MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

Regional Inequality and the Territorialisation of Social Investment

A study of ECEC and parental employment in Austria and the United Kingdom and its regional differences

verfasst von / submitted by

Mathias Lipp, BA

angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of

Master of Arts (MA)

Wien, 2019 / Vienna 2019

Studienkennzahl lt. Studienblatt / degree programme code as it appears on the student record sheet:	UA 066 905
Studienrichtung lt. Studienblatt / degree programme as it appears on the student record sheet:	Masterstudium Soziologie
Betreut von / Supervisor:	Univ.-Prof. Yuri Albert Kyrill Kazepov, PhD

Eidesstattliche Erklärung zur Masterarbeit

Ich versichere, die Masterarbeit selbstständig und lediglich unter Benutzung der angegebenen Quellen und Hilfsmittel verfasst zu haben.

Ich erkläre weiter, dass die vorliegende Arbeit nicht im Rahmen eines anderen Prüfungsverfahrens eingereicht wurde.

Datum; Ort	Mathias Lipp

Danksagung

An dieser Stelle möchte ich mich bei meiner Familie für die großartige Unterstützung während meiner Studienzeit bedanken. Insbesondere möchte ich mich bei meiner Mutter und meiner Schwester bedanken die mir immer wieder Zuversicht gegeben haben.

Ein besonderer Dank gilt meinen Betreuer Professor Yuri Kazepov, der mir ermöglichte meine Masterarbeit im Zuge des Europäischen Projektes COHSMO zu verfassen. Die Masterarbeit, aber auch das Mitwirken in unterschiedlichen Projekten unter Professor Kazepov gaben mir die Möglichkeit meine fachliche Kompetenz weit über das reguläre Studium hinweg zu entwickeln.

Ebenfalls möchte ich mich bei meinen Kollegen bedanken, die mir mit viel Geduld, Interesse und Hilfsbereitschaft zur Seite standen.

Kurzfassung

Die regionale Ungleichheit hat in den letzten Jahren dramatisch zugenommen, was zu einem stetigen Anstieg der Armutsraten und der sozialen Ungleichheit in Europa führte. Diese Trends führen zu neuen Herausforderungen für den Sozialstaat und erfordern eine Neuausrichtung der Sozialpolitik. Der Social Investment Ansatz gehört zu einem der aktuell dominierenden sozialpolitischen Insbesondere gehören Kinderbetreuungsmaßnahmen zu einem der wichtigsten Säulen dieses Ansatzes. Studien zeigen jedoch, dass Social Investment Maßnahmen nur unter bestimmten Kontextbedingungen einen positiven Effekt haben. Darüber hinaus führt die zunehmende regionale Ungleichheit zu einer Verschlechterung der Lebensbedingungen in allen europäischen Regionen. Die komplexen institutionellen Gegebenheiten und die sich verändernden sozioökonomischen und regionalen Bedingungen in Europa fördern ein komplexes Netzwerk von unterschiedlichen Social Investment Auswirkungen in ganz Europa. Aus diesem Grund beschäftigt sich die vorliegende Masterarbeit mit den institutionellen Bedingungen von Kinderbetreuungspolitik in Österreich und Großbritannien, deren Einfluss auf die elterliche Beschäftigung und deren regionale Unterschiede.

Abstract

Regional inequality has increased dramatically in recent years, leading to a steady increase of poverty rates and social inequality. These trends lead to new challenges for the welfare state and require a reorientation of social policy. The Social Investment approach is one of the most dominant social policy paradigms recently and was developed to prepare the welfare state for the challenges of the 21st century. In particular, childcare policies are one of the most important pillars of this approach. However, studies show that Social Investment measures only have a positive effect under certain contextual conditions. In addition, increasing regional inequality leads to a deterioration of living conditions in all European regions. The complex institutional circumstances and changing socio-economic and regional conditions in Europe foster a complex network of diverse outcomes of Social Investment measures across Europe. For this reason, the present thesis deals with the institutional conditions of childcare policies in Austria and Great Britain, their influence on parental employment and their regional differences.

Table of Content

Figures

Tables

Abbreviations

AT: Austria

DEGURBA: Degree of urbanisation

ECEC: Early Childhood Education and Care

EU: European Union

EYSFF: Early Years Single Funding Formula

LAU: Local Administrative Units

NUTS: Nomenclature of territorial units for statistics

OECD: Organisation for Economic Co-operation and Development

Ofsted: Office for Standards in Education, Children's Services and Skills

PVI: Private Voluntary Independent

SI: Social Investment

UK: United Kingdom

1 Introduction

Regional inequality has increased dramatically in recent years, leading to a steady growth in poverty rates and social inequality (Iammarino et al., 2018). These trends lead to new challenges for the welfare state and call for a reorientation of social policies (Ranci, 2010a). Social Investment belongs to the most dominant social policy paradigm and was developed in order to prepare the welfare state for the challenges of the 21st century (Hemerijck, 2018). Due to globalization and the rise of new technologies, the economic and social circumstances in Europe changed dramatically (Taylor-Gooby, 2004). A result of this process was that the "three foundations (work, family and welfare) on which post-war European societies rested" and provided security for its citizens have lost their efficiency (Ranci, 2010b: 4). Not only have they lost their capacity, these three institutions are also the source of new social risks (Esping-Andersen, 1990; Ranci et al., 2014; Taylor-Gooby, 2004). In the end, structural changes in the labour market, the family and the social system had a major impact on individual needs. Combined with old social risks, new social risks create a difficult constellation, especially for women, people in transition from school to work and unskilled workers (Taylor-Gooby, 2004). Therefore, Social Investment should address new social risks (Morel et al., 2012) and combine social inclusion and economic competitiveness (Hemerijck, 2017).

However, research shows that Social Investment measures only have a positive impact under certain contextual preconditions (Kazepov and Ranci, 2017). Furthermore, increasing regional inequality is leading to a deterioration in living conditions throughout European regions (Iammarino et al., 2018). The complex institutional circumstances and the changing socio-economic and regional conditions in Europe foster a complex network of different Social Investment outcomes throughout Europe. These areas are strongly interrelated, engendering complex crosscutting topics whose understanding requires an interdisciplinary, multi-scalar and multi-method approach (Scandurra et al., 2019).

The present thesis with the title: "Regional Inequality and territorialisation of Social Investment; A study of ECEC and parental employment in Austria and the United Kingdom and its regional differences", wants to investigate how the contextual preconditions of Early Childhood Education and Care (ECEC) effect parental employment, and how territorial specifications

effect this influence. ECEC is an important policy instrument of the Social Investment approach (Esping-Andersen, 2002; León, 2017; Morel et al., 2012). Therefore, the concentration on ECEC policies has increased as a mean to develop the socio-economic outcomes as well as the fulfilment of social inclusion and poverty reduction (Morel et al., 2012; Penn, 2010; White, 2011). In this context, ECEC should promote female labour force participation and the best possible educational opportunities for children at the same time (Bonoli, 2013; Esping-Andersen, 2002).

Therefore, I will first analyse the impact of childcare on parental employment and its regional differences. Second, to understand possible regional differences I will investigate the institutional organisation of ECEC in Austria and Great Britain. In doing so, the main research questions are:

1. What influence do ECEC policies have on territorial employment patterns?
2. Can the institutional structure of ECEC within a country explain different territorial employment patterns of parents?

In order to carry out this research project, the present thesis is structured into four parts. The first chapter sets out the theoretical foundation of the thesis. In the theoretical chapter, the emergence of the Social Investment approach is examined. In order to make this possible, firstly the economic and social changes in Europe since the 1990s are discussed. Furthermore, I will address the challenges this posed to the welfare state. Subsequently, the Social Investment approach will be discussed in more detail. Since the thesis deals with the territorial impact and the institutional context conditions of Social Investment, the second part will work on a territorial concept of Social Investment policies, in more detail with ECEC policies. In the course of that, the third part of the theoretical chapter deals with the literature on ECEC developments under the Social Investment approach. Furthermore, the state of art on this research topic will be provided.

The second chapter has the goal of conceptualizing the research project. Based on the theory, the research questions are set out, and the further procedure will be discussed. In addition, the methods and data used are described in more detail.

The third chapter forms the empirical part of the thesis and is divided into two sections. In the first section, the circumstances of ECEC in Austria and Great Britain are examined in detail on the basis of a quantitative descriptive analysis. Subsequently, the influence of ECEC and on parental employment and their regional differences is analysed using a logistic regression model. In the second part of the empirical chapter, the territorial differences are explained by using an institutional analysis. In the last and final chapter, the research findings will be summarized, and the research question will be answered.

2 Theoretical framework

2.1 The welfare state and the origin of Social Investment and its territorial precondition

The Social Investment paradigm was developed in order to respond to new social risks and adapt the welfare state to the new economic conditions of the 20th century (Hemerijck, 2017: 29). Social Investment is seen as a productive social policy that makes it possible to combine social integration and economic competitiveness at the same time (Morel et al., 2012).

In order to understand this new political paradigm, the discussion of the changes in the different European social systems and the economic conditions is crucial. Therefore, the following part will give an overview of the social and economic changes in Europe since 1990. First, the economic changes in relation to the knowledge-based economy will be discussed. Second, the causes and manifestations of new social risks are analysed in detail.

In the third section of this chapter, I will concentrate on the beginning of the Social Investment paradigm. This part deals with the different core elements of this new social policy orientation. Furthermore, this chapter discusses the critical aspects of Social Investment.

Although countries have a complexity of institutional and regional conditions, social policies are still discussed at the national level (Ranci, 2010a: 25). Therefore, the third section develops a territorial view of Social Investment. In particular, the question of why a regional approach on Social Investment is necessary will be clarified. In this sense the chapter forms the theoretical foundation of the present thesis.

2.1.1 *New social risks and the crises of the welfare state*

The technological and social change since the mid-1970s led to a transformation of economic structure in the Western world. In the information age, the exercise of knowledge will generate wealth (Amin, 1994: 1) for the knowledge-based economy (Hemerijck, 2012: 53). The concept of this new economy refers to a specific phase of capitalism (Lundvall and Johnson, 1994: 24-25). In our contemporary economy knowledge is a fundamental resource (Lundvall and Johnson, 2016: 108) in order achieve economic growth (Hemerijck, 2012: 53). The Post-Fordist era introduced a new constellation of knowledge and learning to the economy, which is

connected to three phenomena. Firstly, the developments in information, computer and telecommunications technologies (ICT); secondly, the trend towards flexible specialisation in the labour market; and thirdly, changes in the innovation process (Lundvall and Johnson, 2016: 109). The decline of the industrial society (Amin, 1994: 4) and other structural, social and economic changes, that paved the way for the fourth industrial revolution, led to the rise of the knowledge society. Although at different speeds, this trend changed the structure of labour markets and local economies, generating novel forms of poverty and social vulnerability across all European countries (Ranci et al., 2014). Due to those changes, the welfare state was challenged by the new social and economic order at the end of the 20th Century. The demographic change with small working cohorts, an erosion of the traditional family model and the ageing expenditure oriented social system confronts the welfare state with new social risks and uncertainties (Esping-Andersen, 2002; Taylor-Gooby, 2004; Ranci, 2010b).

New social riske are "the risks that people now face in the course of their lives as a result of the economic and social changes associated with the transition to a post-industrial society" (Taylor-Gooby, 2004: 2-3). Unlike the industrial welfare state, the post-industrial welfare state is unable to meet these new and growing challenges (Taylor-Gooby, 2004: 1). The development of the welfare state after 1945 (World War II) took place under stable economic conditions with a stable nuclear family and neo Keynesian employment policies. These policies controlled the economy, secured employment and stable incomes (Taylor-Gooby, 2004: 1-2). If the market or the welfare state were unable to provide social services, the family would perform these tasks, for instance, the caring tasks in conservative social systems (Taylor-Gooby, 2004). As a result, the three foundations of the welfare state have lost their efficiency (Ranci, 2010b). Not only have these three institutions lost their capacity, they also have become a source of new social risks (Esping-Andersen quoted in Ranci, 2010b; Taylor-Gooby, 2004). The subsequent part is meant to discuss the changes in these three areas.

First, the labour market has failed to respond to the changing technological and economic demands (Ranci, 2010b: 4). Due to technological changes, unskilled workers are no longer needed. In particular, "unskilled workers" are at high risk of unemployment and poverty (Taylor-Gooby, 2004: 13). As a result of globalization and economic competition between countries, the labour market is seeking for more flexibility to cope with economic competition

(Taylor-Gooby, 2004: 2), which leads to increasing job insecurity (Ranci, 2010b). Furthermore, the economic system is changing towards a service oriented (Esping-Andersen, 2002: 2) and knowledge-based economy (Hemerijck, 2017). In particular, low-skilled workers face a higher risk of lower wages or unemployment as their skills do not meet the new requirements of the labour market. This means that an individual's life chances are highly dependent on his/her human capital (Esping-Andersen, 2002: 2-3). In this context, human capital is defined "as the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being" (Keeley, 2007: 29).

Second, the erosion of the traditional family as a consequence of demographic change amplifies social risks. Furthermore, the typical male breadwinner model becomes rarer (Pavolini and Ranci, 2010). In order to overcome the declining rate of economically active men on the labour market, women must go into paid employment. The two-earner model gets more common in order to guarantee a family income (Taylor-Gooby, 2004: 3). However, due to the aging society, the responsibility for care tasks are increasingly in demand. Women who cannot participate in the labour market because of care responsibilities are confronted with a high risk of poverty (Taylor-Gooby, 2004: 3). In this context, unskilled women are affected by new social risks because they have difficulties in reconciling family and care responsibilities (Taylor-Gooby, 2004). In contrast, single parents and single parent households are becoming common (Ranci et al., 2014).

Thirdly, in most European countries, the social protection system only provides social services if the person is fully integrated into the labour market. As the economy changes and job insecurity increases, the social protection system is only able to provide social protection for a small share of people (Ranci et al., 2014: 19). More importantly, the existing welfare state was not able to react to new social risks (Esping-Andersen, 2011). Moreover, the privatization of social measures led to an increase of new social risks. Especially when private provision does not meet citizens' needs. The changes from the public to the private sector was most evident in the pension system (Taylor-Gooby, 2004: 5).

In the end, structural changes had a major impact on individual needs (Ferrera et al., Esping-Andersen, Bonoli quoted in Ranci et al., 2014: 6). Combined with old social risks, new social risks create a difficult constellation, especially for women, people in transition from school to

work and unskilled workers (Ranci et al., 2014). Old social risks are primarily risks to which people are exposed due to illness, unemployment, disability or old age and which occur in middle or old age. These risks were tackled by the social system (Taylor-Gooby, 2004: 8). New social risks, on the other hand, affect people at the beginning of their careers. Individuals find it difficult to get a secure job in the labour market and are often faced with care responsibilities in the early stages of family life (Ranci, 2010b). This structural change in European societies is leading to a crisis of the social system (Taylor-Gooby, 2004) and calls for a reform of the welfare state (Esping-Andersen, 2002). According to Ranci et al. (2014), the welfare state must rethink the organization and financing of social policy measures.

The existing welfare state is based on an intergenerational contract that includes financial transactions and social insurance contributions (Taylor-Gooby, 2004: 9). The prevailing financial situation and demographic trends make it impossible to maintain the current system (Esping-Andersen, 2002). Furthermore, Esping-Andersen (2002) points out that the traditional welfare system, which is based on social protection, may hinder employment growth and the competitiveness in the knowledge based economy.

Through the Social Investment perspective, the welfare state should get the possibility to address new social risks in a better way (Bonoli quoted in Morel et al., 2012: 2).

2.1.2 *The Social Investment policy paradigm*

The Social Investment perspective was developed in order to address new social risks (Bonoli, 2013) and should enable economic competitiveness and social inclusion (Hemerijck, 2017).

The end of the 20th. century was characterized by rising poverty rates, in-work poverty and social exclusion. Especially in countries that had implemented neoliberal social policies (Hemerijck, 2017: 7). Furthermore, the post-war breadwinner welfare state was exposed to a lot of criticism (Hemerijck, 2017: 7). The old welfare system was not capable of dealing with the social and economic transformation. Conservative welfare states in particular have failed to respond to demographic changes in the society and the emergence of new social risks (Hemerijck, 2017). Moreover, the "old" welfare state is unable to create new jobs for the knowledge-based economy (Bonoli quoted in Morel et al., 2012: 2). Various attempts have

been made to redefine the objectives, instruments and principles of the welfare state. Social policy must change radically to meet the problems emerging from changes in the economic and social order. The idea of the European Union was to adapt the welfare state to the new socio-economic conditions in the European Union (Hemerijck, 2012: 48).

The crucial element of Social Investment is that it prepares certain social groups to protect themselves from social and economic risks, and not to react with passive income transfers once the risk has occurred (Morel et al., 2012: 2). Leading social democratic leaders followed the idea that the passive traditional welfare state must change. In their view, the welfare state must evolve into an active welfare state to manage new social risks more properly (Hemerijck, 2012). Subsequently, the Organisation for Economic Co-operation and Development (OECD) turned away from its neoliberal lobbying work. The European Union also endorsed the new approach. The European Commission has identified social policy as a productive factor (European Commission, 2000). The aim was to prevent the dogma that social policy measures can only have negative economic effects (Hemerijck, 2017: 28). In contrast to neoliberal policies that compromise between economic growth and social policies, the Social Investment approach is based on a productive mechanism in social policy measures (Hemerijck, 2017). Social Investment should, on the one hand provide social protection, but on the other hand improve the productivity of a state (Hemerijck, 2017: 7). With the Lisbon Strategy, the European Commission has attempted to change the European welfare states (European Commission, 2000).

The welfare state should be able to address the new social risks (Bonoli quoted in Morel et al., 2012: 1). In this context, Social Investment policies are based on the idea of investing in the development of human capital, early childhood education and care, education and lifelong learning. Social spending should be redirected from passive to active social policies (Hemerijck, 2012: 51). In addition to developing human capital, Social Investment policies should aim at the efficient use of human capital (Hemerijck, 2017: 4). In this new welfare paradigm, social policies are seen as a prerequisite for economic growth and job creation (Hemerijck, 2017). Next to the investment in human capital the development of social services and policies that support the labour market, early child hood education and care, higher education and live-long learning, policies that support women´s employment are in the focus of the Social Investment

perspective (Hemerijck, 2017). Anton Hemerijck (2017) emphases that the essence of Social Investment is an encompassing strategy to increase employment and protects human capital. In this regard, three interdependent policy functions can be distinguished.

First, measures that increase the "stock" of human capital and skills throughout life (Hemerijck, 2017: 20). This policy function was designed to strengthen skills and capacities and improve further life chances. Policy areas such as ECEC, general education, post-secondary vocational and university education and lifelong learning policies can be assigned to this function. Stock policy functions are designed to develop a person's skills to meet the demands of the labour market and ensure long-term employability (Hemerijck, 2017: 20).

Second, the policy function "flow" aims at facilitating access to the labour market and ensuring a high employment rate for all genders (Hemerijck, 2017: 20 -21). The aim of these policies is to reintegrate) people, especially school leavers, the unemployed and parents, into the labour market in uncertain times. People are at risk during the transition from school to the first job, parenthood and from the labour market to retirement (Hemerijck, 2017: 23). Therefore, the "flow" function of Social Investment should secure life course transitions to ensure sustainable and long working careers (Hemerijck, 2017: 20 -21).

Third, the "buffer" function ensures income protection and economic stabilization (Hemerijck, 2017: 21). This function should enable a high degree of social security so that people can develop their human capital. Social security aims to protect people from poverty if they are involuntarily excluded from the labour market. In the context of Social Investment, social security should especially support people's transition to the labour market, increase human capital and provide effective social protection (Hemerijck, 2017: 21).

These three policy functions are not independent of each other; in “actual policy practice”, there are functional overlaps between and among them (Hemerijck, 2017: 22). The functions "stock", "flow" and "buffer" influence each other. In theory, early childhood education and care should increase parents’ employability, which in turn increases family income and reduces the probability of poverty. It also increases a child's human capital (Hemerijck, 2017: 22).

However, there are also various papers that critically examine the Social Investment approach. In this context, a distinction can be made between three different strands (Cantillon and Van

Lancker quoted in Kazepov and Ranci, 2017: 92). Firstly, Social Investment has a negative distributional effect and therefore excludes disadvantaged groups from public support (Cantillon and Van Lancker, 2013). Second, the productivity inherent in Social Investment can lead to further inequalities (Saraceno, 2015). Third, Social Investment policies can change the normative basis of social protection expenditure. For example, Social Investment policies can be seen as mere costs that cannot generate economic growth (Bouget et al., 2015).

In addition to the three critical points, Social Investment only has a positive impact under certain context conditions (Kazepov and Ranci, 2017). Therefore, the next section discusses a territorial approach on Social Investment.

2.1.3 *The territorial approach on Social Investment*

In the previous part, the economic and social changes in Europe and the emergence of new social risks, as well as the crisis of the welfare state were discussed. In addition, the emergence of the Social Investment paradigm and the most important social policy mechanisms of this social policy paradigm were outlined.

The following section deals with territorial approach on Social Investment. Although countries have a complex set of different territorial conditions and a range of institutional structures, social policies are still discussed at the national level (Kazepov and Barberis, 2017). As a result of the rescaling and territorialisation of social policies at the subnational level (Kazepov, 2010) and of persisting regional and local disparities (Commission, 2017), local welfare arrangements gain increasing relevance (Andreotti et al., 2012). The territorial dimension of social policy has long been ignored in comparative social policy analysis, although structural change in the 1970s initiated a territorial reorganisation of social policy (Kazepov, 2010). The reforms carried out concerned the territorial dimension of social policy and all the actors involved (Kazepov, 2010). This concept of “subsidiarisation” captures the vertical dimension of social policies (territorial reorganization) and the horizontal dimension (Kazepov, 2010: 36). The horizontal dimension refers to a multiplication of social policy actors (Kazepov, 2010: 36-37). Another point of criticism discussed here is the universal orientation of Social Investment measures. In this context, Kazepove and Ranci (2017) criticize that Social Investment policies do not take into account the socio-economic structure of a country.

