fathers being employed. The higher the income group of the household, the greater the probability of fathers being employed. If a father resides in a household with an annual income between 19,000€ and 46,000€, the probability of employment increases by 21.8 percentage points compared to fathers in households with incomes less than 19,000€. For fathers in households with an income between 46,000€ and 64,000€, the probability increases by 33.4 percentage points, and for fathers in households earning more than 64,000€, the probability rises by 36 percentage points. These coefficients are significant at a 1% level of significance.

The number of all children in the household has a significantly negative impact (at a 1% level of significance) on the employment of fathers. One more child living in the household decreases the probability of employment by 0.9 percentage points. It is evident that the number of children does not have as much impact on the employment of fathers as it does on mothers, as fathers traditionally have less responsibility for childcare and are able to dedicate more time to their job. In the base model extra children between 0 and 2 as well as children between 3 and 5 years have no significant effect on the probability of paternal employment at a 10% level of significance. This changes in model 2: Children between the ages of 0 and 2 have a significant positive effect of 2.2 percentage points on paternal employment and an extra child between 3 and 5 increases the employment probability by 1.4 percentage points. Theses effects vanish in model 3, which includes the age of the youngest child living in the household.

The income contribution of fathers has a highly significant effect at a 1% level of significance. The effect is negative due to the way how the variable is calculated (by reducing household income by wage). If the household income without the wage of the father increases by 1%, the fathers probability of being employed is reduced 10.8 percentage points.

The coefficients of the categorical variable for education are significantly positive. Fathers with a secondary education degree have a 2.7 percentage point higher probability of employment compared to fathers with a primary degree. Similarly, fathers with a tertiary degree experience a 6.8 percentage point increase in the probability of employment compared to fathers with primary education. These coefficients remain significant across all models.

Age has a highly significant and positive coefficient at a 1% level of significance, meaning with an increase in age the probability of employment increases by 1.6 percentage points. The negative coefficient for age square indicates that initially the probability of being employed increases rapidly with age, but with advancing age, this increase slows down.

In the base model, urbanization has a significant positive impact on paternal employment. The likelihood of a father being employed increases as the level of urbanization decreases. Fathers living in municipalities with over 100,000 inhabitants have a 4.4 percentage point higher probability of employment than fathers in Vienna. For fathers in municipalities with 10,000 to 100,000 inhabitants, the probability is 4.6 percentage points higher, while for fathers in regions with less than 10,000 inhabitants, the probability is approximately 5 percentage points higher.

For fathers, the variable "west" which represents Tyrol and Vorarlberg, has a significant positive effect at a 1% level of significance. Fathers residing in Western Austria have a 5.2 percentage point higher probability of being employed compared to fathers in Eastern Austria. This could be attributed to factors such as a stronger economy in Western Austria or the influence of more traditional family values, which may impact the division of labour between mothers and fathers.

Being a single parent has no significant effect at a 10% significance level on the probability of being employed for fathers.

In model 2 potential childcare costs as natural logarithm are added and the coefficient shows a significant negative effect on the probability of being employed. When potential

childcare costs increase by 1% the probability of a father having a job drops by 1.8 percentage points. This effects remains significant in model 3 and model 4.

In model 3 shows that the age of the youngest child has no statistically significant effect on the probability of paternal employment at a 10% significance level.

In model 4 the variable potential wage is added and the coefficient of this variable is negative significant at a 1% significance level. If potential wage increases by 1% the probability of a father being employed decreases by 6.7 percentage points. This negative effect is unexpected but could be related to personal preferences or the employment status of their partners. If high-earning fathers are more likely to have high-earning partners, both parents have the financial flexibility to not pursue employment for childcare purposes, which gives these fathers the possibility to care for the child.[26]

[26]According to the pseudo R-squared values of the models, model 4 has the highest goodness of fit with a value of 0.3539, model 3 has a pseudo R-squared of 0.3522, model 2 has a value of 0.3488, and model 1 has a value of 0.3467. Measured by the pseudo R-squared, the models are better at explaining the labour market participation of fathers compared to that of mothers. This may be because there are additional factors such as cultural capital or traditional values that also play an important role for mothers.

Table 21: Paternal Labour Market Participation: Probit-Model Marginal Effects

Variables	**1.Model**	**2. Model**	**3. Model**	**4. Model**
Potential care cost (ln)		-0.0178***	-0.0181***	-0.0179***
		(0.00560)	(0.00598)	(0.00601)
Potential wage (ln)				-0.0670***
				(0.00832)
Institutional care hour	0.000450	0.000414	0.000590*	0.000658**
	(0.000289)	(0.000306)	(0.000353)	(0.000257)
Non-institutional care hour	0.00144***	0.000918	0.00102*	0.000670
	(0.000519)	(0.000559)	(0.000604)	(0.000552)
2. Household income group	0.218***	0.222***	0.223***	0.251***
	(0.0267)	(0.0289)	(0.0301)	(0.0197)
3. Household income group	0.334***	0.338***	0.337***	0.378***
	(0.0283)	(0.0316)	(0.0323)	(0.0189)
4. Household income group	0.360***	0.364***	0.363***	0.400***
	(0.0279)	(0.0309)	(0.0318)	(0.0199)
No. child	-0.00933***	-0.00872***	-0.00791***	-0.00954***
	(0.00331)	(0.00234)	(0.00274)	(0.00325)
No. child 0-2	0.00976	0.0222***	0.0194	0.00345
	(0.00669)	(0.00832)	(0.0154)	(0.0140)
No. child 3-5	0.00310	0.0140**	0.00614	0.00891
	(0.00625)	(0.00601)	(0.00928)	(0.00767)
Income contribution (ln)	-0.108***	-0.111***	-0.111***	-0.0997***
	(0.00643)	(0.00660)	(0.00646)	(0.00778)
2. Edu	0.0266*	0.0280*	0.0276*	0.0325**
	(0.0148)	(0.0149)	(0.0149)	(0.0139)
3. Edu	0.0676***	0.0706***	0.0702***	0.0824***
	(0.0147)	(0.0141)	(0.0145)	(0.0136)
Age	0.0159***	0.0151***	0.0155***	0.0130**
	(0.00473)	(0.00513)	(0.00513)	(0.00539)
Age^2	-0.000233***	-0.000224***	-0.000228***	-0.000186**
	(6.31e-05)	(6.84e-05)	(6.76e-05)	(7.29e-05)
2. Urbanization	0.0440**	0.0344	0.0345	0.0370*

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	(0.0212)	(0.0229)	(0.0233)	(0.0222)
3. Urbanization	0.0460***	0.0468***	0.0483***	0.0489***
	(0.0169)	(0.0165)	(0.0172)	(0.0131)
4. Urbanization	0.0469***	0.0389***	0.0405***	0.0382***
	(0.00962)	(0.00984)	(0.0104)	(0.00872)
West	0.0516***	0.0548***	0.0563***	0.0425***
	(0.0180)	(0.0174)	(0.0173)	(0.0162)
One parent	-0.0429	-0.0349	-0.0373	-0.0311
	(0.0370)	(0.0378)	(0.0388)	(0.0460)
Age youngest: 0			0.0237	0.0267
			(0.0336)	(0.0279)
Age youngest: 1			0.00338	0.0144
			(0.0261)	(0.0216)
Age youngest: 2			-0.00692	0.00856
			(0.0274)	(0.0243)
Age youngest: 3			0.0158	0.00159
			(0.0185)	(0.0157)
Age youngest: 4			-0.00304	-0.0202
			(0.0220)	(0.0210)
Age youngest: 5			0.0303	0.0285*
			(0.0198)	(0.0158)
Observations	3,983	3,684	3,684	3,585
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

8.4 Labour Intensity

In this chapter, I examines the effect institutional care costs on the work intensity of mothers and fathers. Work intensity is measured in terms of hours worked per week. It is important to note that individuals who are not employed are excluded from this variable. Therefore, the lower limit for work intensity is set at 1, as specified in the Tobit model (with no upper limit imposed).

The hypothesis posits that the impact of costs on work intensity is stronger for mothers compared to fathers. The same variables are used as for the probit regression.

8.4.1 Maternal Labour Intensity

Just like in the probit regression, four models with the same variables as in Chapter 8.3 are employed here. The results regarding maternal labour intensity are presented in table 22.

The base model (model 1) shows that the demand of institutional care hours has a significant positive effect at a 1% level of significance on maternal labour intensity. The same holds for the demand of non-institutional care hours. One additional hour of institutional childcare increases the hours worked per week by 0.12 hours. One additional hour of non-institutional care increases the work time of a mother by approximately 0.09 hours a week.

The categorical variable for household income group is also highly significant, with the lowest income group serving as the reference category. As household income increases, the number of hours worked by mothers also increases. Compared to mothers in households with an income of less than 19,000€, mothers in households with an annual income between 19,000€ and 46,000€ work 4.5 hours more per week. For mothers in households with an income between 46,000€ and 64,000€, the increase in hours worked is 6.5, and for mothers in households earning more than 64,000€, the increase is 9.2 hours.

The overall number of children living in the household has a significantly positive effect on the labour intensity of a mother at a 10% level of significance. An additional child increases the work intensity by 0.4 hours. The number of children between 0 and 2 years and the number of children between 3 and 5 years living in the household have a significant negative effect on the hours worked by a mother. An additional child between 0 and 2 years of age decreases the labour time of a mother by 3.6 hours, and an additional child between 3 and 5 years of age by 3.7 hours. The coefficients of this variable are significant at a 1% level of significance.

The higher the households income without the mother's earnings, the less hours the mother works, this shows the variable income contribution: If the contribution of maternal income decreases by 1% the mother works 4 hours less. This effect is significant at a 1% level of significance.

Primary education serves as reference category for the variable education. In the base model only mothers with a secondary degree of education show a significant negative effect at a 5% level of significance, when compared with mothers with a primary degree: Women with a secondary degree work 1.4 hours less. Only in models 4, the coefficient for mothers with a tertiary degree becomes significantly positive compared to mothers with a primary degree at a 5% level of significance. Mothers with a tertiary degree work 1.1 hours more than mothers with a primary degree.

The variable age has a significantly negative coefficient at a 1% level of significance. With an increase in age the work intensity of mothers decreases. Age square has a positive significant coefficient at a 1% level of significance. This indicates that the decline in work intensity slows down with increasing age over time.

In the base model, using Vienna as the reference category, the categorical variable "urbanization" shows that the more rural a mother's living area, the fewer hours she works per week compared to mothers in Vienna. Mothers living in municipalities with over 100,000 inhabitants work 1.2 hours less per week, mothers in municipalities between 10,000 and 100,000 inhabitants work 3.1 hours less, and mothers living in municipalities with fewer than 10,000 inhabitants work 3.6 hours less per week compared to mothers in Vienna. In the base model, these results are significant at a 1% and 5% level of significance. However, the category "Municipalities with over 100,000 inhabitants" (2. urbanization) loses its significance compared to Viennese mothers when childcare costs are included in the regression (starting from model 2).