Therefore, the following chapter focusses on a territorial approach on Social Investment in order to understand different outcomes of Social Investment measures. The territorial dimension of Social Investment in this thesis is related to the interdependency between institutional design and regional circumstances.

2.1.3.1 Institutional diversity of European welfare states

In the last decades, social policy comparisons were mainly conducted on a national level, but the autonomy of European regions has grown (Ranci, 2010a: 25). Furthermore, several European countries have federal institutional structures. However, with a few exceptions, the nation state is still the main "unit of analysis" in comparative social policy (Ranci, 2010a: 25). In particular, in the last three decades several events brought more attention to the regions (Ranci, 2010a: 25).

Firstly, European integration has limited the scope of national governments and thus strengthened regional autonomies (Brenner, 2004: 470).

Secondly, the regions gained new responsibilities for a number of reasons. Firstly, the new regionalism was the direct consequence of increasing the fiscal responsibility of subnational governments and thus reducing the national tax burden (Pierson, Ferrera quoted in Ranci, 2010a: 26). Secondly, the local and regional level often seemed more capabale for the development of social policies than the state level (Taylor-Gooby quoted in Ranci, 2010a: 26). Local welfare systems are therefore becoming increasingly important (Andreotti et al., 2012; Kazepov, 2008; McEwen and Moreno, 2005).

Andreotti et al. (2012) argues that the localization of welfare services is more efficiently. In the last 20 years, local government bodies became strong actors in planning, financing and implementing social policies (Andreotti et al., 2012). The current configuration of welfare systems is a mix of central and subnational policies. Subnational governments are bodies, which refer to actors at territorial levels lower than the central government, like counties, regions, municipalities, provinces (Andreotti et al., 2012: 1926). The role of local governments in social

policy delivery does not mean that social policies are a local product. In almost every country, the policy frameworks are shaped by national laws and institutions, which determine the amount of resources spent on the main welfare services such as pension, health care and social assistance (Andreotti et al., 2012: 1926).

The implementation of Social Investment policies "implies a huge activation of local welfare bodies, which are the main providers of social services and programs (such as childcare facilities, activation schemes, social inclusion activities, housing support) that may have a social and economic value added" (Ranci et al., 2014: 5). The increase in social vulnerability is caused not only by demographic changes, but also by changing social needs. Therefore, local social systems have gained in importance in recent decades (Bagnasco and Le Galès, Brenner quoted in Ranci et al., 2014: 19). European integration and the increasing responsibility of the regions have not only led to the relative autonomy of regional bodies. These developments have also promoted significant territorial disparities in terms of social and economic development (Ranci, 2010a: 26). These changes led to new social and economic disparities between European regions (Brenner quoted in Ranci, 2010a: 26).

In addition, urban centres also play an important role in the nation states. Although cities have a better economic performance, it should be noted that cities are always embedded in a national framework. Therefore, the influence of nation states on urban and subnational policies is effective in all European cities and local welfare systems (Kazepov 2005, 2010). The regionalisation of social policies entailed a decentralisation of regulatory powers (vertical) and a stronger role for non-state actors (horizontal) (Kazepov and Barberis, 2017: 302). The belief that national policies that mainly provided income support could be the foundation to balance the inequality between different territories within a country and the neglecting of local welfare services lead to a limitation of data at local level. The consequence of this process is that the quantity, quality, availability and comparability of (secondary) data at local level is still limited compared to their need for research and practice (Kazepov and Barberis, 2017: 302).

2.1.3.2 Territorial inequality

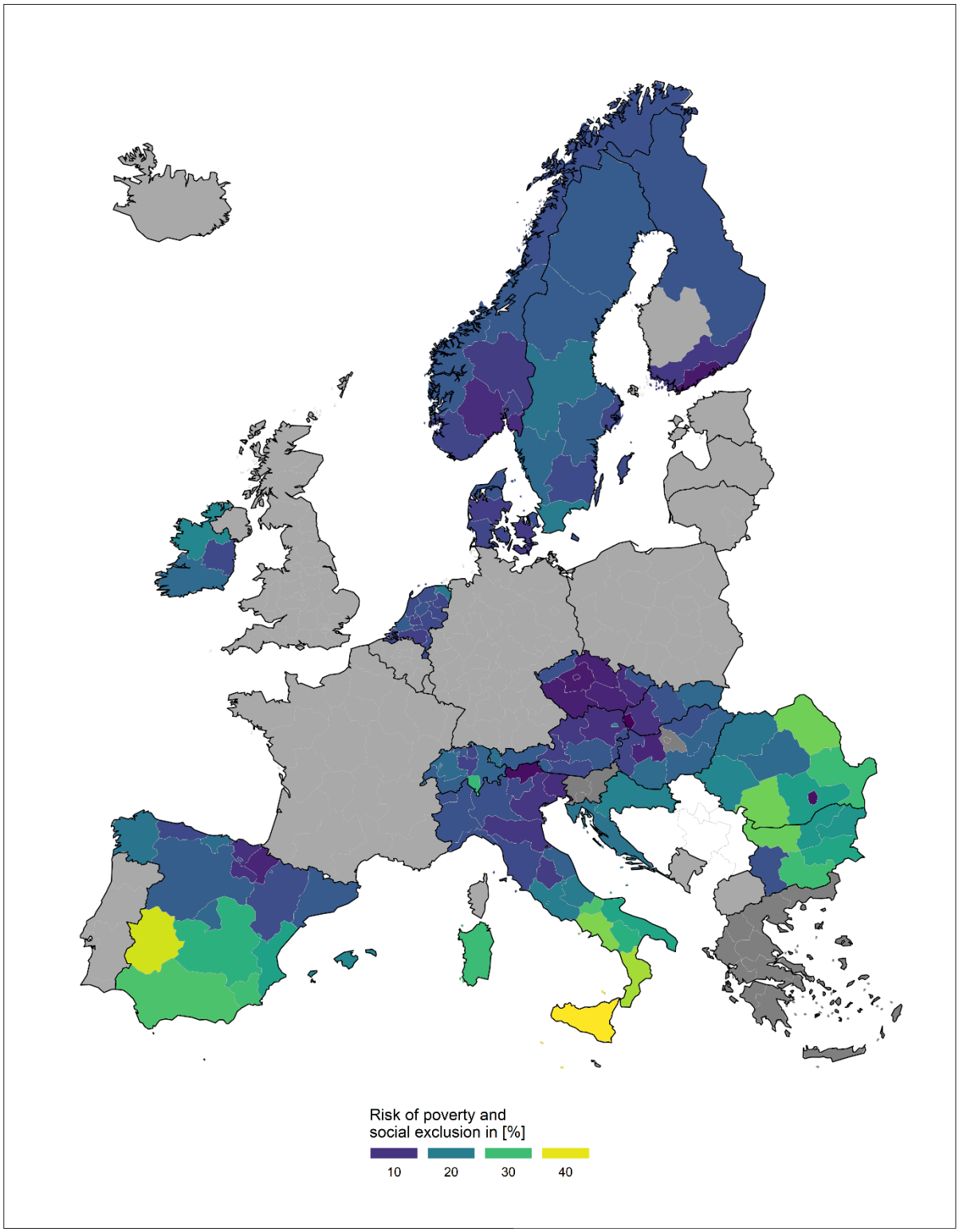
Additionally, to the strong institutional differences in various European countries (Ranci et al., 2014: 20), the inequalities among regions in the European Union are rising due to globalization and technological changes (Moretti, 2013). While these changes led to a confrontation of former prosperous regions with job loss and declining labour force participation, other regions experienced an increase of employment, but mostly in the low-wage sectors (Iammarino et al., 2018: 274). “Centres of small- and medium-sized manufacturing cities continue to suffer from a decline in employment or relative income, while their surrounding suburban or rural areas are characterised by income stagnation” (Iammarino et al., 2018: 274).

On the other hand, “many large metropolitan areas, including their suburbs, are now among the most dynamic in terms of income and employment creation” (Iammarino et al., 2018: 274). The “inter-regional inequality” in the European Union is an economic and political problem (Iammarino et al., 2018: 274). These developments led to political instability and territorial conflicts (Rodríguez-Pose, 2018: 194).

While the regional inequality within countries is rising, the inequalities between the European states have fallen by 45 % (Heidenreich and Wunder, 2008: 32). This argument is strengthened by the visualization in figure 1. The map visualises the indicator [1] “At risk of poverty or social exclusion by NUTS 2 regions” in Europe (Eurostat - Data Explorer, 2019e). The meaning of the NUTS levels is discussed in more detail in chapter 3.2 on page 39. The indicator shows: “Persons who are at risk of poverty or severely materially deprived or living in households with very low work intensity. Persons are only counted once even if they are present in several sub-indicators. At risk-of-poverty are persons with an equivalised disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income (after social transfers)” (Eurostat, 2019a). As we can see in figure 1, there are strong variations within the European countries.

[1] All indicators were downloaded with the Statitik program R Studio and are publicly accessible on the website: https://ec.europa.eu/eurostat/data/database . The exact source of the indicators is given in the bibliography under "Eurostat Indikators".

Figure 1 At risk of poverty or social exclusion by NUTS 2 regions in 2016



Source: Authors own calculation on Eurostat online database

Regional inequality, for example, is very pronounced in Italy and Spain. However, there is also a variation in Austria. In Vienna, 20 % of the population live at risk of poverty and social exclusion, whereas in Lower Austria the rate is only 9 %.

Ranci (2010a) pointed out that the distribution of social risks across European regions are not homogeneous. The increase of new social risks has also increased regional inequality (Ranci et al., 2014: 4). In addition, regional and urban specifications "play a relevant role in the configuration of social risks" (Ranci et al., 2014: 5).

The increasing territorial inequality is a second reason for a stronger attention on regional dimension of social policies (Ranci, 2010a: 28). Although social inequality is mainly discussed and analysed on national level, social inequalities are connected to the "international division of labour" (Ranci, 2010a: 27). On a global scale inequality does not concern individuals but regions (Rancia, 2010a). Studies show "that inequality and poverty are explained less by the traditional distinction among different welfare regimes than by the degree of economic development and the general level of well-being of the population" (Ranci, 2010a: 27). Therefore, inequality is "mainly caused by variations among rich and poor regions within countries themselves" (Steward quoted in Ranci, 2010: 27).

Because of the increasing regional disparities and varieties of regional contexts, there is a need for "place sensitive" policies (Iammarino et al., 2018: 273). The overall economic activity of the EU reflects a variety of measures taken by different levels of government, businesses and households. At a more detailed level, much of the economic process has a specific territorial dimension, with the degree of activity depending to some extent on a range of territorial goods such as transport or communication networks, access to services, natural resources, supply or skills of the local workforce (Iammarino et al., 2018). This wide geographical diversity makes the analysis of the situation in different regions a complex task (Ranci, 2010a).

2.1.3.3 Interrelationship between institutional circumstances and regional performance of Social Investment measures

The last two sections have shown that the welfare state at the end of the 20th Century was challenged by a new social and economic order (Esping-Andersen, 2002; Taylor-Gooby, 2004; Ranci, 2010b). In particular, the technological and social change since the mid-1970s lead to a transformation of economic structure in the western world (Amin, 1994). These developments in turn led to new social risks and put pressure on the post-war welfare state.

However, Social Investment can only have a positive impact if the socio-economic structure of a country is taken into account (Kazepov and Ranci, 2017). The rescaling process and the resulting autonomy of the regions on the one hand and the regional differences in economic performance on the other lead to a localization of the opportunity structure (Ranci et al., 2014: 26). The regional characteristics have a strong influence on the individual new social risk profile (Ranci et al., 2014: 6).

The reasons for these unequal regional economic performances are technological changes and regional evolutionary characteristics. These transformations discourage employment, in particular the creation of quality jobs at some intermediate and in particular lower skill levels, while at the same time improving employment opportunities for those with the highest qualifications (Iammarino et al., 2018: 282).

Therefore, Social Investment policies have a negative impact if the institutional and socio-economic characteristics of a country are not taken into account Italy (Kazepov and Ranci, 2017). Due to this complex circumstances Kazepov and Ranci (2018) argue that the simple truism contained in the following equation is that Context + SI = Outcome has important consequences for the way we conceive the implementation of Social Investment measures.

Neglecting part of the equation will lead to misleading interpretations of the expected Social Investment effects like in the case of Italy (Kazepov and Ranci, 2017). Thus, Social Investment can lead to positive results only under certain circumstances (Kazepov and Ranci, 2017). The complex institutional circumstances and the changing socio-economic and regional conditions in Europe foster a complex network of different Social Investment outcomes throughout

Europe. These three areas are strongly interrelated, engendering complex cross-cutting topics whose understanding requires an interdisciplinary, multi-scalar and multi-method approach (Scandurra et al., 2019). In order to understand the different outcomes of Social Investment it is crucial to consider the institutional socio economic and regional preconditions throughout European welfare states.

Therefore, the main objective of the present thesis is to analyse the intuitional set up of specific Social Investment policies and its impact on a regional scale. More precisely, I am going to analyse the regional challenges of ECEC and its impact on parental employment. In doing so, the main research questions are:

1. What influence do ECEC policies have on territorial employment patterns?
2. Can the institutional structure of ECEC within a country explain different territorial employment patterns of parents?

To answer the research question, it is necessary to discuss and analyse ECEC policies in more detail. For this reason, the next chapter deals with ECEC policies in relation to Social Investment and the state of the art.

2.2 Early childhood education and care in the European Union

ECEC is seen as one of the most important policy fields of the Social Investment perspective (Esping-Andersen, 2002; León, 2017; Morel et al., 2012). Since the end of the 20th, the concentration on ECEC has increased in order to develop further socio-economic outcomes as well as the fulfilment of social integration and poverty reduction (Morel et al., 2012; Penn, 2010; White, 2011).

The European Union defines ECEC as the provision of care facilities for children "from birth through to primary education that falls within a national regulatory framework, i.e., it has to comply with a set of rules, minimum standards and/or undergo accreditation procedures" (European Commission, 2014: 19). This framework must "comply with a set of rules, minimum

standards and/or undergo accreditation procedures" (European Commission, 2014: 19). The provision can be made by "Public, private and voluntary sectors – both publicly subsidised and self-financing private/voluntary sectors are within the scope" (European Commission, 2014: 19). In the further course of the thesis, a distinction is made between formal and informal childcare. A detailed classification of the different types of care is given in Chapter 4.2.1.

ECEC is part of a strategy to ensure the development of the EU in an international knowledge-based economy (European Commission, 2000). In particular, the EU made the following statement, underlining the importance of the ECEC in 2011:

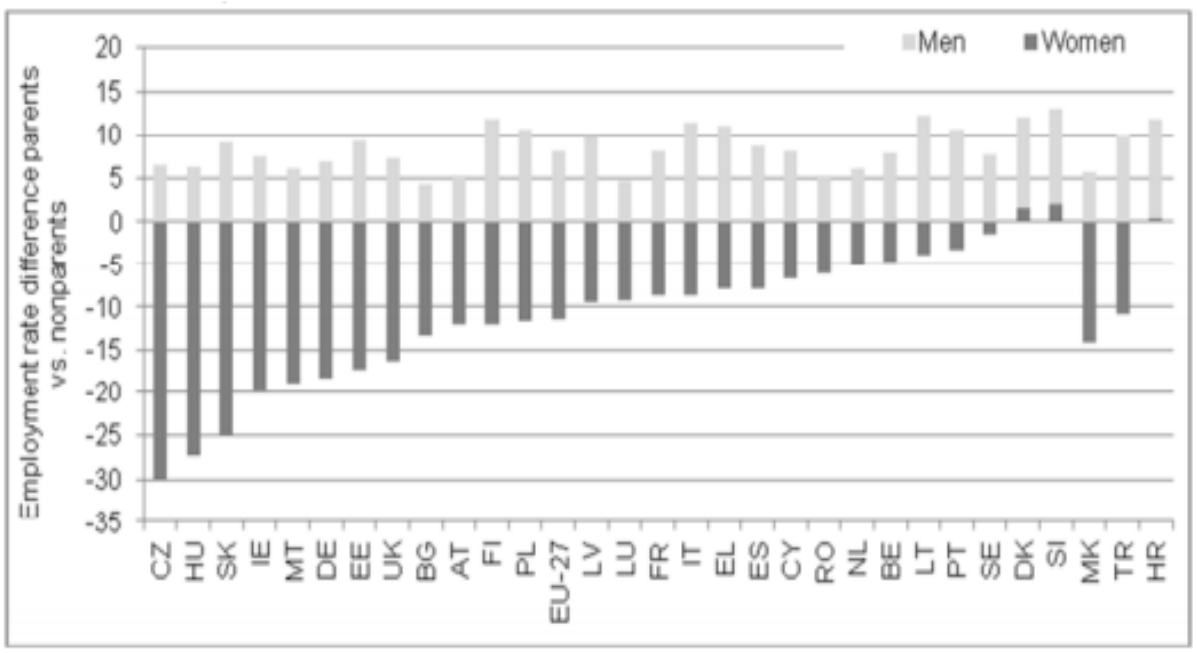
> "high quality early childhood education and care (ECEC) provides a wide range of short- and long-term benefits for both individuals and society at large. Complementing the central role of the family, ECEC lays the essential foundations for language acquisition, successful lifelong learning, social integration, personal development and employability. If solid foundations are laid during a child's formative years, later learning becomes more effective and more likely to continue throughout life, increasing the equity of educational outcomes and lowering the costs for society in terms of lost talent and public spending on welfare, health and even justice" (Council of the European Union, 2011: 2)

Therefore, "ECEC plays a central role, not only as a creator of human capital" in the short term, "but also for macroeconomic returns in the long" term (Campbell-Barr and Nygård, 2014: 349).

In addition to various studies, the European Commission highlighted the positive interrelation between the number of childcare places and female labour market participation (European Commission, 2011). Parenthood has a particularly negative impact on female employment, as can be seen in figure 2. The graph illustrates the difference in employment rates between parents and non-parents for 25-49 year-olds. The graph shows that maternity is "negatively correlated with employment across the vast majority of European Union Member States." (Mills et al., 2014: 12).

In this context, ECEC should promote female labour force participation on the one hand and the best possible educational opportunities for children on the other hand (Bonoli, 2013; Esping-Andersen, 2002). ECEC is the first stage for a child in the education system and at the same time the most effective phase in childhood development (European Commission, 2014: 16). In particular, children from disadvantaged backgrounds benefit from childcare, because it leads to improved school performance and career prospects (Heckman, 2006; Waldfogel and Washbrook, 2011).

Figure 2 "Difference between employment rate with and without children under 12, men and 25–49 years old, 2010" (Mills et al., 2014: 12)



One reason why the expenditures on ECEC have increased are the implementations based on the findings of Nobel Prize winner James Heckman (van Belle, 2016: 19). The economic returns on ECEC expenditures are higher than the economic returns in any other educational level (Heckman, 2006: 1901). The findings of his research led, among other things, to the Lisbon Strategies (van Belle, 2016: 19). Due to the positive impact of ECEC on the development of children and the economy in a country, several supranational organizations, such as the EU, have encouraged their member states to improve ECEC in their countries (European Commission, 2011). For woman in particular, the lack of adequate institutional support in order

to combine work and family life has a negative effect on female employment and having children at the same time (Drobnič and León, 2013).

Although childcare expenses are rising in most European countries in relation to the GDP, the coverage rate of ECEC in the most European countries is below the Barcelona goals (van Belle, 2016).

2.2.1 *Childcare regimes*

Past research shows that the expenses on family policies like ECEC policies differ greatly between liberal, socialist and conservative welfare regimes (Taylor-Gooby, 2004). Furthermore, after the finical crises of 2008, countries have reduced the expenses in particular in the UK. In addition, it depends whether institutions who are responsible for the implementation of ECEC policies are implemented on national or subnational level (León, 2017).

From a Social Investment perspective, the main policy functions of ECEC, the flow (human capital gains), buffer (securing income protection for vulnerable families) and stock (labour market integration), differ between countries because of "institutional, economic and cultural conditions" (León, 2017: 118). To understand the challenges European countries are facing in relation to ECEC it is important to analyse and compare the various national circumstances (European Commission et al., 2015).

Brewster and Rindfuss (2000) analysed in their article "Fertility and Women's Employment in Industrialized Nations", that in the second half of the 20th Century it was almost impossible for woman to combine childcare and economic activity at the same time, because of the distance to the work site and inflexible working hours. Thus, care tasks are still seen as the responsible of women. Therefore, if women have the wish to participate in the labour market they have to decrease their fertility or they have to find different care arrangements (Brewster and Rindfuss, 2000: 272). Research shows that the fertility rate in most industrialized countries is undergoing population renewal and that the majority of women require non-motherly care (Brewster and Rindfuss, 2000).

Due to the economic growth since 1965 in industrialized countries, the fertility rate decreases, while the rate of female labour participation increases (Brewster and Rindfuss, 2000: 275).

Furthermore, most employed women leave their paid work for some time in the period after birth. This period varies among countries and women depending on fiscal leave incentives, childcare and education background. If they return to work, they often do it on part time basis. Furthermore, the combination of childcare and labour market participation often depends on the cost of childcare and income from work (Brewster and Rindfuss, 2000). Although women in all industrialized, countries experience difficulties to balance family and employment, it is in some countries easier to coordinate these responsibilities than in others (Berhardt, Ellingsaeter and Rønsen, Brewster and Rindfuss quoted in Brewster and Rindfuss, 2000: 283). This strongly depends on childcare arrangements (Brewster and Rindfuss, 2000). All advanced industrial nations have some kind of services for families (Brewster and Rindfuss, 2000), but the extent strongly depends on the welfare regime type (Taylor-Gooby, 2004).

In order to overcome the high dimensional structure of ECEC between and within welfare states Thomas P. Boje and Anders Ejrnæs (2011) developed a typology of family policy regimes for the European Union.

Purpose of the study was that the existing categorization of welfare regimes based on the work of Esping-Andersen (1990) is not sufficient to distinguish between different childcare arrangements. First, the researchers argue that the typologies create the impression of coherent welfare regimes. Due to the "differences in the institutional and contextual construction of the national welfare systems" this is not the case (Boje and Ejrnœs, 2011: 78).

Second, Esping-Andersen cluster is based mainly on "data from the Northern and Western European countries while typically the Central and Eastern European countries are absent" (Boje and Ejrnœs, 2011: 78).

Finally, the analysis focuses mainly on state and labour market policies while other important welfare policies, such as family policies are absent. Furthermore, "most typologies exclude the family and its internal gendered dynamics" (Boje and Ejrnœs, 2011: 78). Although the EU tried to promote the reconciliation of caring and paid employment. The implementation depends very much on the various member states (Boje and Ejrnœs, 2011). In order "to understand the form and nature of contemporary welfare societies" it is important to include childcare policies (Boje and Ejrnœs, 2011: 79).

The first cluster represents a high level of childcare for children from zero to three years of age. In addition, there is a comprehensive right to parental leave combined with a generous wage during parental leave. In addition, the countries represented in this cluster have high government spending on family policies. Denmark, Sweden France and Belgium are represent in this "Extensive family policy model" cluster (Boje and Ejrnœs, 2011: 86). These countries are furthermore, characterized as weak breadwinner countries (Lewis, 1992).

The second cluster is the "Part-timel model" (Boje and Ejrnœs, 2011: 87). This cluster includes the Netherlands and the United Kingdom. These countries have a low care rate for children from zero to three years. In addition, childcare is usually combined with part-time work for women. However, there are differences in the labour market systems in both countries (Boje and Ejrnœs, 2011).

The third cluster, the "Continental model" (Boje and Ejrnœs, 2011: 86) includes the countries Germany, Austria and Luxembourg. These countries were already described as strong breadwinner models in other typologies (Esping-Andersen, 1990; Lewis, 1992). Due to that, parental leave is relatively well paid in these countries and the level of spending on family policies is high. Furthermore, parental leave is paid for a long period. In particular, women in Austria and Germany are not integrated into the labour market for a longer period due to the long care of their children (Boje and Ejrnœs, 2011: 86). After care, women often take over a part-time job. Part-time employment in these countries is precarious with a few working hours. Women with children in these countries are often forced to take care of their offspring. Thus, woman face problems while getting back into regular employment because of long-term inactivity (Boje and Ejrnœs, 2011: 86). Next to these problems, there is a general lack of childcare institutions, which fit to the working schedule. In addition, the coverage rate of formal childcare facilities is low and child caring is mostly done by grandparents (Boje and Ejrnœs, 2011: 88).

The "Family care model" (Boje and Ejrnœs, 2011: 89) is the fourth cluster. This cluster has low rate of woman in the labour market. Although parental leave varies in these countries, financial support is insufficient. Therefore, these countries rely on a male breadwinner model (Boje and Ejrnœs, 2011: 89). Furthermore, the amount of childcare facilities is low, and the existing ones only have short opening hours and are often expensive. As parental leave is not strongly

promoted and there is a limited number of public childcare facilities, family policy expenditure in this cluster is low (Boje and Ejrnœs, 2011: 89).

The fifth and last cluster, the "Parental leave model" (Boje and Ejrnœs, 2011: 89-90), includes the countries Hungary, Poland, Czech Republic, Lithuania and Finland. These countries are characterized by "long periods of effective parental leave" (Boje and Ejrnœs, 2011: 89). Moreover, all countries in this model show a low childcare rate, relatively few women in part-time work and children are mostly cared by family members (Boje and Ejrnœs, 2011: 90).

The researchers emphasize that a more "gender-balanced citizenship" requires a care obligation in the European Union (Boje and Ejrnœs, 2011: 91). The typology of care models shows the constraints faced by mothers in combining work and care (Boje and Ejrnœs, 2011: 92). Policies must consider an "interplay between different kinds of family policies and gender norms" that "shape the relationship between paid work, unpaid work and care in different national contexts" (Boje and Ejrnœs, 2011: 92).

Due to the different organization of family policies, it is possible to cluster five different childcare regimes in Europe. Every cluster organizes family policies in various ways and therefore tackles the reconciliation of caring and paid employment different (Boje and Ejrnœs, 2011: 93).

2.2.2 *Childcare markets*

Lindsay Flynn (2017) goes one step further and shows that different forms of care markets correspond with maternal employment. She argues that in order to enter paid employment mothers relay different forms of childcare providers. A countries childcare market is defined by its different forms of care, which "correspond with maternal employment patterns at both the country (macro) and individual (micro) level" (Flynn, 2017: 260).

Mothers still spend more time with caring for children than fathers (Cleveland and Krashinsky, 2003). Therefore, childcare policies should "reduce the penalty faced by mothers who want to remain in or re-enter the paid market" (Flynn, 2017: 261). Flynn (2017) argues that it is important to understand the forces behind maternal employment because of three reasons.

First, because of policy reasons and the decrease of economic growth which leads women to exit the labour market (OECD, 2012).

Secondly, on a personal level, since low employment creates statistical discrimination against women in the workplace (Pettit et al., 2010)

Thirdly, the lack of reconciliation between family and employment makes it hard to increase the size of the household (Adema and Whiteford quoted in Flynn, 2017: 261). This is a particular problem for welfare states, that depend on stable or growing populations (Flynn, 2017).

Welfare states have reacted in several ways to address the different female employment patterns (Flynn, 2017: 261). For example, governments provide direct childcare, a combination between public and private market or tax relieve (Flynn, 2017: 262). Due the lack of public childcare markets, private childcare markets have developed (Del Boca et al., Esping-Andersen, Morgan quoted in Flynn, 2017: 263). Although the existing literature is not focusing on the effects that private care markets have on maternal employment, most parents rely on it. Childcare for children from zero to three years in countries like Austria, Canada, Ireland, the Netherlands, Switzerland and the United Kingdom are primarily provided by the private market (Flynn, 2017: 263).

Figure 3 Childcare market types (Flynn, 2017: 264)

		Is Care Available?	
		No	Yes
Is Care Affordable?	Yes	Affordable care options exist, but supply does not meet demand *Corresponds with Female Penalty*	Affordable care can be secured through multiple sources *Corresponds with No Child Penalty*
	No	Care is difficult to secure, and expensive when found *Corresponds with Traditional Child Penalty*	Care is available, but only for those segments that can afford it *Corresponds with Young Child Penalty*

Figure 3, shows how the available but not affordable of childcare markets effects maternal employment (Flynn, 2017: 264). The literature on childcare stresses the "importance of the availability and affordability of childcare in alleviating tradeoffs between work and family" (Kreyenfeld and Hank quoted in Flynn, 2017: 263). Private care markets neglect these two mechanisms. Furthermore, research on childcare shows that childcare is more expensive in countries with little government involvement (Richardson quoted in Flynn, 2017: 263). In contrast, public care is an important component of affordable care. Nevertheless, neither is private care unavailable or unaffordable by definition, nor is public care available and affordable by definition (Flynn, 2017: 263). Next to the possibility of unavailable or unaffordable private care markets, private care markets are characterized by fewer regulations compared to public care markets. Therefore, private care markets are likely to vary between quality of childcare provision (Vandell and Wolfe quoted in Flynn, 2017: 263). The results of low-quality childcare are "negative consequences on child development in the short term and human capital in the long term" (Flynn, 2017: 263). On the other hand, public care markets offer advantages, "especially for children from low-income families" (Garces et al. quoted in Flynn, 2017: 263). The literature on childcare clearly states out that the quality of childcare is a crucial element in ensuring children developments (Flynn, 2017: 263). Because of the strong connection between availability and affordability of childcare and the different forms of care markets which directly influences maternal employment, Flynn creates four different childcare market types (see figure 3).

The childcare markets which have a deep private, as well as a public childcare market are represented in the top right. These countries do not have a child penalty because the available and affordable of childcare is guaranteed (Flynn, 2017: 263). Most Scandinavian countries and Belgium are represented in this quadrant and have childcare markets, which have public and private care providers, which make an informal childcare market unnecessary. Furthermore, the employment patterns between woman and mothers do not differ (Flynn, 2017: 265).

The bottom left quadrant shows childcare markets where care is neither available nor affordable (Flynn, 2017: 265). Childcare markets are not prioritized by the governments and are therefore poorly developed. The absence of formal care markets led to a "traditional child penalty" (Flynn, 2017: 265). Due to the restriction of childcare markets, mothers have to leave

the labour market and therefore have problems if they want to reintegrate into the labour market. In both cases, families depend on informal care. Continental countries like Germany are represented in this quadrant. Austria, Finland and Switzerland also belong to this cluster (Flynn, 2017: 267).

The bottom right quadrant represents childcare markets where care is available but not affordable (Flynn, 2017: 265). Mothers who leave the labour market due to pregnancy have to enter the market after a certain period. This quadrant is labelled as "young child penalty" (Flynn, 2017: 265). This is typically the case in the United Kingdom (Flynn, 2017: 265).

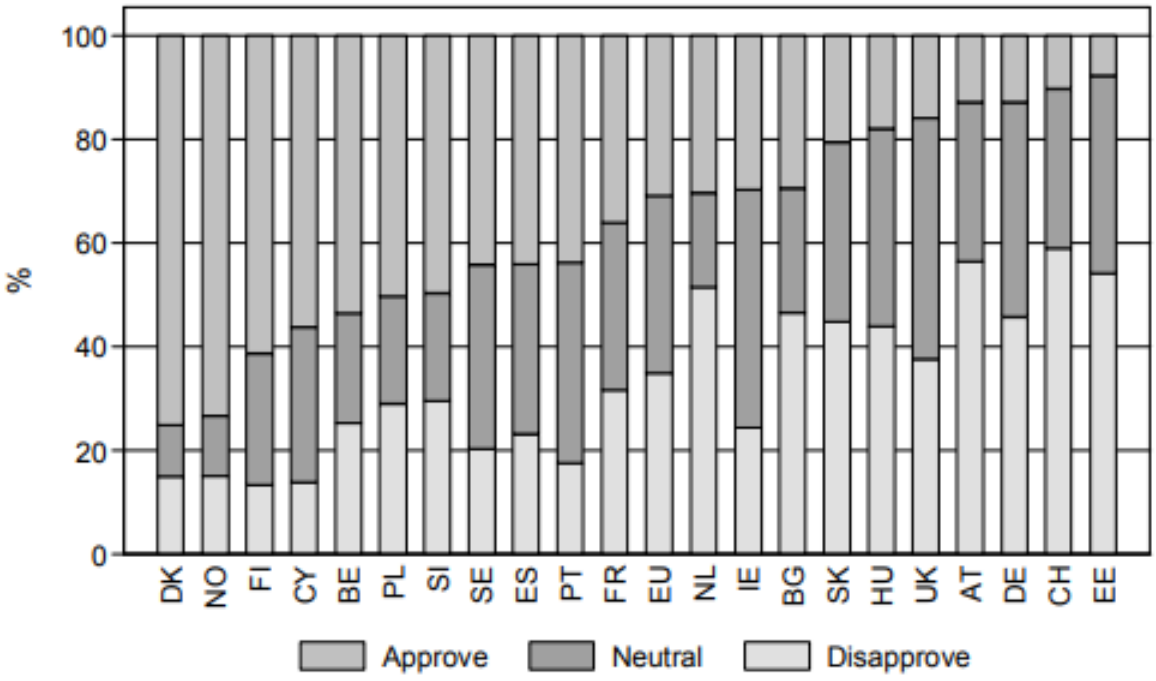
The last and final quadrant on the top left represents childcare markets where care is affordable but unavailable (Flynn, 2017: 265). Low-cost childcare is not available to enable the employment of mothers. Flynn labels this quadrant as "female penalty" (Flynn, 2017: 265). The southern European countries, Ireland and the Netherlands fall into this category and are characterised by an inflexible labour market in which women are less able to work (Flynn, 2017: 265).

2.2.3 *Childcare and cultural preconditions*

In addition to political and economic factors, cultural norms about mothers' employment have an impact on maternal employment. Due to the rising rate of maternal employment in the "industrialized world, work- family policies and cultural norms about mothers' employment have changed" (Pfau-Effinger quoted in Budig et al., 2012: 167).

Figure 4 illustrates the degree of consent and rejection of "whether a woman with a child under three years of age should have a full-time job" (Mills et al., 2014: 14). The figure shows, "that more than 50 per cent of adults approve that a woman with a child under three years of age should have a full-time job in more than 50 per cent of the countries" (Mills et al., 2014: 14).

Figure 4 "(Dis)approval of a full-time working woman with a child under three years of age, by male and female adults" (Mills et al., 2014: 15)



EU refers to average for the 20 EU Member States in this Figure

Family policy should aim to help women find permanent employment during child-bearing years. However, cultural norms play an important part in shaping family policies (Lewis, 1992). Politics interacts with cultural norms in determining women's decisions on reconciling work and family life (Pfau-Effinger quoted in Budig et al., 2012: 167).

2.2.4 *Organization set up and funding of ECEC*

Overall, ECEC should lead to an increase of parental employment but the last part showed that the outcomes of ECEC depend on a plurality of circumstances and varies between the European member states (León, 2017). Furthermore, these circumstances underline the main argument of the present thesis. In order to analyse the impact of Social Investment policies, it is necessary to explore the institutional preconditions (Kazepov and Ranci, 2017). In order to understand the effects of ECEC we have to consider how ECEC is organized, set up and financed (van Belle, 2016).

First, the provision and organisation of ECEC affects the availability and accessibility of childcare facilities. This results in different opening hours, minimum age of access and compensation of parents. For example, the age at which children have the legal right/obligation to attend ECEC facilities affects access to ECEC institutions (van Belle, 2016: 6). For children under the legal age of eligibility, available places are lower than demand in most European countries. The cost for families for ECEC places below the legal entitlement age is higher than for children above the legal entitlement age (van Belle, 2016: 7). Furthermore, the access of ECEC in most European countries is regulated through a legal entitlement or a compulsory attendance (van Belle, 2016: 7). Legal entitlement means that public authorities in a country guarantee a place for children in ECEC facilities when parents demand it (van Belle, 2016: 7). This does not mean that provision is free but in most cases, provision is publicly subsidized and affordable (van Belle, 2016: 8). In contrast to legal entitlement, compulsory attendance means that children of a certain age are obliged to enter ECEC facilities (van Belle, 2016: 8). In almost all European countries, the free access to ECEC only covers a certain number of weekly hours and all hours above the free care are subject to a fee (van Belle, 2016: 10). The Social Investment literature suggests that only inexpensive 30 hour care has a positive effect on the employment of women (Mills et al., 2014). Another important aspect which is necessary to consider in terms of the provision of ECEC is if provision happens through private or public sector (Flynn, 2017).

Second, how ECEC is set up in a country has implications for the acceptability. A distinction is made between whether a country operates a divided or uniform and whether it is a domestic or center-based care system (van Belle, 2016: 11). In most European countries there is a differentiation between two age groups (zero to three and three to five years), and the provision of ECEC service happens in two different institutions (European Commission, 2014). That means that the responsible institutions vary between these different age groups (van Belle, 2016: 5). In addition, in most countries the competent bodies for governance, regulation and financing also differ between different types of offers. This has consequences for the quality of the ECEC (van Belle, 2016).

Third, next to the institutional set up the funding influences the availability of ECEC. This means in which extent ECEC is available and effective for all children, independently from there

economic and ethnic background (van Belle, 2016: 17). Measures, which lead to an enhancement of ECEC, are part of family or ECEC policies. Family policies include financial assistance, reduction in fees and special family allowances (van Belle, 2016). Furthermore, recent studies showed that the offer of childcare facilities has an influence on the enrolment decisions (Wrohlich, 2011).

Not only the organisation, implementation and financing of ECEC is important. Moreover, it is important to consider the socio-economic background of a child. The socio-economic status of the parents has an influence on whether or not they have children, which are cared for (van Belle, 2016: 16). Children from more affluent families are more likely to attend preschool than those childrean from socio-economic weaker households who would benefit more from it (Wirth and Lichtenberger, 2012). Previous research has shown "that access to formal childcare of children under the age of three is socially stratified" (Mills et al., 2014: 21). Children with a higher socio-economic status are more likely to attend formal childcare facilities, than children from a socio-economic weak household (Wirth and Lichtenberger, 2012). This is problematic, as children from socio-economically weak households would benefit most from formal childcare (Mills et al., 2014: 21). These different factors are influencing each other (van Belle, 2016). The female participation on the labour market is directly paired on the availability and accessibility of ECEC (van Belle, 2016: 25).

As soon as a woman has a certain amount of hours in employment, the private handling of childcare is no longer sufficient. Childcare must be provided for at least 30 hours or more per week to enable both parents to enter the labour market and to ensure stable employment (Mills et al., 2014). One of the main reasons why parents do no give their children in care taking facilities are the high costs for ECEC institutions. Research shows that when a country offers affordable childcare, a higher proportion of women are in employment than in countries with high costs of childcare (Mills et al., 2014: 17).

The negative repercussions of low coverage rate and high costs of ECEC goes far beyond outcomes (van Belle, 2016). Expensive or insufficient provision of ECEC leads to a reduction in the re-employment rate of women due to time off from the labour market. This also results in the "gender pay gap" and the "family pay gap" (Harkness and Waldfogel, 2003: 15).

3 Research project on ECEC in Austria and Great Britain

3.1 Research question and case study selection

The changing economic and social circumstances at the end of the 20th Century confronted the post-industrial welfare state with new challenges (Esping-Andersen, 2002; Taylor-Gooby, 2004; Ranci, 2010b). The structural changes created new social risks. These structural changes led to a crisis of the system (Taylor-Gooby, 2004) and calls for a reform of the welfare state (Esping-Andersen, 2002). One of the crucial elements of the Social Investment paradigm is that it should prepare certain social groups to protect themselves from social and economic risks, instead of reacting with passive income transfers once the risk has occurred (Morel et al., 2012), through ECEC, vocational education or lifelong learning policies (Hemerijck, 2017). In particular, ECEC policies are seen as one of the most important policy fields of the Social Investment paradigm (Esping-Andersen, 2002; León, 2017; Morel et al., 2012). From the Social Investment, ECEC should promote female labour force participation and the best possible educational opportunities for children (Bonoli, 2013; Esping-Andersen, 2002; Heckman, 2006; Waldfogel and Washbrook, 2011).

However, the previous chapter has shown that the outcomes of ECEC polices vary between countries (León, 2017) and influence the employment of men and women in different ways (Boje and Ejrnœs, 2011). In order to understand ECEC policies and their impact on parental employment it is necessary to analyse how the ECEC is organised, set up and financed (van Belle, 2016). Furthermore, although each country has complex institutional and regional conditions, Social Investment is mainly theorized and analysed at the national level (Kazepov and Barberis, 2017). Due to the rescaling and territorializing of social policies at the subnational level (Kazepov, 2010), local welfare arrangements gain increasing relevance (Andreotti et al., 2012). Furthermore, research shows that Social Investment policies only have a positive impact on individual needs if the socio-economic structure of a country is taken into account (Kazepov and Ranci, 2017). If policy makers do not consider the socio-economic circumstances of a country Social Investment policies can have negative effects, like in the case of Italy (Kazepov and Ranci, 2017).

Next to institutional diversity of ECEC within and between countries, the rescaling process and the resulting autonomy of the regions on the one hand and the regional differences in economic performance on the other lead to a localisation of the opportunity structures. The territorial characteristics have a big influence on the individual new social risk profile (Ranci et al., 2014). It is therefore necessary to analyse the interdependency between institutional and regional circumstances of Social Investment policies.

However, given the complexity of the situation, it is necessary to take the contextual conditions of ECEC policy into account and to explore the territorial effects on parental employment.

The complex institutional circumstances and the changing socio-economic and regional conditions in Europe foster a complex network of different ECEC outcomes throughout Europe. These areas are strongly interrelated, engendering complex cross-cutting topics whose understanding requires an interdisciplinary, multi-scalar and multi-method approach (Scandurra et al., 2019).

In more detail, the present works builds on the equation of Kazepov and Ranci (2018) to understand the different effects of Social Investment policies.

Context + SI = Outcome

(Territorial Circumstances + Institutional Preconditions) + ECEC Policies =

Parental Employment Patterns

Therefore, the main objective of the present thesis is to analyse the institutional organisation of ECEC policies and their impact on individual circumstances and their regional differences in Austria and Great Britain. More specifically, I will first investigate the impact of childcare on parental employment and its regional differences. Secondly, to understand possible regional differences it is necessary to understand the institutional organisation of ECEC. In doing so, the main research questions are:

1. What influence do ECEC policies have on territorial employment patterns?

2. Can the institutional structure of ECEC within a country explain different territorial employment patterns of parents?