The dummy variable for Western Austria indicates that women living in Tyrol or Vorarlberg work significantly fewer hours than mothers in Eastern Austria. In the base model, it corresponds to a difference of 1.8 hours per week. This coefficient is significant at a 1% level of significance.

Whether a mother is single or not does not have a significant effect on her working hours in these models.

In model 2, the potential institutional childcare costs are included as a natural logarithm. This variable has a positively significant coefficient at a 5% level of significance. Mothers living in households with higher potential childcare costs work approximately 0.6 hours more per week.

In model 3, the age of the youngest child is included, the youngest child aged six serves as reference category. Mothers with one-year-old children work 2.6 hours more per week than mothers with the youngest child aged six. Mothers with five-year-old children work 2.7 hours more per week. The categories are statistically insignificant at a 10% level of significance.

In model 4, potential wage exhibits a significant effect at a 1% level of significance. An increase of 1% in potential wage is associated with a decrease of 2.9 hours in weekly working hours. A higher hourly wage allows mothers to work less overall without experiencing significant financial difficulties.[27]

[27]The Tobit models show relatively low pseudo R-squared values: Model 1 has a pseudo R-squared of 0.0307, model 2 has 0.0327, model 3 has 0.0337, and model 4 has 0.0425. This suggests that the Tobit models can explain a relatively small portion of the variation in the dependent variables. Other factors, such as traditional values or opening hours of childcare facilities, could have an impact on the explanatory power. However, these variables are not included in the dataset.

Table 22: Maternal Labour Intensity: Tobit-Model

Variables	**1.Model**	**2. Model**	**3.Model**	**4. Model**
Potential care cost (ln)		0.559**	0.583**	0.454**
		(0.220)	(0.236)	(0.216)
Potential wage (ln)				-2.894***
				(0.347)
Institutional care hour	0.117***	0.120***	0.133***	0.125***
	(0.0171)	(0.0176)	(0.0183)	(0.0170)
Non-institutional care hour	0.0894***	0.108***	0.113***	0.104***
	(0.0201)	(0.0219)	(0.0221)	(0.0212)
2. Household income group	4.472***	4.415***	4.512***	7.084***
	(0.784)	(0.946)	(0.953)	(1.198)
3. Household income group	6.458***	6.515***	6.593***	10.63***
	(0.953)	(1.169)	(1.127)	(1.371)
4. Household income group	9.195***	9.191***	9.227***	14.29***
	(0.971)	(1.264)	(1.218)	(1.439)
No. child	0.420*	0.347	0.464*	0.168
	(0.235)	(0.222)	(0.239)	(0.233)
No. child 0-2	-3.565***	-3.956***	-5.330***	-4.541***
	(0.401)	(0.435)	(1.315)	(1.226)
No. child 3-5	-3.685***	-4.071***	-5.119***	-4.787***
	(0.480)	(0.523)	(0.838)	(0.717)
Income contribution (ln)	-3.963***	-3.911***	-3.921***	-4.785***
	(0.358)	(0.335)	(0.327)	(0.343)
2. Edu	-1.357**	-1.482**	-1.405**	-0.967*
	(0.574)	(0.662)	(0.645)	(0.587)
3. Edu	0.187	0.231	0.310	1.108**
	(0.614)	(0.679)	(0.651)	(0.534)
Age	-0.896***	-0.912***	-0.868***	-0.757***
	(0.236)	(0.250)	(0.241)	(0.229)
Age^2	0.0112***	0.0112***	0.0106***	0.00969***
	(0.00333)	(0.00346)	(0.00329)	(0.00312)
2. Urbanization	-1.163**	-0.389	-0.388	-0.388
	(0.554)	(0.503)	(0.507)	(0.564)

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3. Urbanization	-3.138***	-2.693***	-2.569***	-2.462***
	(0.558)	(0.565)	(0.555)	(0.576)
4. Urbanization	-3.616***	-2.877***	-2.750***	-2.606***
	(0.549)	(0.617)	(0.625)	(0.656)
West	-1.851***	-2.298***	-2.184***	-2.029***
	(0.508)	(0.492)	(0.496)	(0.494)
One parent	-1.233	-0.907	-0.961	-1.193*
	(0.824)	(0.774)	(0.745)	(0.682)
Age youngest: 0			3.634	2.147
			(2.216)	(2.085)
Age youngest: 1			2.630**	0.231
			(1.280)	(1.210)
Age youngest: 2			1.728	0.321
			(1.323)	(1.247)
Age youngest: 3			1.450	1.077
			(1.108)	(0.979)
Age youngest: 4			1.267	1.117
			(0.995)	(0.916)
Age youngest: 5			2.703***	2.525***
			(0.881)	(0.742)
var(e.work_hours)	76.09***	75.29***	74.79***	69.66***
	(3.387)	(3.752)	(3.810)	(3.319)
Constant	78.95***	76.49***	74.45***	84.30***
	(4.832)	(5.394)	(5.588)	(5.400)
Observations	3,169	2,798	2,798	2,786
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

8.4.2 Paternal Labour Intensity

Paternal labour intensity is analyzed with the same four tobit regression models as maternal labour intensity. The first model is the base model, in the second model potential institutional care costs as natural logarithm are added, model three includes the age of the youngest child living in the household as categorical variable and model four adds potential wage as natural logarithm.