In order to analyse these complex circumstances, I rely on a comparative case study analysis (Ragin, 2014) with a mixed method approach (Biesenbender and Héritier, 2014). Comparative Social Science is a central analytical tool in the today´s social science. Comparative studies provide the "basis for making statements about empirical regularities and for evaluating and interpreting cases relative to substantive and theoretical criteria" (Ragin, 2014: 1).

When examining differences and similarities, it is possible to determine how different combinations of conditions have the same causal meaning and how similar causal factors can counteract each other (Ragin, 2014). Therefore, I am using a "case-oriented approach" (Ragin, 2014: 18) in order to analyse the outcomes of ECEC in different contexts.

For this reason, I choose Austria and Great Britain as case studies, as they differ both in the traditional welfare state classification according to Esping Anderson (1990) and in the structure of childcare systems (León, 2017). Gøsta Esping-Andersen marks Great Britain as a liberal welfare state "which meanstested assistance, modest universal transfers, or modest social-insurance plans predominate" (Esping Anderson, 1990: 26). In this type of welfare state regimes, "the progress of social reform has been severely circumscribed by traditional, liberal work-ethic norms: it is one where the limits of welfare equal the marginal propensity to opt for welfare instead of work. Entitlement rules are therefore strict and often associated with stigma; benefits are typically modest" (Esping Anderson, 1990: 26). The state, on the other hand, promotes the "passively - by guaranteeing only a minimum - or actively - by subsidizing private welfare schemes" (Esping Anderson, 1990: 27).

In contrast, Austria is labelled as an ideal type of a conservative and strongly "corporatist" welfare state (Esping Anderson, 1990: 27). In these conservative welfare states the "liberal obsession with market efficiency and commodification was never preeminent and, as such, the granting of social rights was hardly ever a seriously contested issue" (Esping Anderson, 1990: 27).

Since the priority is to preserve status differences, the rights are bound to the class. The market as a welfare provider does not play a major role, which means that private insurance and ancillary professional services play a marginal role (Esping-Andersen, 1990).

Nevertheless, Thomas P. Boje and Anders Ejrnæs (2011) showed in their article that the existing classification of welfare regimes based on the work of Esping-Andersen is not sufficient to distinguish between different childcare arrangements. In their classification the UK is labelled as a "Part-time model" and Austria is labelled as a "Continental model" (Boje and Ejrnœs, 2011).

3.2 Territorial and regional aspect

The territorial dimension is essential in this work and will be presented in the further analysis by the degree of urbanisation. The degree of urbanization plays "a relevant role in the configuration of social risks" (Ranci et al., 2014: 18).

Therefore, it is necessary to consider the different degrees of urbanization of the individual local administrative units (LAUs). The LAU regions are administrative units and are arranged under the NUTS3 regions. The degree of urbanization (DEGURBA) is a uniform European classification that indicates the character of a geographical entity. More precisely, it classifies local administrative units into cities, suburbs or rural areas (Eurostat, 2019b).

The classification is "based on a combination of geographical contiguity and population density, measured by minimum population thresholds applied to 1 km² population grid cells; each LAU belongs exclusively to one of these three classes" (Eurostat, 2019b).

In order to compare the various institutional circumstances of ECEC in Austria and Great Britain I use the Nomenclature of Territorial Units for Statistics. The Nomenclature of Territorial Units for Statistics (NUTS) is a hierarchical system to break down the economic areas of the EU for the following purposes (Eurostat, 2016b):

- "NUTS 1: major socio-economic regions
- NUTS 2: Basic regions for regional policy
- NUTS 3: small regions for specific diagnoses"

Therefore, it is possible to compare various political regions in the European Union. Because of its federal structure, childcare policies in Austria are organized at federal level (Blum, 2015). The nine federal states are congruent with the new NUTS 2 regions. Although Great Britain is, highly centralized, childcare policies differ between England, Scotland, Wales and Northern Ireland (Campbell-Barr and Nygård, 2014). These four political regions are represented by the NUTS 1 classification (Eurostat, 2016b).

3.3 Executive summary and further procedure

In order to analyse the research question, and to understand the different outcomes on parental employment because of different organization, set up, funding and territorial circumstances of ECEC policies, I relay on a mixed method approach (Biesenbender and Héritier, 2014).

Therefore, the first part focuses on a quantitative analysis on bases of the first research question:

- What influence do ECEC policies have on territorial employment patterns?

The influence of childcare on parental employment and the differences between urban, suburban and rural areas will be analysed. This research question is answered using different quantitative methods in chapter four. This chapter is split into two sections: in the first part of the quantitative analyses, the various national and regional circumstances of ECEC in Austria and the United Kingdom based on Eurostat macro indicators are analysed. This part is meant to give a descriptive overview about the regional and nation circumstances of ECEC policies and parental employment in Austria and Great Britain. The regional aspect is a central aspect of this work, but due to the lack of data, only the degree of urbanization can be considered in the following analysis.

In the second section of the quantitative analyses, several logistic regression modules analyses are performed to measure the individual effects of ECEC policies on parental employment. Due to the lack of data, it is not possible to analyse the differences between the NUTS 2 regions in

the quantitative analysis. However, the distinction between the different urban areas provides information on possible territorial differences. In addition, the regional differences will be pointed out later by using secondary data.

In order to understand possible different territorial differences in Austria and Great Britain, I will analyse the institutional structure of ECEC in both countries on the basis of the second research question:

Can the institutional structure of ECEC within a country explain different territorial employment patterns of parents?

In more detail, I will investigate whether possible territorial differences can be explained by the institutional architecture of ECEC. The following section aims to explain the territorial differences that exist in relation to the employment patterns of parents and whether the institutional structure is able to explain these differences.

3.4 Derivation of the quantitative research hypotheses

Based on the theoretical chapter and the research question, the research hypotheses for the qualitative part of the thesis are now derived. It was shown that ECEC is seen as one of the most important policy fields of the Social Investment perspective (Esping-Andersen, 2002; León, 2017; Morel et al., 2012) and should therefore increase parental employment (European Commission, 2011). In particular, available and affordable childcare should have a positive impact on female employment (Hemerijck, 2017). However, current research shows that women are still engaged in caring activities more often then men (Cleveland et al., 2015 quoted in Flynn, 2017). For this reason, the use of childcare services should have a positive influence on female employment. Therefore, the first hypothesis is:

H1: Childcare has a greater impact on the employment of women than on the employment of men.

Boje and Ejrnœs describe United Kingdom as "Short leave, Part-time" model, and it is defined with modest level of public childcare, combined with women working part-time (Boje and Ejrnœs, 2011: 86). In addition, the theoretical part of the work has shown that there is a low coverage of childcare facilities for children aged from zero to three years in this country. In addition, the use of childcare services is connected with part-time employment of women (Boje and Ejrnœs, 2011). In contrast Austria is defined as a "Continental model" (Boje and Ejrnœs, 2011: 93). This means that parental leave is relatively well paid in these countries and the level of spending on family policies is high. Furthermore, parental leave is paid for a long period. Women with children in Austria are often forced to "taken up part-time work combined with caring for children, but their part-time jobs are typically short-hours in order to fit in with the caring obligations" (Boje and Ejrnœs, 2011: 88). Although female part-time employment is very high in both countries, due to the strong parental leave in Austria, the influence of childcare in the UK on parental employment is stronger than in Austria. Accordingly, the following hypotheses can be derived:

H2: The effects of childcare (formal and informal) on parental employment are more pronounced in Great Britain than in Austria.

The degree of urbanization plays an essential role in the provision of social policies (Ranci, 2010a). Therefore, the third and final hypothesis is as follows:

H3: The effect of childcare has a stronger impact in urban areas than in rural areas.

3.5 Logistic regression analysis and used data

To investigate the influence of childcare on parental employment, I use a logistic regression model. Logistic regression belongs to the category of structure testing procedures. The aim is to determine which independent variables exert an independent influence on the dependent variable. More precisely a logistic regression is based on estimates of the probability of occurrence of a certain state of the dependent variable, based on one or more independent variables (Backhaus et al., 2016).

Since the dependent variable in this thesis, whether a person is employed or not, is a binary variable, a binary-logistic regression analysis is used (Backhaus et al., 2016). This allows statements to be made about how high the chance of gainful employment is under the influence of the independent variables.

Based on the pseudo R2 statistics, the share of the variance explained by the logistic regression is presented (Backhaus et al., 2016). There are different types of pseudo-R2 values for logistic regression, whereby McFadden's pseudo R2 is represented in the analyses (McFadden, 1973). This quality measure is examined in this thesis to determine to what extent the model with predictors improves by adding independent variables compared to the zero model. The values of pseudo R2 vary between zero and one, but the larger the pseudo R2, the better the independent variables can explain the dependent variable (Backhaus et al., 2016). Increasing values represent a higher significance of the model. If the value is zero, the model is meaningless. Values of 0.2 and 0.4 respectively are referred to as very good model adaptation (Backhaus et al., 2016). In addition, significance tests are used to check whether the individual independent variables have a significant influence on the target variable (Backhaus et al., 2016).

To carry out the logistic regression analysis, the European Union Statistics on Income and Living Conditions (EU-SILC) 2016 is used. EU-SILC is a tool to collect “timely and comparable cross-sectional and longitudinal multi-dimensional micro data on income, poverty, social exclusion and living conditions. This instrument is anchored in the European Statistical System (ESS)” (Eurostat, 2016a).

4 Empirical analyses of ECEC and parental employment

4.1 Descriptive analyses

In order to get a better overview of the ECEC situation in Austria and Great Britain, the following part of the analysis focuses on regional and national conditions of ECEC in connection with parental employment. As already mentioned before, in the descriptive part various Eurostat indicators[2] are analysed.

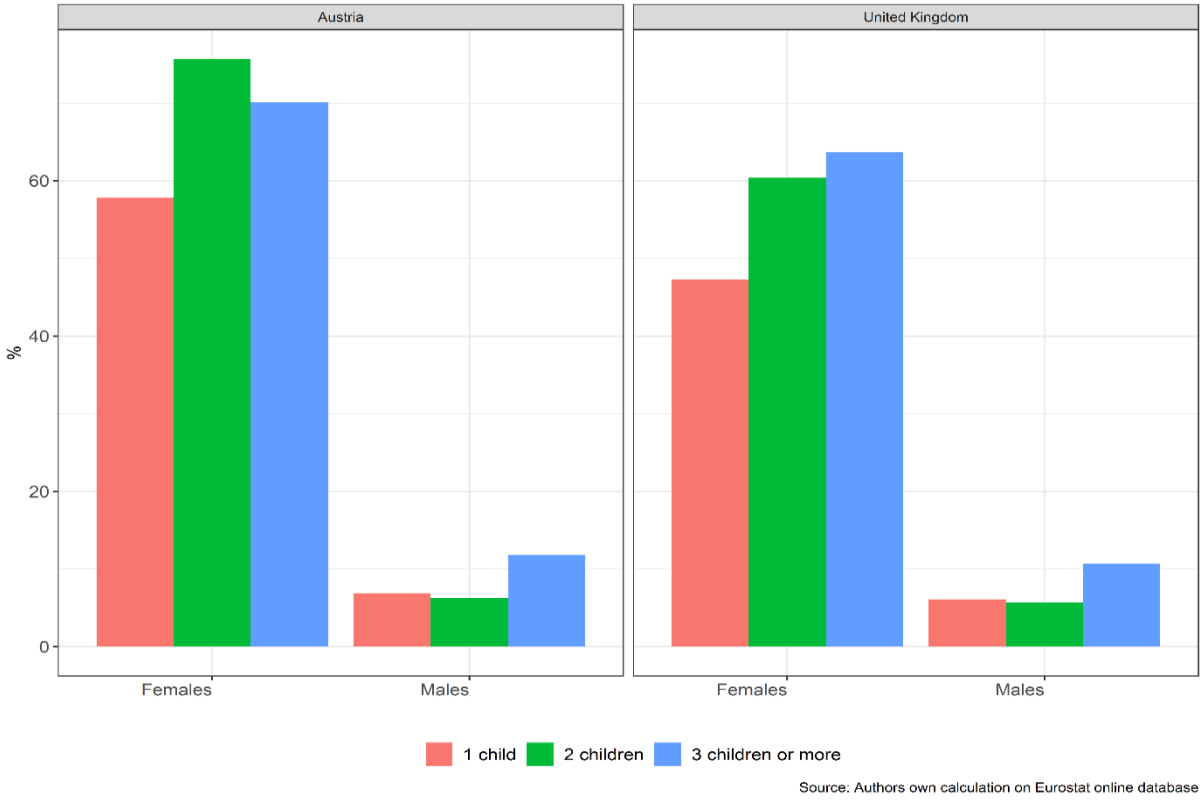
The Statistical Office of the European Union (Eurostat) is the administrative unit of the European Union for the production of official European statistics. Eurostat's main task is the processing and publication of comparable statistical data at European level and thus an important analysis tool for comparative research in Europe (Eurostat, n.d.).

The descriptive analyses focuses on parental employment patterns, the extent of informal and care arrangements, the difference between different types of households and the degrees of urbanization. Furthermore, the reasons for parents that hinder them to use childcare facilities will be analysed.

To analyse the effects of children on parental employment, the first indicator “Percentage of part-time employment of adults by sex and number of children”, is visualized in figure 5 (Eurostat - Data Explorer, 2019f). The graph shows the difference between part-time employment of men and women for the age group 15 to 65 with children under six years. Due to the lack of data, it is not possible to compare both genders with no children to the group with children. Although the comparison between parenthood and no parenthood is not possible, the figure clearly shows that there are major differences between genders in both countries. On average woman with children are more often part- time employed than men. In Austria, 67.87 % of employed women with children are working part-time, while in the United Kingdom it is 57.13 %. The percentage of part time employed males with children is much lower. Among the employed men, 8.30% of employed men with children work part-time in Austria and 7.50% in the United Kingdom.

[2] All indicators were downloaded with the Statitik program R Studio and are publicly accessible on the website: https://ec.europa.eu/eurostat/data/database . The exact source of the indicators is given in the bibliography under "Eurostat Indikators".

Figure 5 Percentage of part-time employment of adults by sex and number of children



Source: Authors own calculation on Eurostat online database

Table 1 Percentage of part-time employment of adults by sex, age groups, number of children and age of youngest child

Country	Gender	Number of children	2005 [%]	2018 [%]	change over time [%]
Austria	Females	1 child	50,3	57,8	7,5
		2 children	63,9	75,7	11,8
		3 children or more	62,6	70,1	7,5
	Males	1 child	3,5	6,9	3,4
		2 children	3,2	6,3	3,1
		3 children or more	6	11,8	5,8
United Kingdom	Females	1 child	54,3	47,3	-7
		2 children	69,3	60,4	-8,9
		3 children or more	67,2	63,7	-3,5
	Males	1 child	4,7	6,1	1,4
		2 children	3,8	5,7	1,9
		3 children or more	7,7	10,7	3

Source: Authors own calculation on Eurostat online database

In order to analyse the change over time, table 1 presents the values for the respective countries, gender and number of children for the years 2005 and 2018. In addition, the change over time was calculated in column change over time [%].

Surprisingly, the number of women with children in part time employment has decreased in Great Britain. Compared to Austria, the female part time employment has increased in all three groups.

Figure 6 and table 2 presents the share of children in formal childcare or education by age group and duration in % of the population in different age groups in Austria and Great Britain for the years 2006, 2013 and 2016 (Eurostat - Data Explorer, 2019b). The indicator measures the weekly duration children spend in formal childcare arrangements for the age groups from zero to less than three years and three years until compulsory school education.

In the age group less than three years (right column of figure 6), the percentage of children in formal childcare arrangements in Austria increased from 2006 to 2016 by 16.5 %. Taking a closer look at the different weekly hours, one can see that the percentage of the group “From 1 to 29 hours a week” increased more than the percentage of the group “30 hours or more a week”.

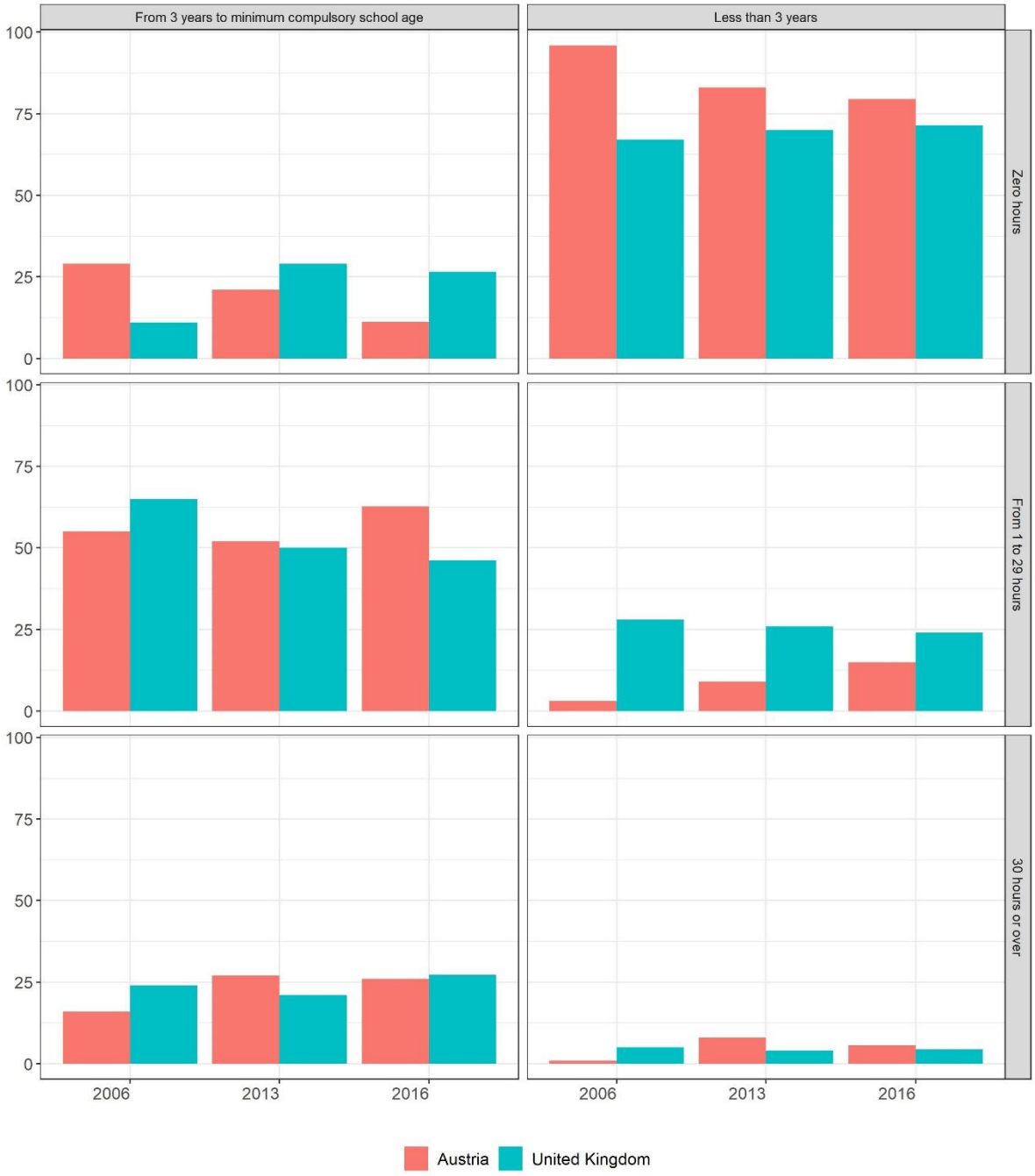
The situation in the United Kingdom is different. The percentage of children less then tree years in formal childcare arrangements decreased from 33 % in 2006 to 28.5 % in 2016. For this age group, this means a 4.5 % decline in care in 10 years.

In the left column of figure 6 the values of the age group three to minimum compulsory school age is visualized. The rate of children cared in this age group increased in Austria by 17,8 % Surprisingly, the group of people with children cared for over 30 hours a week increased more than the time group of 1 to 29 hours a week. Although care time has increased by more than 30 hours, 55 % of children in this age group in Austria are cared for less than 30 hours per week.

The situation in the UK is slightly different. In the UK the care rate of children from three until to the minimum compulsory school age have decreased from 2006 to 2016 by 4.5 %. There are also differences between care periods in this country. In Great Britain, almost half of the children (46%) are cared for less than 30 hours a week.

Compared to the age group zero until less than three years, the percentage of children in formal childcare facilities in the age group from three years until compulsory school age is significantly higher. In Austria, 88.8 % and in United Kingdom 73.4 % were cared in childcare facilities in 2016. For the age group zero to less than three years it was 20.5 % in Austria and 28.5 % in the United Kingdom in 2016. The disparity between the individual age groups is obvious. Furthermore, we can see that Austria has a higher rate of children cared for in the age group three until compulsory school age than the United Kingdom. The opposite is the case in the age group zero to less than three years. In this group, the UK has a higher care rate than Austria.

Figure 6 Children in formal childcare or education by age group and duration - % over the population of each age



Source: Authors' own calculation on Eurostat online database

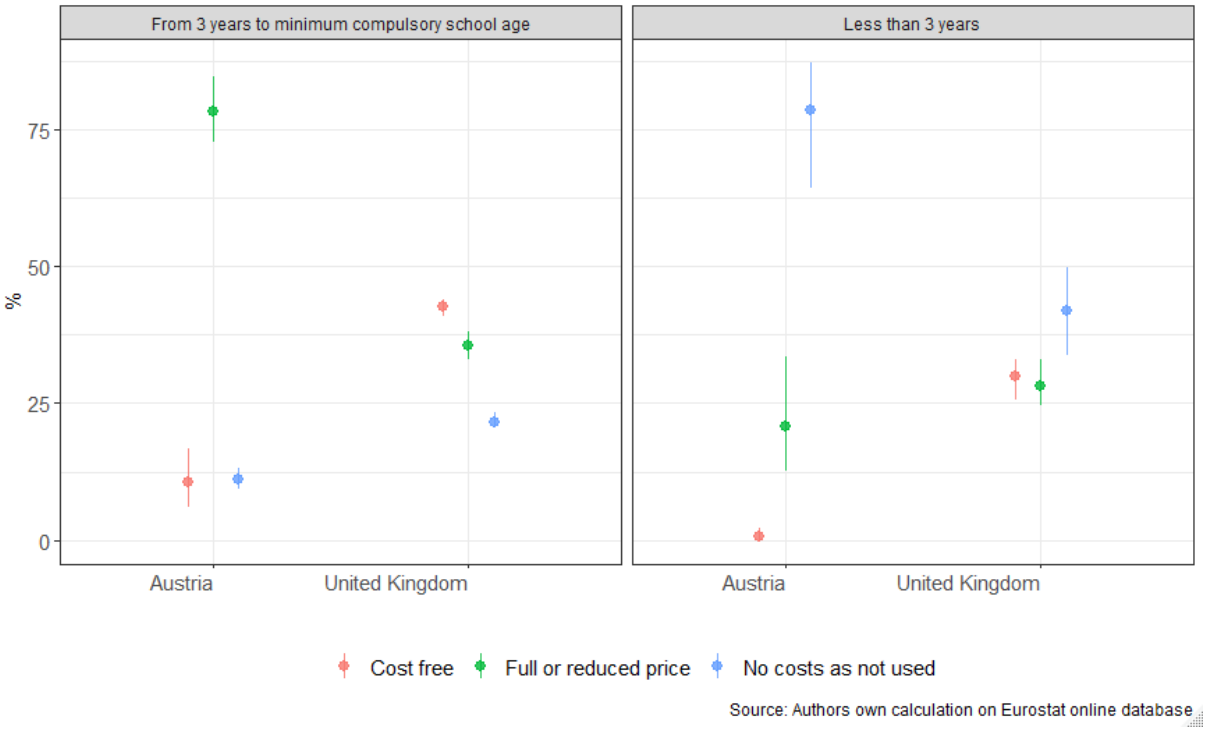
Table 2 Weekly care hours in percentage [%]

		Weekly care hours in percentage [%]					
		Austria			United Kingdom		
	Years	Zero hours	From 1 to 29 hours	30 hours or over	Zero hours	From 1 to 29 hours	30 hours or over
From three years to minimum compulsory school age	2006	29	55	16	11	65	24
	2013	21	52	27	29	50	21
	2016	11,2	62,7	26	26,6	46,2	27,2
Time change [2006 to 216]		***-17,8***	***7,7***	***10***	***15,6***	***-18,8***	***3,2***
Less than three years	2006	96	3	1	67	28	5
	2013	83	9	8	70	26	4
	2016	79,5	15	5,6	71,5	24	4,4
Time change [2006 to 216]		***-16,5***	***12***	***4,6***	***4,5***	***-4***	***-0,6***
	Source: Authors own calculation on Eurostat online database						

In order to analyse the situation of children in formal childcare arrangements on a regional scale, the next indicator represents children receiving formal childcare services by age, income group and degree of urbanization in 2016 (see figure 7) (Eurostat - Data Explorer, 2019c). In order to make the differences between city, suburb and city and rural areas in Austria and Great Britain visible (see figure 7). The left side of figure 7 represents the age group from three to minimum compulsory school age and the right side represents the age group less than three years. The different colours represent the cost of the various childcare arrangements. The length of the lines represents the variation between cities towns and rural areas. A long line means a great variation between the different territories, while a short line means the opposite. For the age group less than three years the variation between different cost arrangements is higher than the variation between cities, towns and rural areas in Austria. On average 78.5 % of the children, less than three years do not visit formal childcare arrangements in Austria. The length of the line indicates that there is a high variation between the different regions. The percentage in cities (63%) is much lower than in towns (83.9%) or rural areas (87.4 %). When comparing the two different cost arrangements, one can see that a higher percentage of parents rely on childcare arrangements with full or reduced price (mean value 20.8 %). Only 0.7

% of children less than three years receive free formal childcare. Compared to the group “cost free”, the group “full or reduced price” shows a higher variation between cities, towns and rural areas. Children in urban areas have a higher care rate than children in towns and rural areas. That means cities in Austria have a higher care rate than towns and rural areas.

Figure 7 Mean Range children receiving formal childcare services by age and degree of urbanization in 2016



In the UK, the patterns are different: figure 7 shows that the variation between various cost arrangements is lower. An average of 42 % does not use childcare for children less than three years. An average of 29.9 % uses free childcare and 28.1 % pay the full or a reduced price. As one can see from the length of the lines, there is less variation between the different regions within UK in comparison to the Austrian regions. Although there is little variation between regions in the UK, it should be emphasised that the care rate in towns and rural areas in formal childcare facilities is higher than in cities.

In the age group from three years to minimum compulsory school age, the care rate in Austria is considerably higher compared to the age group less than three years. On average, 89 % of the children in Austria are in childcare facilities. It is noteworthy in this case that 78.4 % of the parents have to pay the full or a reduced price. Only 10.5 % of childcare in this group is free. Furthermore, there is also little variation between the individual regions. Although cities have a higher childcare rate in Austria, the provision of free childcare is higher in towns (16.8 %) and rural areas (8.8 %) than in cities (6.1 %).

As in the case of the age group less than three years the age group from three until compulsory school age the variation between the different cost arrangements in the UK is significantly lower compared to Austria. In addition, there is little variation between the individual regions. Although the childcare rate is somewhat lower than in Austria, there is evidence that significantly more children in this age group have free childcare. 42.7 % of children in the age group from three years to minimum compulsory school age do not have to pay for their care.

The fourth indicator represents children receiving formal childcare services by household type, degree of urbanization and level of difficulty to afford formal childcare services (Eurostat - Data Explorer, 2019d). Due to the lack of data, it is not possible to distinguish between the different income situations of the various households.

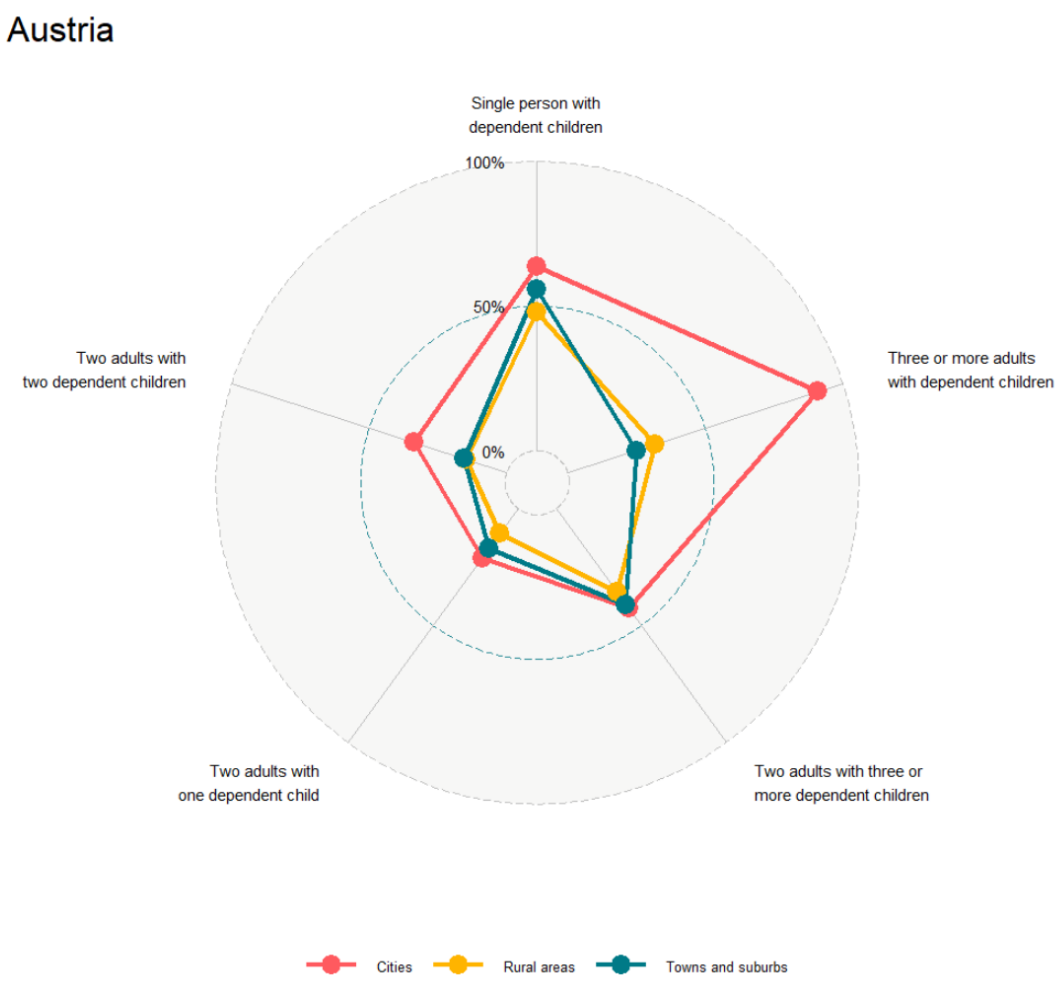
On average, 35.7 % of Austrian parents have difficulties to finance childcare (see table 3 and figure 8). The group most affected are single parents with dependent children, were 55.8 % of single parents have difficulties financing the childcare. The second most frequently affected group are three or more adults with dependent children. Here, 49.13 % of the respondents have problems financing childcare. In the group two adults with three or more dependent children, 39.8 % of the interviewees have problems with financing childcare. Parents with one or two dependent children find it much easier to finance childcare. Here only 21.43 % (two children) and 16.36 % (one child) have problems in financing childcare.

Table 3 and figure 8 show the difficulty to afford formal childcare services by household type and degree of urbanization. It can be seen that families in urban areas have the struggle the most with financing childcare.

Table 3 Children receiving formal childcare services by household type, degree of urbanization and level of difficulty to afford formal childcare services in Austria in 2016

	Cities [%]	Towns and suburbs [%]	Rural areas [%]
Single person with dependent children	63,8	55,7	47,9
Three or more adults with dependent children	90,9	25	31,5
Two adults with one dependent child	21,4	17,1	10,6
Two adults with two dependent children	33,7	15,7	14,9
Two adults with three or more dependent children	42,7	41,2	35,5
Mean Value	50,5	30,94	28,08
Source: Authors own calculation on Eurostat online database			

Figure 8 Children receiving formal childcare services by household type degree of urbanization and level of difficulty to afford formal childcare services in Austria in 2016

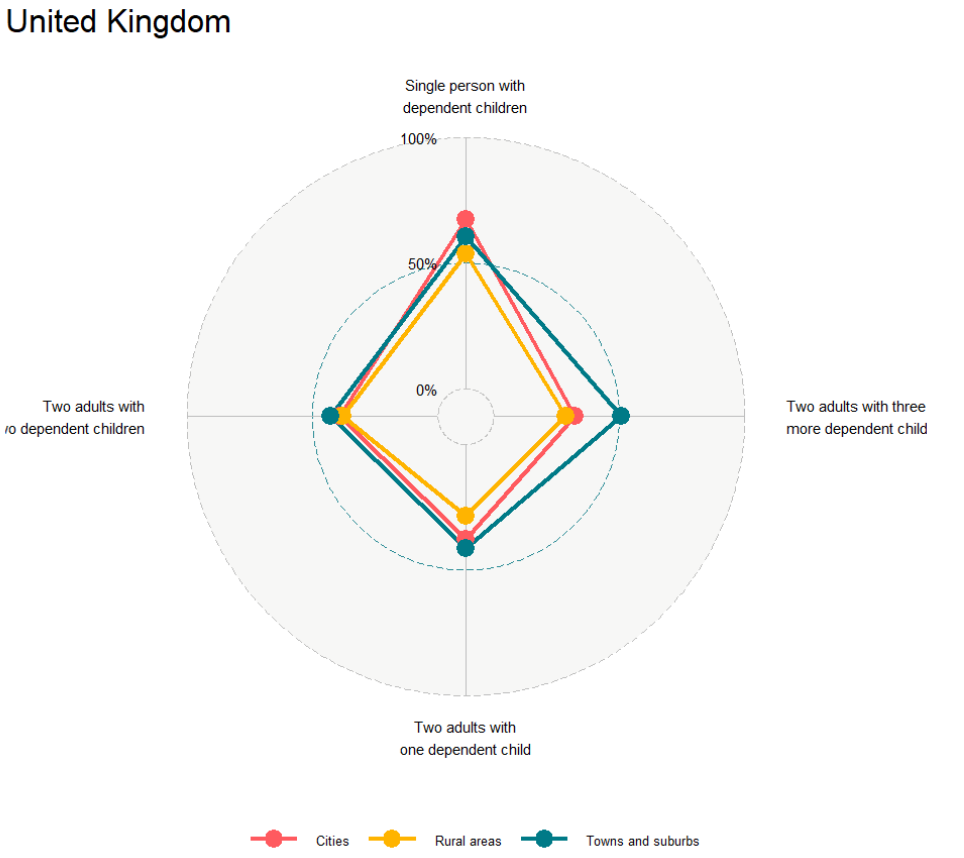


Source: Authors own calculation on Eurostat online

Overall, 50.5% of families with children in cities in Austria have problems financing childcare, whereby the group three or more adults with dependent children and the single parents' dependent children are most affected by it. In contrast, an average of 31% in towns and suburbs and only 28.1 % in rural areas have problems financing childcare.

Overall, almost 70 % of British parents have difficulties paying for childcare. As in Austria, single parents with depending children have the most problems with financing of childcare. 60.53 % of single parents have difficulties in financing. Due to the lack of data, the household with three or more adults with dependent children cannot be included in the analysis for Great Britain.

Figure 9 Children receiving formal childcare services by household type, degree of urbanization and level of difficulty to afford formal childcare services in 2016



Source: Authors own calculation on Eurostat online database

In table 4 and figure 9, the difficulty of providing formal childcare services according to household type and degree of urbanization is presented for Great Britain. In contrast to Austria,

the United Kingdom shows a lower variation between the different regions. Nevertheless, towns and suburbs face the biggest problems. Almost 50 % of families in these regions have problems in financing childcare. In contrast to Austria, there is no great variation between the different regions in Great Britain. However, on average, 48.8 % of families in towns and suburbs find it hard to afford childcare. In the second place are urban areas. Here, 44.3 % of families have problems financing childcare. Families in rural areas have the least difficulties compared to the other regions.

Table 4 Children receiving formal childcare services by household type, degree of urbanization and level of difficulty to afford formal childcare services in the United Kingdom

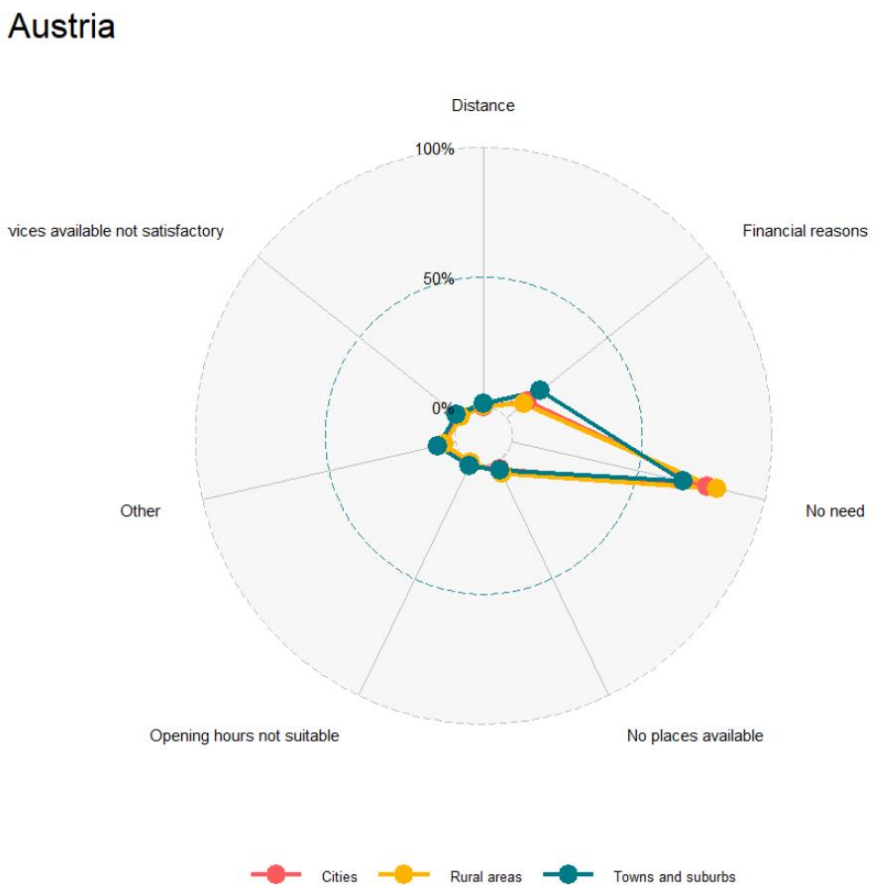
	Cities [%]	Towns and Suburbs [%]	Rural Areas [%]
Single person with dependent children	67,5	60,5	53,6
Two adults with three or more dependent children	32,2	50,6	28,5
Two adults with one dependent child	37,9	41,4	28,6
Two adults with two dependent children	39,3	42,7	38,1
Mean	44,225	48,8	37,2
Source: Authors own calculation on Eurostat			

The last indicator “Children by household type, degree of urbanization and main reason for not meeting needs for formal childcare services” discussed in this chapter presents the main reasons people with children have for not using formal childcare arrangements (Eurostat - Data Explorer, 2019a).

The main reason why families do not put their children in childcare in Austria is because they claim that no childcare is needed. 75% (see figure 10) of people with dependent children say that no childcare is needed. The second most common reason is the cost of childcare. 11.7 % of families say that they cannot use childcare due to financial reasons. The proportion of parents who say that distance is a reason why they do not use childcare services is 6.1 %. As

one can see in graph 1, no territorial difference can be discerned here. Reasons why childcare services are not used are very similar in cities, suburbs and rural areas in Austria.

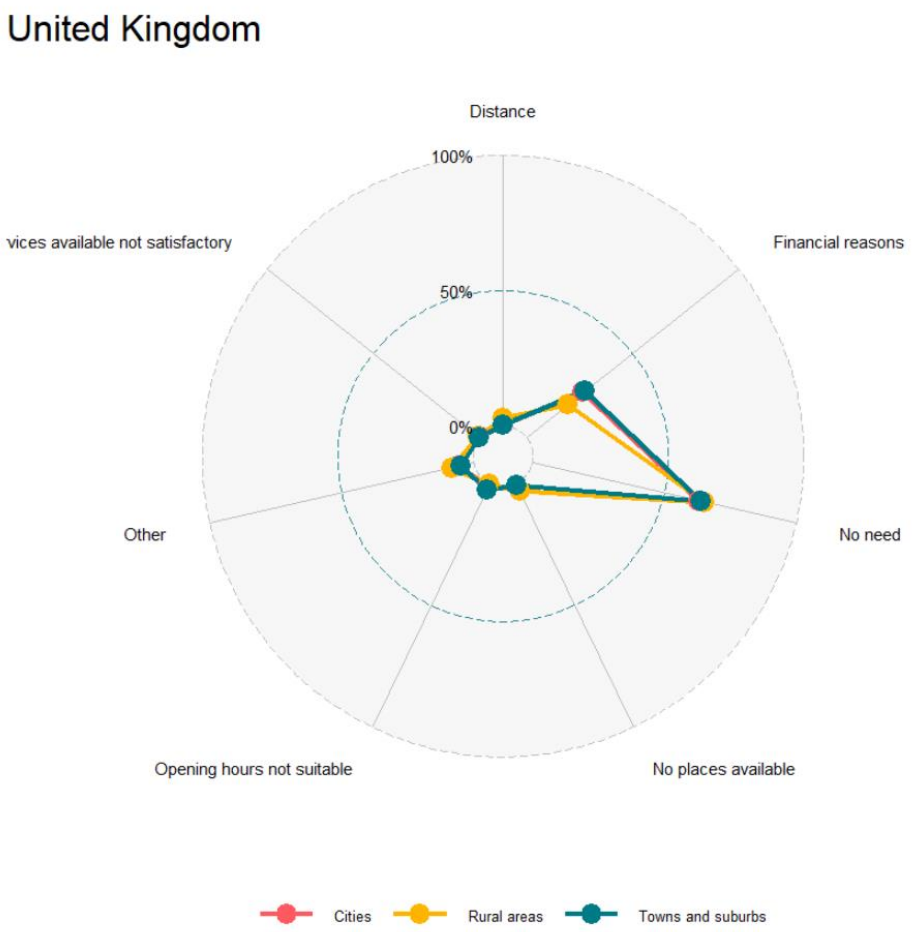
Figure 10 Children by household type, degree of urbanisation and main reason for not meeting needs for formal childcare services in Austria in 2016



Source: Authors own calculation on Eurostat online database

The reasons why parents do not use childcare are similar in the United Kingdom compared to Austria. In the UK, 63.5 % (see figure 11) of parents answer the question of why they do not use childcare because they do not need it. The second most common reason is related to the costs of childcare. 25.9 % of parents say that they cannot use childcare because of financial reasons. Only 0.6 % of parents say that they cannot use childcare because of the distance. As in Austria, there is no big difference between urban, suburbs and rural areas.