In the base model as well as in the three other models the demand of institutional and non-institutional care hours does not show any significance at a 10% level of significance.

The categorical variable "Household income group" is only significant in its last category. This means that fathers residing in households with an annual income of 64,000 or more work approximately 4 hours more per week compared to fathers in households with an annual income of less than 19,000. This result is significant at a 1% level of significance. In the fourth model, which controls for potential wage, the other two categories also have significant coefficients at a 1% level of significance.

The overall number of children in the household has no significant effect on the hours worked by fathers per week at a 10% level of significance. The number of children between 0 and 2 years has only in model 2 a significant negative effect at a 10% level of significance. But this effect is again insignificant in model 3 and 4. The variable representing the number of children between the ages of 3 and 5 has a significant negative coefficient. In the base model, this significance is observed at a 10% level, while in the other three models, it is significant at a 1% level. Having one additional child in this age group in the household reduces a father's weekly working hours by 0.5 hours in the base model.

The variable income contribution represented as the natural logarithm has a significant negative effect on the working hours of fathers. This means that as the household income, excluding the father's income, increases, the father works fewer hours per week. This effect is significant at a 1% level in all three models. In the base model, a 1% increase in household income, minus the father's income, is associated with approximately 0.8 hours less working time.

The coefficients of the categorical variable for education have a significant effect only in the comparison between primary and tertiary degrees, at a 1% level of significance in model 1. A father with a tertiary education works approximately 1.5 hours less per week than a

father with a primary education. This result appears to be related to income, as in model 4 this effect is no longer significant at a 10% level.

The age of a father does not show any significant effect a 10% level of significance on paternal employment intensity.

Fathers who live in municipalities with between 10,000 and 100,000 inhabitants work 0.8 hours more than fathers in Vienna. Fathers living in Tyrol or Vorarlberg work significantly more than fathers living in the eastern part of Austria in all four models. In Model 1, fathers in the western part of Austria work approximately 1.5 hours more per week than fathers living in the east. This coefficient is significant at a 1% level of significance in all four models.

The variable controlling for single parent households does not show any significance at a 10% level of significance.

In model 2 institutional childcare costs are added, this variable does not show any significant coefficients at a 10% level of significance in any model.

Model 3 includes the age of the youngest child residing in the household. The reference category for this variable is children of six years old. There is no significant effect observed for children in the age range of crèche. However, there are significant positive coefficients for fathers whose youngest child is in the nursery school age range. If the youngest child in the household is 3 or 4 years old, the father works 1.5 hours more, and if the child is 5 years old, the father works 1.8 hours more compared to fathers whose youngest child is 6 years old. This suggests that as children reach the stage of attending school, the caregiving responsibilities of fathers may change, possibly due to work arrangements with their partners. In model 4, in which potential wage is included, the significance of the variables is weaker.

The potential wage as natural logarithm is highly significant at a 1% level of significance. Fathers who earn 1% more, work 3,2 hours less per week. A higher hourly income allows for working fewer hours. In terms of work intensity, it is observed that higher income leads to lower hourly work levels for both mothers and fathers.[28]

[28]The R-squared values of the models reflect the low explanatory power of childcare factors on the working hours of fathers. Model 1 has a pseudo R-squared of 0.0076, model 2 has 0.0080, model 3 has 0.0086, and model 4 has 0.0158.

Table 23: Paternal Labour Intensity: Tobit-Model

Variables	**1.Model**	**2. Model**	**3.Model**	**4. Model**
Potential care cost (ln)		0.144	0.173	0.105
		(0.194)	(0.191)	(0.169)
Potential wage (ln)				-3.220***
				(0.762)
Institutional care hour	-0.0117	-0.00888	-0.00377	0.000900
	(0.0124)	(0.0134)	(0.0143)	(0.0130)
Non-institutional care hour	0.00123	0.00725	0.0124	0.0165
	(0.00819)	(0.0106)	(0.0118)	(0.0116)
2. Household income group	0.326	0.275	0.305	4.886***
	(1.155)	(1.223)	(1.229)	(1.200)
3. Household income group	1.363	1.200	1.159	6.888***
	(1.013)	(1.078)	(1.089)	(1.395)
4. Household income group	4.020***	3.946***	3.856***	10.39***
	(1.025)	(1.086)	(1.102)	(1.545)
No. child	0.0884	0.140	0.210	0.170
	(0.172)	(0.198)	(0.219)	(0.207)
No. child 0-2	-0.376	-0.627*	-0.475	-0.602
	(0.267)	(0.348)	(0.793)	(0.806)
No. child 3-5	-0.530*	-0.819***	-1.398***	-1.378***
	(0.277)	(0.306)	(0.481)	(0.474)
Income contribution (ln)	-0.811***	-0.869***	-0.889***	-1.146***
	(0.135)	(0.154)	(0.152)	(0.253)
2. Edu	0.177	0.221	0.227	0.582
	(0.294)	(0.306)	(0.298)	(0.398)
3. Edu	-1.458***	-1.471***	-1.452***	-0.806
	(0.535)	(0.538)	(0.545)	(0.611)
Age	-0.190	-0.229	-0.213	-0.161
	(0.144)	(0.143)	(0.151)	(0.142)
Age^2	0.00182	0.00226	0.00208	0.00157
	(0.00191)	(0.00189)	(0.00197)	(0.00188)
2. Urbanization	0.0155	-0.0336	0.0232	-0.00604
	(0.393)	(0.400)	(0.420)	(0.343)

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3. Urbanization	0.809**	0.866**	0.922**	0.894***
	(0.391)	(0.386)	(0.380)	(0.341)
4. Urbanization	0.332	0.499	0.541	0.668*
	(0.369)	(0.372)	(0.376)	(0.361)
West	1.500***	1.499***	1.557***	1.562***
	(0.445)	(0.431)	(0.438)	(0.432)
One parent	-6.145	-6.383	-6.644	-5.555
	(3.936)	(4.001)	(4.098)	(3.776)
Age youngest: 0			1.045	1.093
			(1.085)	(1.104)
Age youngest: 1			0.255	0.342
			(0.966)	(0.972)
Age youngest: 2			0.457	0.502
			(0.786)	(0.832)
Age youngest: 3			1.473**	1.282*
			(0.695)	(0.693)
Age youngest: 4			1.495**	1.329*
			(0.650)	(0.685)
Age youngest: 5			1.748*	1.583
			(0.948)	(0.979)
var(e.work_hours)	51.74***	53.08***	52.88***	50.29***
	(3.111)	(3.351)	(3.313)	(3.207)
Constant	51.23***	52.04***	50.78***	54.48***
	(3.474)	(3.359)	(3.575)	(4.225)
Observations	3,476	3,203	3,203	3,198
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

9 Discussion

In their article, Kleven et al (2020) raise the question of whether gender inequalities in earnings are predominantly influenced by factors beyond the government's control. The authors argue that a significant portion of the disparity in earnings between men and women stems from the unequal burden of parenthood, with mothers earning considerably less than their childless female counterparts, starting from the first child. Women, they note, do not recover from this child penalty. To examine the impact of family-oriented policies such as parental leave and childcare services on gender inequality, the authors conduct an investigation.

In their findings, they discover that, in the long term, all reforms related to parental leave have no discernible effect. Similarly, an expansion of childcare places shows no significant impact on women's earnings. The authors suggest that this lack of effect is due to the displacement of other forms of informal care and the persistent adherence to strong norms regarding maternal care. Kleven et al (2020) do not account for institutional childcare costs in their approach, which have an effect on the amount of childcare demanded by different households. When considering the effects of an expansion of childcare facilities on mothers' earnings, the costs associated with utilizing this additional service must also be taken into account.

Neuwirth et al (2021) and Grand and Fink (2021) can be read as responses to Kleven et al (2020) and demonstrate the impact of childcare costs on maternal employment. This master's thesis aligns with these studies. I examined the effects of institutional childcare costs on childcare participation and intensity for children in crèches and nursery schools, as well as the impact of institutional childcare costs on maternal and paternal labour market participation and intensity. Institutional childcare and childcare costs are indeed an area in which family policy can intervene to reduce gender inequalities. To enable both parents to work, childcare needs to be distributed, and usually, childcare services need to be utilized. Therefore, in analyzing parental labour supply, the question arises: Which factors influence parents' decision to place their child in childcare, and how do individual childcare costs play a role in this decision? To determine this, I estimated the potential childcare costs for children (see Chapter 7.3) and differentiated between infants/toddlers in crèches and older children in nursery schools. There is no other paper regarding Austria which differentiated between nursery school and crèche children. I assume that parents have different preferences regarding childcare for children under and over the age of three. This difference may be due to the age of the children as well as the fact that statutory parental leave can be taken until the child reaches the age of two. Parental leave allows parents to fully dedicate themselves to caring for their children without having to sacrifice their job or full income. Additionally, the costs

of childcare for children under the age of three are higher, the expansion of childcare facilities is more limited, and the regulation of childcare for this age group is weaker across the federal states.

My results show that institutional childcare costs play a more important role for the childcare participation and intensity regarding crèche children than nursery school children. Regarding childcare participation institutional childcare costs show only an statistically significant negative effect for crèche participation and here at a 1% level of significance. If the costs increase by 1%, the probability of the child being in childcare decreases by 2.9 percentage points. The fact that childcare costs only have a significant effect on the childcare participation of children in crèches is due to the fact that nursery school children, depending on their age and the federal state they are living in, can attend nursery school for free (for instance for the last year of nursery school is free of charge in Austria).

Regarding childcare intensity there is a statistically significant positive effect for nursery school children as well as for crèche children. But for crèche this coefficient has stronger effect and it remains significant after including parental education in the third model. This is not the case for nursery school, here the significance vanishes after including parental education. If costs increase by 1%, children in crèches spend an additional 1.2 hours per week in childcare, while nursery school children spend an additional 0.3 hours. This is because higher demanded hours are associated with higher costs. It's important to note that the analysis regarding childcare intensity does not include children who are not in childcare at all.

During the observation period between 2008 and 2019, only one federal state, Vienna, offered free public institutional childcare for children under the age of three. However, across Austria, the last year of nursery school is free of charge for half-day attendance, and in the federal states of Lower Austria and Upper Austria, half-day attendance for all nursery school children is free. Additionally, the federal states often impose stricter cost boundaries for nursery school childcare, or childcare for infants and toddlers in crèches is initially priced higher. This reflects in a greater effect of institutional childcare costs for crèche children compared to nursery school children.

Another reason why institutional childcare costs have a stronger impact on the care of children under the age of three could be parental leave. Parents of children up to the age of two have the option to independently care for their children without having to give up their job or to experience a total loss of labour income. Therefore, high childcare costs are more likely to act as a deterrent, as the opportunity costs of personally caring for their children are lower.