Figure 11 Children by household type, degree of urbanisation and main reason for not meeting needs for formal childcare services in the United Kingdom in 2016



Source: Authors own calculation on Eurostat online database

4.1.1 *Summary of descriptive analyses*

In the last part, the most important indicators of ECEC in Austria and Great Britain were presented and analysed on a country level. In the following section, the most important results are summarized.

In terms of part-time employment, there are strong differences between the sexes in Austria and Great Britain. Women (67.87 % in Austria and 57.13 % in the United Kingdom) with children in employment are more often part-time employed, compared to men with children (8.3% in Austria and 7.5% in the United Kingdom). Furthermore, there is a difference between the countries over time. The proportion of women with children in part-time employment has

declined in Austria and increased in Great Britain in the time span from 2005 to 2018. In particular, in the UK the number of women with more than one child in part time employment has increased. In addition, in both countries, women with more than one child are more frequently part time employed than women with one child. If we consider the care rates in the individual age groups, there is a clear difference between children under three years and children from three years to compulsory school age. As already pointed out in the theoretical part, the children in the age group of three years old to compulsory school age show significantly higher care rates as the age group less than three years. This difference can be seen in Austria, as well as in Great Britain. It also shows that the rate of care of children from three years to minimum compulsory school age in Great Britain fell between 2006 and 2016. Thus, in the UK we have a decreasing share of part time employment among women and decreasing rates of childcare rates for children in the age group of three years to minimum compulsory school age.

One reason for this development could be that most parents in Austria and Great Britain are dependent on paid formal childcare. Surprisingly, the proportion of free formal childcare for both age groups is higher in the UK than in Austria. The UK has the highest proportion of free formal childcare in the age group from three to school age. However, more than 50 % of the parents in both age groups have difficulties with the payments for formal childcare. Another important aspect is the variation between urban, suburban and rural regions. Especially in Austria, parents in urban areas have the most difficulties to afford formal childcare. In the last part, the reasons why childcare is not used were examined. It showed that parents who do not use childcare say they do not need it. Furthermore, there is no difference between urban, suburban and rural areas.

4.2 Logistic regression analysis

In order to understand the effects of ECEC policies on the individual circumstances of parents a logistic regression analyses is used. The method allows an investigation of the impact of childcare on parental employment.

In the first part of this chapter, I am going to discuss the used variables in more detail and will present a descriptive overview about the dependent variable and independent variables. In the second and last part of this chapter, I will discuss the various results and test my hypothesis. All calculations were performed with the R Studio program. The syntax, calculations and detailed results of the logistic model can be found in the appendix.

4.2.1 *Descriptive overview of the variables*

The dependent variable in both models is the "Adjusted self – defined current economic status". In order to be able to use the variable for logistic regression, the variable was recoded into a binary variable. In further analyses, a distinction is made between unemployed (0) and employed (1).

4.2.1.1 Dependent variable: Adjusted self – defined current economic status

To get a better overview of the variables, table 5 shows a descriptive overview of the employment status of women and men in Great Britain and Austria.

Table 5 Descriptive summary adjusted self – defined current economic status

		N	Employed [%]	Unemployed [%]	Mean	Standard Deviation	NA´s
Austria	Male (0)	627	92	8	0,93	0,24	8
	Female (1)	691	52	48	0,51	0,5	12
United Kingdom	Male (0)	990	93	7	0,95	0,21	27
	Female (1)	1267	63	37	0,65	0,47	48
Source: Authors own calculation on EU-SILC Data 2016							

4.2.1.2 Independent variables

In order to analyse the impact of care arrangements on parental employment, the weekly informal and formal care arrangements were calculated. The calculations are based on the EU statistics on income and living conditions (EU-SILC) methodology, concepts and contents document (Eurostat, 2017).

In this context, the following variables have been used for the calculation of weekly informal and formal care arrangements:

Weekly Informal Care Arrangements in hours:

- Childcare by a professional child-minder at child's home or at child-minder's home (RL050)
- Childcare by grand-parents, others household members (outside parents), other relatives, friends or neighbours (RL060)

Weekly Formal Care Arrangements in hours:

- Education at pre – school (RL010)
- Education at compulsory school (RL020)
- Childcare at centre – based services (RL030)
- Childcare at day – care centre (RL040)

In the further course of the analysis, the two variables were divided into two groups. The group one represents people without formal or informal childcare (0), the second group represents people with informal or formal childcare (1). Table 6 gives a descriptive overview of the two variables for Great Britain and Austria.

Table 6 Descriptive summary weekly informal and formal care arrangements

		N	Children in care Arrangements [%]	Children in no care arrangements [%]	Mean	Standard Deviation	NA´s
Austria	Formal Care Arrangements	1318	46	54	0,46	0,49	0
	Informal Care Arrangements	1318	72	28	0,71	0,45	0
United Kingdom	Formal Care Arrangements	2257	44	56	0,44	0,49	0
	Informal Care Arrangements	2257	58	42	0,58	0,49	0
Source: Authors own calculation on EU-SILC Data 2016							

The variable degree of urbanisation is used to analyse the impact of territorial circumstances on the effects of childcare on parental employment. As can be seen in table 7, a distinction is made between two degrees of urbanisation (urban (1) and rural (0)).

Table 7 Descriptive summary degree of urbanization.

	N	Urban [%]	Rural [%]	Mean	Standard Deviation	NA´s
Austria	1318	55	44	0,55	0,49	1
United Kingdom	2257	87	12	0,87	0,33	0
Source: Authors own calculation on EU-SILC Data 2016						

In addition to the central variables (childcare) in this analysis, other factors may also influence the dependent variable (employment status). For this reason, it is necessary to test the effect of these possible influences in the statistical model. Therefore, the educational level (see table 8) of the parents and the size of the household (see table 9) are used as control variables.

In particular, according to the Social Investment literature, the education background has fundamental influence on the employment possibilities of people (Morel et al., 2012). The calculations of the two variables are conducted on the basis of the (EU-SILC) methodology, concepts and contents document (Eurostat, 2017).

Table 8 Descriptive summary educational level

	N	High Educated [%]	Medium Educated [%]	Low Educated [%]	Mean	Standard Deviation	NA´s
Austria	1318	42	49	9	2,32	0,638	0
UK	2257	47	31	22	2,28	0,785	36
Source: Authors own calculation on EU-SILC Data 2016							

Table 9 Descriptive summary household size

	N	Min	Max	Mean	Standard Deviation,	NAs
Austria	1318	1	4,4	2,13	0,434	0
UK	2257	1,3	4,8	2,09	0,427	0
Source: Authors own calculation on EU-SILC Data 2016						

4.2.2 *Results of the logistic regression analyses*

To answer the research questions, seven different logistic regression models are calculated. The first model examines the country-specific differences. In the following, territorial and gender differences for Austria and Great Britain will be analysed separately. During the analysis, the variable reason for not meeting needs for formal childcare was added to each model. Since this variable did not cause any change in the model, it was removed in the final version. In addition, the variables were added to the model step by step in a fixed order and the country specific survey weights where used. The tables contain the individual logit of the values. The

probabilities were calculated separately. Whereby, the probabilities can take a value from 0 to 1. A value close to 1 means a high probability and a value close to 0 a very low probability (Backhaus et al., 2016).

4.2.2.1 Model results Austria and Great Britain

In the first stepwise logistic regression model (see table 10), the influence of childcare on parental employment for Great Britain and Austria was jointly analysed. The results of the model can be found in table 10. In the first stage of the analysis, the variable, informal childcare was added to the model. Parents in the United Kingdom and Austria who use informal childcare are 0.62 more likely to be employed than people who do not use informal childcare. This influence is highly significant. However, the R quadrat shows that the variable has a very low explanatory value in the analysis. With the variable informal childcare only 0.73 % of the variance can be explained.

In the second step of the analysis, the variable formal childcare was added. Looking at the effect of the variable formal childcare on parental employment, a positive significant relation emerges. People using formal childcare are 0.73 more likely to be employed than people who are not using formal childcare.

In the third step of the analyses, the sex was added to the model. As can be seen from the change in the R square, the sex has a high explanation for the employment status of parents. Women in the United Kingdom and Austria have a lower possibility to be employed then men.

The education background was added in the fourth stage. The education level of the parents has a highly significant influence on the professional activity. People with a high level of education are more likely to be employed than people with a medium or low level of education. Looking at the R square, this model explains 24 % of the variance. This means that the model has a high explanatory value.

The size of the household was added in a fifth step. This shows a negative correlation, if the household size increases the probability of being employed decreases. However, this influence

is not significant. Looking at the course of the R-square, we can see that the size of the household does not show any increase in the explanatory value.

In the sixth step, the country was included in the analysis. People in the United Kingdom are less likely to be employed than people in Austria. This influence is highly significant.

In the seventh and last step of the analyses, the interaction between the country and the use of informal and formal childcare and their effect on parental employment was analysed. As can be seen, the interaction between informal care and the country is highly significant. People with informal childcare in Austria are more likely to be employed than people in the United Kingdom with no informal childcare. The interaction between formal childcare and the country shows a different picture. People with formal childcare in Austria are less likely to be employed than people in the United Kingdom with no formal childcare. Nevertheless, this influence is not significant.

Table 10 Results of the logistic regression analyses for Austria and the United Kingdom

Steps	I	II	III	IV	V	VI	VII
(Intercept)	0,078***	0,667***	2,339***	3,079***	4,086***	4,081***	4,255***
Informal Care Arrangements							
No Care (Ref.)							
Care	0,427***	1,001***	1,2***	1,222***	1,181***	1,203***	1,226***
Formal Care Arrangements							
No Care (Ref.)							
Care		0,338**	0,391***	0,304*	0,308*	0,363**	0,211
Sex							
male							
female			-2,531***	-2,664***	-2,699***	-2,733***	-2,771***
Educational Level							
High educated (Ref.)							
Middle Educated				-0,787***	-0,755***	-0,699***	-0,723***
Low Educated				-1,462***	-1,371***	-1,397***	-1,423***
Household Size					-0,472***	-0,462***	-0,461***
Country						-0,774***	-1,593***
Interaction							
Informal Care Arrangements: Country							1,314***
Formal Care Arrangements: Country							-0,14
McFadden's R2	0,007	0,043	0,208	0,248	0,254	0,261	0,267

Source: Authors own calculation on EU-SILC Data 2016

Significance Levels: *** p≤ 0,001, ** p≤ 0,01, * p≤ 0,05.

4.2.2.2 Model results for Austria

In the first step of the analysis, the independent dummy variable informal childcare was considered in the model (see table 11). It indicates whether Austrian parents use informal childcare or not. The influence of the variable shows that there is a positive correlation. Parents who use informal childcare are 0.75 more likely to be employed than parents who do not use informal childcare. This influence is highly significant.

The use of formal childcare was added to the model in the second step. The relationship is also positive. Parents who use formal childcare are more likely to be employed than parents without formal childcare. However, the pseudo R square of 6.7 shows that the two forms of childcare have only a low explanatory value for parental employment in Austria.

In the third step of the analyses, the sex was added to the model. As can be seen from the change in the R square, the sex has a high explanation for the employment status of people. Furthermore, we can see that woman in Austria have a lower possibility to be employed then men.

The education of parents was added to the logistic model in the fourth stage. Low qualified parents are less likely to be in employment than high-skilled parents. This influence is of high significance. The difference between people with high and intermediate levels of qualification in terms of employment is smaller than for people with low levels of education. Moreover, the influence is not significant.

In the fifth stage, the variable household size was added to the model. The direction of the influence shows that with increasing household size the probability of employment decreases. The influence of the household size variable is highly significant. Furthermore, the pseudo R square increases by 3 % compared to step four. With the four independent variables in the model, 34 % of the variance can be explained.

In the sixth step of the analysis, the degree of urbanization was added to the model. However, it turns out that the variable has a very low explanatory value. The value of the pseudo R square does not increase any further. However, the probability of being employed in rural areas is higher than in urban areas. Parents in urban areas are 0.97 less likely to be employed than parents in rural areas.

In the seventh stage of the analysis, the interaction between the Sex and the use of informal and formal childcare and their effect on parental employment in Austria was analysed. As can be seen, the interaction between informal care and the gender is significant. It appears that woman with informal childcare are more likely to be employed than men with no informal childcare. In respect to the interaction between formal childcare and the sex, a similar picture emerges. But this interaction is not significant. Woman with formal childcare are more likely to be employed than men without formal childcare

In the eighth and last stage of the analysis, the interaction between degree of urbanisation and the use of informal and formal childcare and their effect on parental employment in Austria was analysed. As can be seen, neither of these interaction effects are significant. However, it appears that parents with informal childcare in urban areas are less likely to be employed than people in rural areas with no informal childcare. In respect to the interaction between formal childcare and the degree of urbanization, a different picture emerges. Parents with formal childcare in urban areas are more likely to be employed than parents in rural areas without informal childcare.

Table 11 Results of the logistic regression analyses for the total size in Austria

Steps	I	II	III	IV	V	VI	VII	VIII
(Intercept)	0,106	-0,21	1,207***	1,562***	3,696***	4,014***	4,379***	3,95
Informal Care Arrangements								
No Care (Ref.)								
Care	1,009 ***	0,95***	1,14***	1,085***	1,166***	1,162***	0,622	1,072***
Formal Care Arrangements								
No Care (Ref.)								
Care		0,859***	1,389***	1,465***	1,686***	1,72***	0.738	1,962***
Gender								
Male								
Female			-2,844***	-2,868***	-3,034***	-3,045***	-4,210**	-3,045***
Educational Level								
High educated (Ref.)								
Middle Educated				-0,326	-0,234	-0,239	-0,283	-0,235***
Low Educated				-1,439***	-1,344***	-1,29***	-1,295***	-1,294***
Household Size					-1,025***	-1,083***	-1,074***	-1,101
Degree of Urbanization						-0,341	-0,354***	-0,123***
Interaction								
Informal Care Arrangements: Sex							1,505**	
Formal Care Arrangements: Sex							0,757	
Interaction								
Informal Care Arrangements: Degree of Urbanization								-0,427
Formal Care Arrangements: Degree of Urbanization								0,1433
McFadden's R2	0,039	0,067	0,287	0,311	0,341	0,344	0,357	0,345
Source: Authors own calculation on EU-SILC Data 2016.						Significance Levels: *** p≤ 0,001, ** p≤ 0,01, * p≤ 0,05		

In order to measure the influence of childcare on fathers' employment, the cases of woman were excluded from the analyses (see table 12). The results of logistic regression only for men show a different outcome compared to the analysis with both sexes.

As shown in table 12, the influence of the variable informal childcare is small in the course of the analysis. Men who use informal childcare are 0.92 more likely to be employed than men who do not use informal childcare. However, the informal childcare variable has no significant impact on the employment status of fathers. In addition, only 0.7 % of the variance can be explained. This suggests that the informal childcare variable has no explanatory value for fathers' employment.

Like the informal childcare variable, the use of formal childcare has a positive impact on paternal employment. The use of formal childcare increases the probability of becoming employed by 0.91. However, this influence is not significant either. In addition, the two childcare variables can explain only 1.7 % of the variance.

In the third step, the variable educational attainment of fathers was included in the analysis. Although the influence is not significant, it shows that men with a low or medium level of education are less likely to be employed than men with a high level of education. Although the value of the pseudo R square has almost doubled, a value of 3.31 means that, the three variable ones together have a low explanatory value for paternal employment.

In the fourth step, the household size was included in the analysis. A negative, highly significant correlation can be seen. If the household size increases, the probability for fathers to take up employment decreases. In addition, the variable household size shows the highest explanatory value in the analysis. The pseudo R square rises to 5.3 %

In the fifth step, the degree of urbanization was included in the analysis. As the value of the pseudo R square shows, the degree of urbanization has no explanatory value for paternal employment. It shows that fathers in urban areas have a 0.75 lower probability of being employed than men in urban areas.

In the sixth and last step of the analyses, the interaction between degree of urbanisation and the use of informal and formal childcare and their effects on father’s employment was analysed. The interaction between informal childcare and the degree of urbanization appears

to lower the chances of fathers with informal childcare in urban areas to be employed in respect to fathers in rural areas without informal childcare. This influence is significant. The values of the interaction between degree of urbanisation and the use of formal childcare show a similar picture. Fathers with formal childcare in urban areas are less likely to be employed than fathers in rural areas without formal childcare.

Table 12 Results of the logistic regression analyses for the men in Austria

Steps	I	II	III	IV	V	VI
(Intercept)	2,028***	1,853***	0,401***	4,477***	0,89***	4,367***
Informal Care Arrangements						
No Care (Ref.)						
Care	0,524	0,466	0,498	0,689	0,739,	1,006
Formal Care Arrangements						
No Care (Ref.)						
Care		0,529	0,517	0,636	0,601	1,932*
Educational Level						
High educated (Ref.)						
Middle Educated			-0,280	-0,309	-0,367	-0,384
Low Educated			-1,023	-1,101	-1,017,	-1,118
Household Size				-1,073**	-1,078**	-1,144**
Degree of Urbanisation						
Interaction					-0,535	-0,643
Informal Care Arrangements: Degree of Urbanisation						-0,638
Formal Care Arrangements: Degree of Urbanisation						-1,85*
McFadden's R2	0,008	0,017	0,031	0,084	0,092	0,117

Significance Levels: *** p≤ 0,001, ** p≤ 0,01, * p≤ 0,05.

Source: Authors own calculation on EU-SILC Data 2016

In the last part of the analysis for Austria, only the influence of the independent variables on the employment status of mothers was examined (see table 13). Women who use informal childcare are 0.60 more likely to be employed than women who do not use it. This influence is highly significant. It can also be seen that the informal childcare variable alone explains 15 % of the variance.

In the second step, the influence of formal childcare on the employment of mothers is considered. The influence of formal childcare on the employment of mothers is also positive. Women whose children are in formal childcare facilities are 0.41 more likely to be employed than women who do not make use of formal childcare. This influence is highly significant. If only the two care variables are considered, the result is an R square of 17 %. This means that 17 % of the variance can be explained by the variables informal and formal childcare. However, it also shows that the variable formal childcare only increases the pseudo R square by 2 %. This implies that a large part of the variance is explained by the informal childcare variable.

In the third step, the educational level of the mothers was included in the analysis. Women with a low educational level are less likely to be employed than women with high educational level. This influence is among others highly significant. Looking at the course of the R square, education has a high explanatory value for maternal employment status. Together with the childcare variables and the education variable, 21 % of the variance can be explained. More precisely, this means that these three variables have a high explanatory value for maternal employment status.

The size of the household was added to the analysis in the fourth step. The influence here is also highly significant. With increasing household size, the probability for mothers to be employed decreases. However, the R square shows that adding this variable does not increase the explanatory value of the model. The declared variance increases from 21 to 24 %

In the fifth step of the analyses, the degree of urbanization was included in the model. As one can see from the change of the R square, the degree of urbanization does not cause any change and has no further explanatory value for the model.

In the sixth and last step of the analysis the interaction between degree of urbanisation and the use of informal and formal childcare and their effect on mother's employment was analysed.

Table 13 Results of the logistic regression analyses for the woman in Austria

Steps	I	II	III	IV	V	VI
(Intercept)	-1,47***	-2,126***	-1,757***	0,087	0,416	0,636
Informal Care Arrangements						
No Care (Ref.)						
Care	1,85***	1,885***	1,986***	2,216***	2,24***	2,069***
Formal Care Arrangements						
No Care (Ref.)						
Care		1,373***	1,306***	1,385***	1,381***	1,141***
Educational Level						
High educated (Ref.)						
Middle Educated			-0,378,	-0,269	-0,257	-0,253
Low Educated			-1,649***	-1,497***	-1,448***	-1,464***
Household Size				-0,975***	-1,055***	-1,047***
Degree of Urbanisation					-0,294	-0,787
Interaction						
Informal Care Arrangements: Degree of Urbanisation						0,383
Formal Care Arrangements: Degree of Urbanisation						0,44
McFadden's R2	0,154	0,174	0,21	0,249	0,245	0,247

Significance Levels: *** p≤ 0,001, ** p≤ 0,01, * p≤ 0,05.

Source: Authors own calculation on EU-SILC Data 2016

The interaction between informal childcare and the degree of urbanization appears to increase the probability of mothers with informal childcare in urban areas to be employed in respect to mothers in rural areas without informal childcare. This influence is not significant. The values of the interaction between degree of urbanisation and the use of formal childcare show that

mothers with formal childcare in urban areas are more likely to be employed compared to mothers in rural areas without formal childcare.

4.2.2.3 Model results for the United Kingdom

In the following part, the results of the logistic regression for the United Kingdom are discussed (see table 14). As in the analysis for the United Kingdom, informal childcare became the first independent variable in the model. Parents who use informal childcare in the UK are 0.81 more likely to be employed than people who do not use informal childcare. This influence is highly significant. However, the R square shows that the variable has a very low explanatory value in the analysis. With the variable informal childcare only 0.5 % of the variance can be explained.

In the second step of the analysis, the variable formal childcare was added. Looking at the effect of the variable formal childcare on parental employment, a positive highly significant relation emerges. People using formal childcare are 0.85 more likely to be employed than people who are not using formal childcare.

In the third step of the analyses, the sex was added to the model. As can be seen from the change in the R square, the sex has a high explanation for the employment status of parents. Woman in the United Kingdom have a lower possibility to be employed then men.

The education background was added in the fourth stage. The education level of the parents has a highly significant influence on the professional activity. People with a high level of education are more likely to be employed than people with a medium or low level of education. Looking at the R square, this model explains 25 % of the variance. This means that the model has a high explanatory value.

The size of the household was added in a fifth step. This shows a negative correlation: if the household size increases the probability of being employed decreases. However, this influence is not significant. Looking at the course of the R-square, one can see that the size of the household does not show any increase in the explanatory value.

In the sixth step, the degree of urbanization was included in the analysis. People in urban areas are less likely to be employed than people in rural areas. However, this influence is not

significant. Similar to the size of the household, the degree of urbanization does not increase the R square. The model with all five variables can explain only 25% of variances.

In the seventh stage of the analysis the interaction between the sex and the use of informal and formal childcare and their effect on parental employment in Great Britain was analysed. As can be seen, the interaction between care and the gender is not significant. It appears that men with informal childcare are more likely to be employed than woman with no informal childcare. In respect to the interaction between formal childcare and the sex, a different picture emerges. Men with formal childcare are less likely to be employed than woman without informal childcare.

In the eighth and last step of the analyses the interaction between degree of urbanisation and the use of informal and formal childcare and their effect on parental employment was analysed. As can be seen, neither of these intergenerational effects are significant. However, it appears that people with informal childcare in urban areas are less likely to be employed than people in rural areas with no informal childcare. The interaction between formal childcare and the degree of urbanization shows a different picture. People with formal childcare in urban areas are more likely to be employed than people in rural areas with no formal childcare.

Table 14 Results of the logistic regression analyses for the total size in the United Kingdom

Steps	I	II	III	IV	V	VI	VII	VIII
(Intercept)	1,077***	0,756***	2,473***	3,28***	4,068***	4,354***	4,380***	4,379***
Informal Care Arrangements								
No Care (Ref.)								
Care	0,384**	0,29*	0,328	0,213	0,206	0,211	0,281	0,559
Formal Care Arrangements								
No Care (Ref.)								
Care		1,041***	1,238***	1,276***	1,234***	1,22***	0,948*	0,773
Gender								
Male								
Female			-2,549***	-2,705***	-2,728***	-2,729***	-2,754***	-2,731***
Educational Level								
High educated (Ref.)								
Middle Educated				-0,824***	-0,801***	-0,799***	-0,800***	-0,8***
Low Educated				-1,522***	-1,448***	-1,445***	-1,449***	-1,436***
Household Size					-0,374*	-0,374*	-0,375*	-0,374*
Degree of Urbanization						-0,315	-0,316	-0,336
Interaction								
Informal Care Arrangements: Gender							0,308	
Formal Care Arrangements: Gender							-0,083	
Interaction								
Informal Care Arrangements: Degree of Urbanization								-0,39
Formal Care Arrangements: Degree of Urbanization								0,506
McFadden's R2	0,006	0,044	0,206	0,25	0,25	0,25	0,255	0,256

Source: Authors own calculation on EU-SILC Data 2016 Significance Levels: *** p≤ 0,001, ** p≤ 0,01, * p≤ 0,05.

The second part of the logistic regression examines the influence of childcare on male employment and the defined control variables for the UK (see table 15). For the influence of the two childcare variables, both care options have a positive impact on male employment. In contrast to formal childcare, the influence of the informal childcare variable is not significant. Men who use formal childcare have a 0.96 higher probability of being employed than men who do not use formal childcare. This influence is highly significant. However, it shows that the two variables can explain only 3 % of the variance. Which indicates a very low to no explanatory value for male employment.

In the third step of the analysis, the level of education of men was considered in the analysis. Men with a low and middle level of education are less likely to be employed than men with a high level of education.

Although the R square has risen from 3 % to 8 %, the variables of childcare and education show a low explanatory value for male employment. The size of the household was included in a fifth analysis step. The R square has only increased by 0.1 %, indicating that this variable has not explanatory value. The same is true for the variable degree of urbanization.

In the sixth and last step of the analyses, the interaction between degree of urbanisation and the use of informal and formal childcare and their effect on paternal employment was analysed. As can be seen, the interaction between degree of urbanisation and the use of formal childcare is highly significant for paternal employment. Fathers with formal childcare in urban areas are less likely to be employed than fathers in rural areas with no formal childcare.

Table 15 Results of the logistic regression analyses for the men in the United Kingdom

Steps	I	II	III	IV	V	VI
(Intercept)	2,766***	2,49***	3,4***	3,706***	4,525***	3,608**
Informal Care Arrangements						
No Care (Ref.)						
Care	0,47	0,38	0,27	0,27	0,29	15,21***
Formal Care Arrangements						
No Care (Ref.)						
Care		1,04**	1,02*	1,01*	0,96*	2,08
Educational Level						
High educated (Ref.)						
Middle Educated			-1,04*	-1,03*	-1,02*	-1,04*
Low Educated			-1,61***	-1,59***	-1,59***	-1,58***
Household Size				-0,14	-0,14	-0,13
Degree of Urbanisation					-0,88	0,04
Interaction						
Informal Care Arrangements: Degree of Urbanisation						-15***
Formal Care Arrangements: Degree of Urbanisation						-1,16
McFadden's R2	0,01	0,03	0,08	0,08	0,09	0,1

Significance Levels: *** p≤ 0,001, ** p≤ 0,01, * p≤ 0,05.

Source: Authors own calculation on EU-SILC Data 2016

In the last part of the analysis, the influence of childcare and control variables on maternal employment was examined (see table 16). Both variables explain 6.97 % of the variance of the dependent variable employment. Childcare alone can explain only a small part of maternal employment. However, there is a positive correlation. Mothers who use formal and informal childcare are more likely to be employed than mothers who do not use childcare.

In step three, the educational level of the mothers was included in the model. The explanatory value for maternal employment has doubled, as can be seen from the R square. The variables

childcare and education explain 12.41 % of the variance. Furthermore, the informal childcare variable has no significant influence on employment status.

The influence of the variable household size has a significant impact on maternal employment. However, the R square of 13 % does not show a large increase in the explanatory value of the model. The probability of being employed decreases with increasing household size.

In the fifth step, the degree of urbanization was taken into account in the analysis, but no increase in the R square nor is a significant influence apparent here.

In the sixth and last step of the analysis, the interaction between degree of urbanisation and the use of informal and formal childcare and their effect on paternal employment was analysed. As can be seen, the interaction between degree of urbanisation and the use of formal childcare is not significant for female employment. Women with formal childcare in urban areas are more likely to be employed than mothers in rural areas without formal childcare.

Table 16 Results of the logistic regression analyses for the woman in the United Kingdom

Steps	I	II	III	IV	V	VI
(Intercept)	0,351***	-0,081***	0,55***	1,436***	1,657***	1,769
Informal Care Arrangements						
No Care (Ref.)						
Care	0,429**	0,32*	0,203	0,195	0,199	0,451
Formal Care Arrangements						
No Care (Ref.)						
Care		1,263***	1,309***	1,264***	1,253***	0,717
Educational Level						
High educated (Ref.)						
Middle Educated			-0,798***	-0,774***	-0,773***	-0,775
Low Educated			-1,525***	-1,437***	-1,433***	-1,424
Household Size				-0,428*	-0,429*	0,427
Degree of Urbanisation					-0,243	-0,363
Interaction						
Informal Care Arrangements: Degree of Urbanisation						-0,289
Formal Care Arrangements: Degree of Urbanisation						0,605
McFadden's R2	0,008	0,07	0,124	0,13	0,131	0,132

Significance Levels: *** p≤ 0,001, ** p≤ 0,01, * p≤ 0,05.

Source: Authors own calculation on EU-SILC Data 2016

4.2.3 *Model summary and hypotheses testing*

In the last part, the results of the seven logistic regression were discussed in detail. In the following part the most important results are presented, and the formulated hypotheses are tested. In both countries, the influence of childcare on women is much more pronounced than on men. The influence of formal and informal childcare on paternal employment is not significant in both countries and shows only minor deviations. However, taking a closer look at the impact on women only, one can see that women with formal or informal childcare are more likely to be employed in both countries than women who do not have childcare. Furthermore, the influences of formal and informal childcare in Austria and formal childcare in Great Britain are highly significant. Thus, the first hypothesis: H1: Childcare has a greater impact on the employment of women than on the employment of men, can be assumed. Childcare has a stronger influence on the employment of women than on the employment of men in the UK and Austria. In addition to childcare, it is also evident that the educational level has a high explanatory value for maternal employment. Highly educated women in Great Britain and Austria are more likely to be employed than low level educated women. The variables education and informal and formal childcare have a high explanatory value for female employment in both countries. This is not the case for the results of the men. The variables defined have only a low explanatory value for paternal employment.

Observing the effects in Austria and Great Britain, it can be seen that childcare in Austria has more explanatory value than in Great Britain. Moreover, the influence of informal childcare is not significant in the UK. As already shown in detail before, the influence of childcare on female employment is significant. Nevertheless, hypothesis 2: The effects of childcare (formal and informal) on parental employment are more pronounced in Great Britain than in Austria, must be rejected.

Neither has the degree of urbanisation a significant influence on the employment status of women and men in Great Britain and Austria, nor does the integration effect show a significant influence in five out of seven models. An exception is the influence on paternal employment in Great Britain. The probability of employment is higher for men with childcare in rural areas than for men in cities without childcare. Due to the different interaction effects of childcare and

degree of urbanization on employment levels in the six models, it is not possible to confirm or reject hypothesis three.

H3: The effect of childcare has a stronger impact in urban areas than in rural areas.

It appears that women with informal childcare in Austria in urban areas are more likely to be employed than mothers in rural areas without informal childcare. The same applies to formal childcare. Observing the interaction effect for paternal employment in Austria, a different picture emerges. The interaction between informal childcare and the degree of urbanization shows that fathers with informal childcare in rural areas are more likely to be employed in comparison to fathers in urban areas without informal childcare. The values of the interaction between degree of urbanisation and the use of formal childcare show similar results. Fathers with formal childcare in rural areas are more likely to be employed than fathers in urban areas without formal childcare. However, these effects are not significant.

The interaction effects for the models in Great Britain shows a similar picture. Women with informal childcare in urban areas are more likely to be employed than mothers in rural areas without informal childcare. The same applies to formal childcare. The interaction effect on paternal employment in Great Britain are different. The interaction effect between informal childcare and the degree of urbanisation shows that fathers are more likely to be employed in informal childcare in rural areas than fathers in urban areas without informal childcare. Moreover, fathers with formal childcare in rural areas are more likely to be employed in comparison to fathers in urban areas without formal childcare. This influence is highly significant. Although in most cases the interaction effects have no significant influence on parental employment, it can be seen that the influence of childcare in combination with parental employment varies greatly between the sexes.

In addition, the control variables of educational attainment and household size show a high explanatory value in the models for female employment. What is surprising here is that the influence of the education variables represents a high positive significant influence for women, but not for men. This is evident for both countries.

4.3 Summary of the quantitative analyses

The empirical part of the present thesis showed the effects of childcare on parental employment in Great Britain and Austria in detail. One of the most important findings is that childcare has a stronger impact on female employment than on male employment. In summary, it can be said that the use of childcare has a positive impact on female employment in the UK and Austria. However, the macro analysis shows that when women with children are employed, they are in most cases in part-time employment. In addition to childcare services, the educational level of mothers plays an important role. Mothers with a high level of education are more likely to be employed than mothers with a low level of education.

Although the interaction effect has no significant influence, the degree of urbanization in interaction with childcare provision has different effects on the employment of women and men. The reason for this result could be first, that in particular rural areas in both regions show an undersupply of childcare facilities. In Austria, in particular the small municipalities have difficulties in financing childcare facilities due to the distribution of competences. Moreover, the descriptive analysis has shown that there is a territorial difference in the funding of childcare. Apart from the direct territorial differences, the coverage rate of childcare institutions in the regions of Great Britain and Austria is very different (Comptroller and Auditor, 2016, Mitterer and Haindl, 2015a). A second reason could be the lack of data at regional level, which did not allow a distinction between the NUTS 2 regions.

In order to understand these regional differences in relation to childcare facilities, the next chapter of the empirical part focuses on the institutional analysis of childcare in Austria and Great Britain. This part will examine the organized, set up and finances of ECEC from an institutional point of view. Furthermore, this part should give information about the way childcare policies in Austria and Great Britain support gender equity. The quantitative analysis has shown that childcare has a very strong influence on maternal employment. To understand these gender-specific differences, it is necessary to show how childcare policies support gender equity enable female employment (Saraceno and Keck, 2011).

4.4 Institutional analyses of ECEC in Austria and Great Britain

The quantitative part of the present thesis analysed the effects of childcare on parental employment in Great Britain and Austria. The analyses showed that the use of childcare has a positive impact on female employment in the UK and Austria. However, when a mother is employed, she is mostly in a part time employment. Thus, it can be said that childcare has a positive effect on the employment of women, but considering the type of employment, female employment shows atypical patterns compared to men.

First of all, for the territorial differences, the logistic regression shows that the interaction effect has no significant influence but the degree of urbanization in interaction with childcare provision has different effects on the employment of women and men. Secondly, the macro analysis has shown that there is a territorial difference in the funding of childcare. Apart from the territorial differences investigated in the quantitative analysis, the coverage rate of childcare institutions in the regions of Great Britain (Comptroller and Auditor, 2016) and Austria (Mitterer and Haindl, 2015a) is considerably different. As can also be seen in the subsequent institutional analysis, the small municipalities in Austria in particular have difficulties in financing childcare (Mitterer and Haindl, 2015a). The aim of the following institutional analysis is to identify and explain the territorial differences of impact of childcare policies on the employment patterns of parents.

In order to understand different territorial, but also country-specific differences, it is necessary that the organizing, set up and financing of ECEC in Austria and Great Britain is taken into account (van Belle, 2016). What is to be understood by organizing, set up and funding of ECEC has already been discussed in detail in the theoretical part of the thesis. The following part will briefly summarize the most important points.

The provision and organization of ECEC describes the different opening hours, access age and compensation of parents (van Belle, 2016). Furthermore, the role of private and public providers is also highlighted under the organization of ECEC (Mills et al., 2014).

The set up of ECEC defines if a country operates a divided or uniform system and whether it is a domestic or centre based care system (European Commission, 2014). In more detail, it should

be analysed whether the responsible institutions vary between these different age groups (van Belle, 2016).

ECEC funding defines the extent to which childcare is available and effective for all children. Based on the funding of ECEC, the costs for childcare institution will be analysed (van Belle, 2016).

In the next and last part of the empirical analysis, the ECEC systems in Austria and England will be examined in more detail and afterwards it will be analysed how the organization, set-up and funding of ECEC could affect territorial differences. The reason why the focus in the following analysis is on ECEC policies in England is that ECEC policies are differing between England, Scotland, Wales and North Ireland (Campbell-Barr and Nygård, 2014). In Austria, the ECEC policies also differ between the individual federal states. Due to the federal structure in Austria, the federal states are responsible for the organization of childcare. More precisely, the Austrian childcare system is characterized by decentralized governance structures (Blum, 2015). This means that the legislative competence lies at the level of the federal states, while the actual funding takes place at the level of the cities and municipalities (Blum, 2015). For this reason, the institutional analysis focuses on the Austrian multi-level governance of ECEC and analyses the institutional conditions of ECEC in Vienna and Lower Austria in detail.

4.4.1 *ECEC in the United Kingdom*

In the late 1990s England started to fund and promote ECEC via the market. Before that time there was just little interest in encouraging ECEC. The British government, a classical male breadwinner model, regarded childcare as parental responsibility (Campbell-Barr and Nygård, 2014).

However, with the introduction of the Childcare Act in 1994 the situation changed. Through the Childcare Act the British government started to support parents with cost of childcare (Campbell-Barr and Nygård, 2014; Evers et al., 2005). Furthermore, the National Child Care Strategy (DfEE quoted in Campbell-Barr and Nygård, 2014: 353), which was introduced by the New Labour Party (HM Treasury quoted in Campbell-Barr and Nygård, 2014: 351) significantly

changed the situation in the UK (Campbell-Barr and Garnham quoted in Campbell-Barr and Nygård, 2014; Evers et al., 2005).

The focus of the strategies was to improve the quality, affordability and accessibility of childcare services in the UK, with some differences between England, Scotland, Wales and North Ireland. There where clear movements to combine the historically differentiation between care and education (Campbell-Barr and Nygård, 2014: 347). Until the year 2004 care and education was regulated within two different systems. In 2004, the English government integrated all childcare services to the education sector of the Department for Education (Roberts-Holmes, 2013). This happened because of the "Every Child Matters Agenda" (Great Britain and Treasury, 2003) and the "Childcare Act" (Parliament of the United Kingdom, 2006). In order to combat social exclusion, the British government has sought to expand ECEC facilities, particularly in disadvantaged regions (Campbell-Barr and Nygård, 2014). Through more and better childcare provision, children in poor areas would be given a better start into life because of early learning and on the other side improving their material circumstances by allowing the mothers, in particular the single mothers, to go into employment. During this period, there was a clear overlap between British policy developments and European efforts to improve ECEC in the European member states (Campbell-Barr and Nygård, 2014: 349).

Another reason why the expansion of ECEC was driven forward was the belief that ECEC is more efficient than parental leave (Evers et al., 2005). To ensure and create sufficient supply of "ECEC places, the government relied on a mixed economy approach that favoured the private sector" (Penn qutoted in Campbell-Barr and Nygård, 2014: 353). This approach reflects the neoliberal market philosophy of welfare provision in England (Penn, 2012: 61).

The "Child Care Act" in particular enshrines this market approach in 2006. This act states that the maintained sector (maintained facilities are provided by the local authorities) should only be used when the private sector is no longer able to provide adequate childcare services (Campbell-Barr and Nygård, 2014: 353). The provision of care through the private market means that the provider is neither a family nor a public body (Brown-Lyons et al., 2001). Recent data shows that the market is the main provider of ECEC in England (McLean, 2014).

Since 2010, there have been 15 hours per week (term only), free childcare for three and four year-old children and for children from disadvantaged households (Campbell-Barr and Nygård,

2014: 353). Referring to the Department of Education (2013), in 2012 almost 60 % of three and four year-olds received some publicly funded ECEC through the state education sector.

The provision of free ECEC is separated into three different categories. To receive free childcare for two year-old children parents must receive income support and fulfil certain criteria. The free entitlement of ECEC in the UK started in 2004 with 12 and a half hours per week and was raised to 15 hours per week in 2010 (term only) (Comptroller and Auditor, 2016). In 2017, the British government raised the free entitlement from 15 to 30 hours a week (Butler and Hardy, 2016: 10) for 38 weeks a year (Comptroller and Auditor, 2016). However, the 30 hours entitlement is not universal like the 15 hours. The 30 hours free, ECEC is for children with working parents only (Butler and Hardy, 2016). The parents are able to choose between the different facilities and amount of hours they want to use.

In order to offer free childcare entitlement, providers have to register at the Office for Standards in Education, Children's Services and Skills (Ofsted). Ofsted is a non-ministerial department that monitors childcare facilities. The task of this organisation is to control whether the registered institutions offer high quality education and care (Comptroller and Auditor, 2016; McLean, 2014). For non-state providers of ECEC the Ofsted holds the Early Years Register. The institutions must meet certain legal requirements in order to be able to operate. Although local authorities are involved in the whole decision-making process, the liberal preference of decentralization is present in the UK (McLean, 2014).

The literature research on the ECEC in England showed that in addition to increasing the number of ECEC facilities, the idea of improving the quality of existing ECEC providers is also dominant. Subsequent policies clearly reflect these ideas.

Nevertheless, the definition of quality of ECEC is a complex concept. The report on “Driving high quality childcare: the role of authorities” (Butler and Hardy, 2016: 10), states out that quality concept of the British Government is not a mature concept. The report concludes that the government has to explicitly articulate the quality aims in order to ensure better ECEC provision. In order to analyse qualitative ECEC provision the researchers used two approaches First childcare “must ensure that children are safe, well and have positive experiences” (Butler and Hardy, 2016: 10).

Secondly, the report states that ECEC institutions must ensure high quality care and good development outcomes for children (Butler and Hardy, 2016: 10). In order to enable this, ECEC providers must assure "well-trained, experienced staff able to identify and respond to children's needs and work in partnership with parents; a good social mix of children; and strong links with early intervention services" (Butler and Hardy, 2016: 10). The report on "Entitlement to free early education and childcare" (2016), emphazises that ECEC should ensure children's development.

The provision of ECEC in England happens through private voluntary and public providers (PVI) (Butler and Hardy, 2016: 10) and maintained providers (Comptroller and Auditor, 2016). Facilities which where run by local providers are called maintained setting (Comptroller and Auditor, 2016). Next to different kinds of ownership, providers can be divided into five different groups (Department of Education, 2016). Furthermore, the ownerships differ PVI and maintained providers (Butler and Hardy, 2016: 10).

The free entitlement can be taken in various childcare facilities (Comptroller and Auditor, 2016). In summary, the free provision of ECEC was separated into three categories until 2017. First, 15 hours provision for disadvantaged two years old if parents fulfil certain criteria. Second a universal 15 hours entitlement for all three and four years-old. Third an "Early Years Premium" for three and four years-old which was introduced in 2014. The aim was to "Improve the quality of education for disadvantaged pupils and encourage the best providers to expand into disadvantaged areas. Give additional funding to providers that take disadvantaged children" (Comptroller and Auditor, 2016: 14).