To analyze the relation between childcare costs of all children living in the household on labour market participation and labour intensity, both mothers and fathers were examined to allow for a comparison and to provide a nuanced understanding of gender dynamics. In the analysis of childcare participation and intensity, only the potential childcare costs for each respective child were considered. However, in the analysis of parents' labour supply, the potential institutional childcare costs for all children in the household up to six years of age were taken into account. Regarding labour market participation, it is evident that childcare costs have a negative effect on both mothers and fathers. Interestingly, the effect of institutional childcare costs on fathers is consistently significant at a 1% level in all three models that included childcare costs. However, this is not the case for mothers. For mothers, childcare costs only show a significant effect of 1.9 percentage points on the probabilty of labour market participation when controlling for the age of the youngest child. This is might be because mothers tend to remain employed as long as they are entitled to parental leave. It is only after the expiration of parental leave, when they can no longer work while simultaneously caring for their children, that they withdraw from the labour market. Therefore, there is a statistically significant positive effect on the likelihood of maternal labour market participation when the youngest child in the household is 0 or 1 year old. For mothers, the magnitude of the effect is also influenced by their wage level. When controlling for potential wage, the effect of institutional childcare costs on the labour market participation is higher for mothers. However, this is not the case for fathers. The effect of potential childcare costs as natural logarithm on the labour market participation of fathers is approximately -1.8 percentage points in every model. This could be the case because, in the decision-making process regarding labour market situations, the relationship between potential childcare costs and potential income is more influential for mothers than for fathers.

Regarding labour intensity, the results show that institutional childcare, including both its potential costs and the number of hours demanded, has a statistically positive significant effect on the labour market intensity of mothers, but not fathers. For mothers, more hours worked are associated with higher potential childcare costs. If potential costs increase by 1%, the mother works an additional 0.6 hours per week. This suggests that working women are more likely to reduce their labour intensity, when childcare costs are reduced. By utilizing childcare services and incurring the associated costs, working mothers are able to increase their weekly working hours. However, this does not hold for fathers. In this analysis, institutional childcare costs and hours demanded are not the driving factors that allow working fathers to increase their workload as there is no statistical significant effect at 10% level of significance. It could be assumed that for fathers, one of the factors that allows them to

increase their working hours is the support and involvement of their partners and mothers of their children. If the goal is to further explore this relationship, it would be worthwhile to investigate the extent to which the work hours of the partner influence the work hours of both fathers and mothers. This would provide valuable insights into the dynamics of working arrangements within couples and their impact on individual work intensities.

The objective of my research was to examine the impact of institutional childcare costs on childcare demand and labour market supply. However, it is important to acknowledge that there are various factors that influence how parents organize and divide childcare responsibilities. Traditional values play a significant role, and as suggested by the findings of Berghammer (2014), social capital may also be an important factor. Berghammer demonstrates that couples with higher educational levels in Austria tend to lean towards a one breadwinner model in the 2000s. The data from the EU-SILC 2015 provides an opportunity to further explore the role of cultural capital through its rotating modules.

In addition to the Tobit model, OLS (Ordinary Least Squares), negative binomial, and Poisson regression models were tested for the analysis of childcare intensity and labour intensity. The results obtained from these different models are found to be very similar in nature. My variable regarding childcare costs is estimated and therefore it might not describe the whole picture. But due to data restrictions, I could not rely on any other data.

10 Conclusion

> "Member States should remove disincentives for female labour force participation and strive, in line with national patterns of provision, to provide childcare by 2010 to at least 90% of children between 3 years old and the mandatory school age and at least 33% of children under 3 years of age"
> (European Commission, 2002)

The European Council, during its second annual spring meeting on the state of the Union in the economic, social, and environmental domains, held on March 15 and 16, 2002, aimed to eliminate barriers to women's employment. One of the objectives was to achieve a childcare enrollment rate of 33% for children under the age of three and a childcare enrollment rate of 90% for children over the age of three. However, according to Achleitner (2022), Austria still falls below this target for children under the age of three in 2019 and laged behind its neighboring countries Switzerland and Germany, which met this target. As the present thesis demonstrated, childcare costs could be one of the factors contributing to this situation. It has statistically significant effects on both the childcare participation and intensity for children in crèche age. However, for children in nursery school, no statistically significant effect was found at a 10% significance level regarding childcare participation, although there was an impact on childcare intensity. As demonstrated by Hanzl (2021), when comparing the federal states, only Vienna and Burgenland met the EU target for childcare enrollment of children under the age of three in the year 2020. Interestingly, these are also the two federal states where public childcare for children under the age of three is offered free of charge.

Austria should strive for equal expansion and cost subsidies for the care of children under the age of three as it does for children over the age of three. Currently, the regulation and provision of institutional childcare is under the jurisdiction of the federal states and therefore, the responsibility lies with the federal states. Chapter 5 demonstrates that the care of infants and toddlers in crèches is neglected in most federal states. This is evident in the higher costs for parents, lack of specific targets for expanding childcare places for this age group, and fewer regulations regarding opening hours. It would be desirable for the federal states to ensure equal access to and support for the care of children under three years old, similar to what is provided for children over three years old.

Institutional childcare enables mothers and fathers to be employed, and therefore, I examined how childcare costs impact the employment and participation of both mothers and fathers. In my thesis, I demonstrated that childcare costs are associated with both labour market participation and the number of hours worked by women. The higher the childcare

costs, the lower the likelihood of a mother being employed. This also applies to fathers in terms of labour market participation. Parents are entitled to parental leave only until their child reaches the age of two. Therefore, it is observed that when the youngest child is 0 or 1 year old, compared to mothers whose youngest child is six years old, this has a positive effect on the mothers' labour market participation. The age of the youngest child does not have this effect on fathers. In Austria, there is no guaranteed right to a créche or nursery school place, so parents are responsible for arranging a nursery school place themselves after the parental leave period. The legal claim to childcare places for children from the age of 1 would be an important measure to support parents.

Potential childcare costs only show a positive significant effect on womens' employment intensity. As expected, employment intensity increases with rising costs of childcare for the household. An 1% increase in potential childcare costs correlates with an increase of 0.6 hours of work per week. The problem in interpreting the effect of childcare costs on women's employment intensity lies in the direction of the relationship. I can only observe a correlation but cannot make a statement about the direction of causality. Nevertheless, the results show that there is a relation between work intensity and childcare costs for working mothers. This does not hold for working fathers.

The government of the state of Salzburg is planning a home care subsidy that provides financial support to families who do not send their children under the age of three to a childcare facility. This policy does fail the EU objective regarding childcare enrollment rate and makes it more difficult for women to reenter the workforce after giving birth (see Ablinger, 2023). It also limits the decision-making options for families, especially for women, regarding work and childcare, unless there is a simultaneous expansion and cost reduction in the field of institutional childcare. In the context of the child penalty, such policies need to be critically examined because in the long run, they contribute to mothers continuing to earn less than their childless counterparts and subsequently having lower retirement benefits.

Institutional childcare costs can serve as a tool for the government to reduce gender inequalities by enabling more women to participate in the labour market. These costs also have an impact on women's working hours. However, it is possible that providing free childcare could result in more part-time work for women as there is a positive correlation between potential childcare costs and working hours.

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12 Appendix

12.1 Appendix A

12.1.1 Sytria childcare cost sliding system

Table 24: Parental contributions and reimbursement for three to four year olds (Daily enrolment of 5 to 6 hours); 2021/2022

Level	Monthly family net income	Maximum monthly parental contribution	Amount of the social scale contribution
1	up to 1.804,93	0.00	144.42
2	1.804,94-1.925,27	28.86	115.56
3	1.925,28-2.045,61	43.29	101.13
4	2.045,62-2.165,95	57.69	86.73
5	2.165,96-2.286,29	72.18	72.24
6	2.286,30-2.406,63	86.67	57.75
7	2.406,64-2.526,97	101.04	43.38
8	2.526,98-2.767,63	115.53	28.89
9	2.767,64-3.008,29	129.96	14.46
10	from 3.008,30	144.42	0.00

Table 25: Parental contributions and reimbursement for three to four year olds (Daily enrolment of 7 to 8 hours); 2021/2022

Level	Monthly family net income	Maximum monthly parental contribution	Amount of the social scale contribution
1	up to 1.804,93	0.00	192.56
2	1.804,94-1.925,27	38.48	154.08
3	1.925,28-2.045,61	57.72	134.84
4	2.045,62-2.165,95	76.92	115.64
5	2.165,96-2.286,29	96.24	96.32
6	2.286,30-2.406,63	115.56	77.00
7	2.406,64-2.526,97	134.72	57.84
8	2.526,98-2.767,63	154.04	38.52
9	2.767,64-3.008,29	173.28	19.28
10	from 3.008,30	192.56	0.00

Table 26: Parental contributions and reimbursement for three to four year olds (Daily enrolment of 9 to 10 hours); 2021/2022

Level	Monthly family net income	Maximum monthly parental contribution	Amount of the social scale contribution
1	up to 1.804,93	0.00	240.70
2	1.804,94-1.925,27	48.10	192.60
3	1.925,28-2.045,61	72.15	168.55
4	2.045,62-2.165,95	96.15	144.55
5	2.165,96-2.286,29	120.30	120.40
6	2.286,30-2.406,63	144.45	96.25
7	2.406,64-2.526,97	168.40	72.30
8	2.526,98-2.767,63	192.55	48.15
9	2.767,64-3.008,29	216.60	24.10
10	from 3.008,30	240.70	0.00

Table 27: Parental contributions and reimbursement for five to six year olds (Daily enrolment of 7 to 8 hours); 2021/2022

Level	Monthly family net income	Maximum monthly parental contribution	Amount of the social scale contribution
1	up to 1.804,93	0.00	48.14
2	1.804,94-1.925,27	9.62	38.52
3	1.925,28-2.045,61	14.43	33.71
4	2.045,62-2.165,95	19.23	28.91
5	2.165,96-2.286,29	24.06	24.08
6	2.286,30-2.406,63	28.89	19.25
7	2.406,64-2.526,97	33.68	14.46
8	2.526,98-2.767,63	38.51	9.63
9	2.767,64-3.008,29	43.32	4.82
10	from 3.008,30	48.14	0.00

Table 28: Parental contributions and reimbursement for five to six year olds (Daily enrolment from 9 to 10 hours); 2021/2022:

Level	Monthly family net income	Maximum monthly parental contribution	Amount of the social scale contribution
1	up to 1.804,93	0.00	96.28
2	1.804,94-1.925,27	19.24	77.04
3	1.925,28-2.045,61	28.86	67.42
4	2.045,62-2.165,95	38.46	57.82
5	2.165,96-2.286,29	48.12	48.16
6	2.286,30-2.406,63	57.78	38.50
7	2.406,64-2.526,97	67.36	28.92
8	2.526,98-2.767,63	77.02	19.26
9	2.767,64-3.008,29	86.64	9.64
10	from 3.008,30	96.28	0.00

12.1.2 Vorarlberg: Net income limits and reduction of tariffs for children under three years

Table 29: Net income limits and reduction of tariffs for children under three years - 2021/2022

Persons in the household	income in €		income in €		income in €		income in €	
	from	to	from	to	from	to	from	to
1 adult - 1 child	0.00	1,672.00	1,672.01	1,805.76	1,805.70	1,939.52	1,939.53	2,073.28
1 adult - 2 children	0.00	2,058.00	2,058.01	2,222.64	2,222.65	2,387.28	2,387.29	2,551.92
1 adult - 3 children	0.00	2,444.00	2,444.01	2,639.52	2,639.53	2,835.04	2,835.05	3,030.56
1 adult - 4 children	0.00	2,830.00	2,830.01	3,056.40	3,056.41	3,282.80	3,282.81	3,509.20
2 adults - 1 child	0.00	2,316.00	2,316.01	2,501.28	2,501.29	2,686.56	2,686.57	2,871.84
2 adults - 2 children	0.00	2,702.00	2,702.01	2,918.16	2,918.17	3,134.32	3,134.33	3,350.48
2 adults - 3 children	0.00	3,087.00	3,087.01	3,333.96	3,333.97	3,580.92	3,580.93	3,827.88
2 adults - 4 children	0.00	3,474.00	3,474.01	3,751.92	3,751.93	4,029.84	4,029.80	4,307.76
Parental rate to be paid	20€- 40€		25%		50%		75%	
	Minimum tariff		% of the normal tariff is to be paid					

12.2 Appendix B

12.2.1 Abstract German

In meiner Masterarbeit gehe ich der Frage nach, welchen Einfluss Kinderbetreuungskosten zum einen auf die Nachfrage von Kinderbetreuung der unter sechsjährigen und zum anderen auf das Arbeitsangebot der Eltern haben. Ich betrachte dabei den Zeitraum zwischen 2008 und 2019 und verwenden EU-SILC Daten. Die potenziellen Kosten für institutionelle Kinderbetreuung schätze ich auf Basis der Haushalts-Betreuungskosten mittels eines Heckman-Models.

Im Rahmen der Kinderbetreuungsnachfrage, betrachte ich sowohl die Wahrscheinlichkeit, dass Kinder in Betreuung sind als auch das Stundenausmaß, das nachgefragt wird. Dabei unterscheide ich zwischen Kindergarten- und Kinderkrippen-Kindern, da sich die Kostenstrukturen für diese beiden Gruppen in den meisten österreichischen Bundesländern unterscheiden. Meine Ergebnisse zeigen, dass besonders bei der Betreuung der 0 bis 2-jährigen die potenziellen Betreuungskosten eine wichtige Rolle spielen.

Bezogen auf das Arbeitsmarktangebot der Eltern wird der Effekt der Betreuungskosten auf die Arbeitsmarktpartizipation und die Arbeitsintensität untersucht. Die Ergebnisse werden jeweils für Mütter und Väter ermittelt, um einen Geschlechtervergleich zu ermöglichen. Meine Ergebnisse zeigen, dass die potenziellen institutionellen Betreuungskosten eines Haushalts besonders auf das Arbeitsmarktangebot von Müttern Auswirkungen haben. Bei Vätern zeigt sich, dass die Betreuungskosten zwar einen Effekt auf deren Arbeitsmarktpartizipation, jedoch nicht auf deren Arbeitsintensität haben. Die vorliegenden Ergebnisse offenbaren, dass mit den Betreuungskosten eine wichtige familienpolitische Maßnahme Auswirkungen auf die Betreuungsnachfrage sowie das Arbeitsmarktangebot hat.

12.2.2 Abstract English

Do family policy measures reduce gender-related inequalities in the Austrian labour market? This question is posed by Kleven et al. (2020) as they examine the so-called "child penalty," which encompasses the economic disadvantages faced by mothers due to parenthood. The authors find that family policy measures, including the introduction of parental leave and the expansion of childcare supply since the 1950s, have had virtually no impact on the child penalty. Despite the assumption that an increase in childcare availability would lead to higher incomes for mothers, this is not reflected in the data. The authors attribute this outcome to personal preferences, traditional values, and the substitution of private childcare with publicly provided institutionalized childcare. However, the role of childcare costs is not considered in their study.

In my master's thesis, I examine the influence of institutional childcare costs on the demand for institutional childcare and the labour market supply of parents. The study aims to shed light on the relationship between institutional childcare costs, childcare demand, and parental employment, focusing on the specific context of Austria and using EU-SILC data from 2008 to 2019. Within the realm of childcare demand, I examine both the probability of children being in childcare and the extent of hours demanded. I differentiate between crèche and nursery school children in my analysis, as cost structures for these two groups vary across most Austrian federal states due to the legal regulations. My findings highlight the significant role of potential childcare costs, particularly for children aged 0 to 2 years, in shaping childcare demand. Regarding parental labour supply, I assess the impact of childcare costs on labour market participation and work intensity. The results are disaggregated for mothers and fathers to analyse how potential childcare costs affect each group differently. The findings reveal that the potential childcare costs of a household have a significant effect on the labour supply (in terms of participation and intensity) of mothers. As for fathers, while childcare costs do influence their labour market participation significantly, they do not significantly impact their work intensity. Thus, the present results suggest that childcare costs, as an important family policy measure, affect childcare demand and labour market supply.