"There are approximately 105,000 childcare providers in England" (Comptroller and Auditor, 2016: 5). Research shows that ownership of providers between local areas differ (Evers et al., 2005). In addition, childcare facilities are unevenly distributed across regions. Nursery classes are strongly represented in poorer areas with low parental employment. In regions with a higher share of parental employment, there is a high share of private and voluntary providers (Brind et al., 2013). These different patterns create two pathways for children through provision of early year's childcare: "children living in less affluent areas are more likely to access free early education in a school nursery class, whilst children with working parents are more likely to

access care in a PVI setting and then transfer to a school-based reception class at age four" (Butler and Hardy, 2016: 10).

Furthermore, it seems that PVI providers in "less affluent areas tend to be lower quality and fewer than half offer graduate-led care" (Butler and Hardy, 2016: 11). Hence, it is more likely that children attending these facilities in less prosperous areas will be more likely to find inferior childcare facilities (Pascal and Bertram, 2013).

The ECEC public funding in England contains aspects of supply and demand side public funding. However, the British system relies heavily on supply side funding (McLean, 2014). There are several initiatives, which provide direct funding to registered providers of ECEC. The motivation of the supply side funding is to increase the use of early education and care services (McLean, 2014). An example for a supply side funding is the "Early Years Entitlement", a universal entitlement for part-time nursery education. The subsidies are delivered to any public or private providers (McLean, 2014). In England local authorities deliver the funding received from central government to individual providers. Furthermore, local authorities have the statutory duty to 'manage the market' by monitoring local ECEC provision and ensuring that there are sufficient places (DCSF, 2016). The funding of ECEC through local authorities happens through a locally designed early years funding formula (Butler and Hardy, 2016).

The demand side subsidies such as the childcare tax credit are mean tested and include minimum requirements of work in a given time. For example, the "Working Tax Credit", which required at least 16 hours work per week, has been removed with the introduction of "Universal Credit" in October 2013 (Department of Work and Pensions quoted in McLean, 2014: 131). In terms of financing, the British state is more an active state rather than a pure liberal welfare state (Arts and Gelissen quoted in McLean, 2014: 130). The proportion of public expenditure on ECEC is much higher in comparison to other liberal welfare states like the USA (McLean, 2014). The paper of McLean showed that the complex institutional arrangements within and among welfare states cannot simply be explained by the welfare regime approach. A more detailed analysis is necessary. McLean emphasizes that the comparative literature would benefit from a better understanding of institutional variation across all three dimensions of the mixed economy: provision, finance and regulation (McLean, 2014: 131). In her opinion, the difference of regulatory frameworks and institutional contexts are the key source to

understand the difference among countries. The difference how the market provision is financed and regulated can affect the availability affordability of ECEC, which influences the children's development and parent's labour force participation (McLean, 2014: 131).

The role of local authorities in England has changed tremendously over the last 30 years. Local authorities in the UK where historically responsible for social car services, but where financed through user fees and the central government (Evers et al., 2005). The OECD Country Note states out that local authorities were the main provider of public services (OECD, 2000). Because of the New Labour Party and its neo liberal policies; ECEC policies where now mostly provided through the market system (McLean, 2014; Evers et al., 2005). In 1990, 24 % of the nursery places were provided by local authorities. By 2004, the share has dropped to 6 % (Evers et al., 2005). The National Strategy Paper which was introduced under New Labour in 1998 had the intention to improve the quality of childcare through decentralization. In particular it shifted the "regulatory responsibility for formal childcare from local authorities to a national regulator, Ofsted" (Butler and Hardy, 2016: 12). However, the local authorities maintained the mandate to ensure and improve the quality of local childcare. Further strategy papers in 2002 and 2004 have strengthened this role (Department for Education and Skills quoted in Butler and Hardy, 2016: 12). The duties of local authorities are defined as follows (Butler and Hardy, 2016: 12):

- "reducing inequalities between young securing provision of free childcare for eligible children (section 7);
- assessing childcare provision in their areas, and ensuring that there is enough childcare locally to enable parents to work, or to enable them to undertake training which could be expected to lead to work (sections 6 and 12); and
- securing the provision of information, advice and training for childcare providers, and prospective providers, in order to promote high quality early education (section 13). Local authorities may charge a reasonable fee for these services. "

To assist local authorities with the implementation, the British Government has created a strategic framework for local authorities. This strategic framework is designed to help local authorities support providers in their beginning (Butler and Hardy, 2016). Cooperation with all

childcare facilities is an essential part of these regulations. This should guarantee that only childcare facilities with a good Ofsted rating are supported (Butler and Hardy, 2016).

The main means of local authorities to ensure and influence the quality of ECEC providers happens through funding arrangements. The funding happens through the “Early Years Single Funding Formula” (EYSFF) which was introduced in 2011 (Butler and Hardy, 2016: 12). The Department of Education emphasises that the EYSFF will establish a transparent procedure for determining the funding unit per child (Butler and Hardy, 2016: 12-13).

The funding unit is: “adapted and applied by each individual local authority to fund the entitlement to free childcare” (Children, Schools and Families Committee quoted in Butler and Hardy, 2016: 13). Because of the fragmented ECEC market with a number of different providers with different service types, which require different kinds of funding, the funding through the EYSFF is a complex matter (Butler and Hardy, 2016: 13). The formula aimed “to create greater consistency and fairness in the approach local authorities used to fund free childcare” (Butler and Hardy, 2016: 13) In order to make the calculations, the local authorities have to collect costs from the providers (Butler and Hardy, 2016: 13).

The report "Driving High Quality Childcare: the role of local authorities" (Butler and Hardy, 2016) shows that, in practice, local authorities provide funds to providers who offer free childcare according to a locally defined formula in the first few years. Under the law, local authorities must set a uniform hours-based price for providers (which may vary from provider to provider) and a withdrawal surcharge (Butler and Hardy, 2016: 13).

Although the report „Driving High Quality Childcare” states out that the EYSFF should create fairness in funding ECEC providers, the report Department on Education funding differs between local authorities (Great Britain and National Audit Office, 2015).

Besides the EYSFF there are other ways to finance ECEC providers (Butler and Hardy, 2016: 14). ECEC providers may receive funding because the employ graduate staff. This funding happens through the Dedicated School Grant (DGS) or the general local authority funding (Butler and Hardy, 2016: 14).

Like already, mentioned: “Local authorities are responsible for ensuring sufficient places for the funded hours and allocating money to providers” (Comptroller and Auditor, 2016: 5).

Furthermore, they have the legal duty to advice and support providers with low Ofsted ratings (Butler and Hardy, 2016: 38). In 2015-16, the Ministry of Education spent £2.7 million on local authorities to help them provide childcare (Comptroller and Auditor, 2016). Although local authorities have the legal duty to ensure qualitative ECEC in their region they are confronted with growing challenges in supporting high quality care in recent years. On the one hand, the funding of the British Government for childcare has decreased in recent years. One the other hand, local governments are confronted with budget cuts, which affect the flexibility to invest in local services (Butler and Hardy, 2016: 38). This makes it difficult to ensure qualitative ECEC provision. Furthermore, there is no evidence how funding should ensure the quality of ECEC providers (Butler and Hardy, 2016: 38).

4.4.2 *ECEC in Austria*

Due to the federal structure in Austria, the organization of childcare is the responsibility of the individual federal states. That means that the minimum age, group size, care key, parental contributions, parental work, equipment, personnel qualification, training and preparation times as well as personnel remuneration differ in the 9 federal states (Baierl and Kaindl, 2011)

More precisely, the Austrian childcare system is characterized by a decentralized governance structure. That means that the legislative competence lies at the level of the federal states, while the actual funding takes place at the level of the cities and municipalities (Blum, 2015). Due to this complexity, only the country-specific regulations in Vienna and Lower Austria can be described.

Although childcare is organized on a federal basis, a distinction can be made between two age groups from zero to three years and three years up to compulsory schooling (six years). Furthermore, there are four different care institutions. Although the names differ between the federal states we can distinguish between the following institutions (Baierl and Kaindl, 2011):

a) Crèches

Crèches are institutions in which only children up to the age of three are cared for. In Lower Austria they are called "Krabbelstuben" and in Vienna "Kleinkinderkrippe”.

b) Kindergarten

Kindergartens exist in all nine federal states and are intended for children from the age of three until they start school. An exception is Lower Austria, where admission is possible from two and a half years of age.

c) Age-extended groups

Age-extended groups are facilities in which children are cared for age spanning and exist in all nine federal states. In Lower Austria, age-extended groups are classified as day-care or childcare facilities, analogous to groups with children under three. In Vienna, on the other hand, age-extended groups are referred to as family groups and are managed separately for up to six year-olds and zero to three year-olds.

d) Children's groups

Children's groups are groups organized by parents and administered as associations. In principle, children up to the age of 16 can be looked after in these institutions. In Lower Austria children groups are classified under day care facilities.

In addition to different forms of care, there is a multitude of different public and private providers. The role and number of providers vary greatly between the federal states and municipalities (Blum, 2015).

4.4.2.1 Legal framework of ECEC in Vienna and Lower Austria

a) ECEC policies in Vienna

The legal framework of ECEC differs from federal state to federal state (Baierl and Kaindl, 2011). In the next part, the legal framework conditions in the two provinces of Vienna and Lower Austria will be discussed in more detail. In Vienna, the different childcare institutions are regulated through the Daily Care Regulation "Tagesbetreuungsverordnung" and the Vienna Kindergarten Act "Wiener Kindergartengesetz" (Baierl and Kaindl, 2011). The Daily Care Regulation, defines the crèches and extended age groups in Vienna (LGBl. Nr. 40/2016, 2016):

- Training courses for childminders
- Requirements for admission to training courses for childcare workers, childminders
- Areas of training and hours of care
- Requirements for the qualifications of the childminders
- Completion of the training courses for childminder
- Requirements for the premises
- Maximum number of children cared for

The Vienna Kindergarten Act regulates, next to the organizational and legal requirements in contrast to daily care regulation, the tasks of a kindergarten. According to the Act, kindergartens in Vienna have the task, in addition to the family, of promoting the development of the overall personality of each child and his or her ability to live in the community. A kindergarten should support the child in the development of its physical and mental powers, according to the secured knowledge and methods of pedagogy (LGBl. Nr. 35/2019, 2019).

Furthermore, the focus should be on the joint education and care of children from different cultural and social backgrounds as well as their individual physical and mental characteristics. Kindergartens should accompany the children on their way to a self-determined and self-responsible life in the community through a democratic style of leadership independent of gender-dependent role fixations. It is also stated that these institutions should make it possible for men and women to reconcile work and family life (LGBl. Nr. 35/2019, 2019).

b) ECEC policies in Lower Austria

In contrast, in Lower Austria, kindergartens are regulated by the Kindergarten Act "Kindergartengesetz", age-extended groups and children's groups are regulated by the Day Care Regulation "Tagesbetreuungsverordnungsgesetz".

The Kindergarten Act of Lower Austria regulates the task of private and public kindergartens the cost in addition to the general legal framework. A public kindergarten is defined by the fact that it will be run by a municipality. Furthermore, kindergarten (private and public) attendance is free of charge for children from Monday to Friday from 7.00 am to 1.00 pm. Costs incurred after this period are not defined by law. In addition, the province of Lower Austria can support private kindergartens with a minimum size of 12 children (LGBl. Nr. 44/2019, 2019).

The tasks of a kindergarten in Lower Austria are defined by six points (LGBl. Nr. 44/2019, 2019):

1. The kindergarten has the task of supporting and supplementing the family education of the children. In particular, the law emphasizes the physical, mental and spiritual development of the children. Kindergarten education should make a fundamental contribution to religious and ethical education in order to support the achievement of school readiness.
2. The children are to be supported according to proven scientific methods.
3. In order to ensure the best possible development, children in kindergartens are forbidden to wear ideological or religious clothing associated with the concealment of the head.
4. The kindergarten teacher must proceed methodically and systematically in the educational work.
5. The kindergarten staff must cooperate with the public youth welfare institutions.
6. The legal guardians must be regularly involved in the performance of the kindergarten's tasks.

The Day Care Regulation defines the legal framework conditions for the operation of age-extended groups, but no costs or subsidies are defined in this law (LGBl. 5065/2-0, 2015).

4.4.2.2 Multilevel Governance of ECEC in Austria

Although ECEC is the competence of the federal states, Article 15a of the Austrian Federal Constitutional Law allows agreements to be reached between the federal government and the states (Baierl and Kaindl, 2011). More specifically, Article 15a allows the federal government and the federal states, to conclude agreements on matters within their sphere of competence (BGBl. Nr. 1/1930, 2004). The first 15a agreements in connection with childcare were concluded in 2008 and 2009. The first agreement had the purpose of expanding the institutional childcare offer and introducing compulsory early language support in institutional childcare facilities and creating a nationwide pre-school education plan (1.1.2008). The second agreement was aimed at introducing half-day free and compulsory childcare (1.9.2009) (Baierl and Kaindl, 2011).

The aim of the first 15 agreement was to provide day care for 33 % of children under three years of age. This objective was in line with the Barcelona objectives of the European Union. The agreement pursues the joint aim of the federal and state governments to increase the childcare rate for children under three years of age in order to achieve full parental employment (LGBl. Nr. 06/2009, 2008). Secondly, children with a lack of German skills should be supported by institutional childcare facilities in such a way that, that they are able to speak German as the language of instruction according to uniform German standards when they enter the first grade of primary school (LGBl. Nr. 06/2009, 2008). On the basis of the formulated objectives, the concrete measures and the budget of the federal government were determined in the further course of the agreement. From 2008 to 2010, 15 million euros a year were made available by the federal government to the federal states for the expansion of institutional childcare and 5 million euros for language promotion measures. The defined budget was distributed on a percentage basis (LGBl. Nr. 06/2009, 2008).

The second 15a regulation, passed on 1 September 2009, aimed to provide all children with the best educational opportunities and a chance to start their careers, regardless of their socio-economic background. For this reason, children in the last year before compulsory schooling should be required to attend suitable institutional childcare facilities of at least 16 to 20 hours on at least four days a week. In addition, half-day visits of 20 hours per week to suitable institutional childcare facilities in the last year before compulsory schooling are to be free of charge in order to further reduce the burden on families. Furthermore, the educational tasks

of childcare facilities, the extent of the obligation to attend and the funding by the federal government were defined. In the agreement, the federal government provided grants of 70 million euros each to cover part of the costs incurred by the Länder, local authorities and the maintaining bodies for the kindergarten years 2009 to 2015. The amount will be divided according to the proportion of five year-old children per federal state who are required to attend kindergarten (BGBl. I Nr. 99/2009, 2009).

Due to the various 15 a agreements it came to a strong expansion of childcare facilities in the last few years. The total number of children in care has increased from by 17 % 2007 to 2015. The Barcelona target (90 %) for this age group of three to five year-olds was thus achieved. Nevertheless, the 23 % rate of children in the age group zero to three years was not reached. However, due to the strong responsibility of the municipalities, the expenditure of the municipalities increased by 70 % (Mitterer, 2015). Although there were various funding arrangements by the federal government and the federal states, the main costs of childcare expansion were covered by the individual municipalities (Mitterer and Haindl, 2015a).

The financial links in Austria between municipalities, federal state and the federal government are regulated by the Financial Equalisation Act "Finanzausgleichsgesetz 2017" (Mitterer and Haindl, 2015a). Financial equalization can be understood as the allocation of public tasks, expenditure and income to the various local authorities in the state structure (Zimmermann et al., 2017). Based on this law, municipalities are obliged to provide childcare facilities on the basis of their budget. The exact distribution of costs varies between the federal states, but the individual municipalities cover a large part of the costs for childcare facilities (Bauer et al., 2017).

Although childcare in Austria has been expanded in recent years, there are large regional disparities in the coverage of childcare facilities. Due to the increasing regional disparities in Austria, we find different framework conditions for childcare provision. With the size of the municipality, the number of childcare facilities increases significantly. In addition, there is a backlog demand for childcare facilities, especially in rural areas (Mitterer and Haindl, 2015a).

In order to compensate for these regional differences in childcare, various experts in this field are proposing a task-oriented financial equalization system (Mitterer and Haindl, 2015a). Thereby, inter municipal cooperation should be strengthened, firstly, in order to significantly

expand the range of care services on offer and secondly, in order to handle financial resources as efficiently as possible. It is therefore necessary to address the specific regional demographic conditions. In order to guarantee the shortest possible distances for parents and children to the childcare facility in all rural municipalities, the federal government would also have to make appropriate funds available for the associated under-utilized groups (Mitterer and Haindl, 2015a). Depending on the number of children cared for, task-related indicators should be developed. Based on these indicators, the budget should be distributed more efficiently and task-oriented financing should be ensured. Furthermore, a differentiation should be made according to age groups and duration of care. In addition to the task-related indicators, a separate consideration of higher service offers (e.g. low closing days, long opening hours) or special charges (e.g. high proportion of children with non-German as their mother tongue) would make sense in the interest of better overall care (Mitterer, 2015). In addition to public funding, childcare is also funded by parental contributions in Lower Austria. In Lower Austria there are cost differences between the different forms of childcare. Day nurseries and extended age groups are subject to payment, but the costs are socially staggered. However, due to the lack of data, it is not possible to give a precise overview of the individual costs for parents (Baierl and Kaindl, 2011). On the other hand, all kindergartens in Vienna have been free of charge since 2009, even outside compulsory care armaments (Holoubek et al., 2014).

4.4.3 *Institutional comparison and the role of local actors*

The previous part of the institutional analysis had the task to analyse the institutional conditions of childcare facilities in Austria and Great Britain and therefore explain the territorial differences. Austria has a mandatory kindergarten year. This means that children between the age of five years and school age are obliged to attend a kindergarten of 20 hours per week. This regulation applies to all federal states (BGBl. I Nr. 99/2009, 2009). In contrast to Austria, England has a legal entitlement of 30 hours a week, terms only (Comptroller and Auditor, 2016). Legal entitlement means that public authorities in a country guarantee a place for children in ECEC facilities when parents demand it (European Commission et al., 2015). However, these 30 hours cannot be claimed by everyone. The 30 hours free of costs in ECEC is for children with working parents only (Butler and Hardy, 2016).

Observing the role of private and public ECEC providers, England shows a mixed economy approach. This approach to the provision of social services reflects "the neoliberal market philosophy that dominates welfare provision in England" (Campbell-Barr and Nygård, 2014: 353). In addition, various laws, such as the Child Care Act in 2006, reinforce this approach (Campbell-Barr and Nygård, 2014). A closer look at the distribution of public and private operators in Austria shows that the number of operators in Austria varies considerably. In Vienna, 71 % of all care institutions are operated by private providers. In comparison in Lower Austria only 11 % of the care facilities are operated by private providers in 2018 (Statistik Austria and Gumpoldsberger, 2019).

Due to the lack of data, it is not possible to show the opening hours of the different car facilities in England. However, it is possible to break down the closing hours of childcare facilities in Lower Austria and Vienna by childcare institutions.

Figure 12 Closing times of childcare facilities in Vienna and Lower Austria (Statistik Austria and Gumpoldsberger, 2019)

	11:59 or earlier	12:00 to 14:59	15:00 to 16:29	16:30 to 18:59	19:00 and later
All childcare facilities in %					
Lower Austria	0	23	39	37	1
Vienna	0	0	3	96	0
Crèches in %					
Lower Austria	0	22	39	38	1
Vienna	0	0	3	96	0
Kindergarten in %					
Lower Austria	0	27	45	28	0
Vienna	0	0	2	98	0
Age-extended groups in %					
Lower Austria	1	17	22	58	2
Vienna	0	0	6	94	0

The table shows that there is a considerable difference in opening hours between Lower Austria and Vienna. It shows that 96 % of the childcare facilities in Vienna are closed between 16:30 and 18:59. Observing the opening hours in Lower Austria a different picture emerges. In Lower Austria more than half of the childcare facilities close before 16:30. This pattern runs through the individual care institutions. On average, childcare facilities in Vienna have longer opening hours than in Lower Austria (Statistik Austria and Gumpoldsberger, 2019).

The financing of ECEC in England can be divided into supply and demand side financing (McLean, 2014) A similar financing systems can also be identified in Austria (Mitterer and Haindl, 2015b). On the one hand, there is the financing by different subsidies of the countries or the respective 15 regulations. It is also possible for families to deduct childcare costs from their taxes (Mitterer and Haindl, 2015b)

One of the most important findings of the institutional analysis is the role of local actors in the provision of childcare services. In England and in Austria individual local administrative units (England: local authorities, Austria: municipalities) play a crucial role in the provision of ECEC. Local authorities were once the main suppliers of social services (OECD, 2000), but the New Labour Party has changed that (McLean, 2014). By centralizing and liberalizing the childcare system, the market should function as one of the main suppliers of childcare in England (McLean, 2014). Local authorities should manage the market (Butler and Hardy, 2016). However, it is evident that local authorities play an important role and have more than a management function in the provision of childcare. Since 2004, local authorities have been responsible for improving local childcare in England (Butler and Hardy, 2016). In order to meet the above quality criteria, local authorities and private operators apply different funding measures. Although these funding mechanisms are intended to create fairness, there are considerable differences between regions with the same socio-economic composition (Comptroller and Auditor, 2016). Local authorities in England have a legal obligation to ensure the quality of the ECEC in their region, for which they face growing challenges in the recent years (Butler and Hardy, 2016). The financing of the free childcare, provision providet by the English government has decreased in recent years. Furthermore, local governments are faced with budget cuts, which affect flexibility in investing in local services (Butler and Hardy, 2016).

In Austria, municipalities are facing increasing challenges too. Although the basic legal conditions are determined by the individual federal states, the municipalities are responsible for the maintenance and financing of childcare facilities. In this context, there are strong regional differences with regard to the coverage of childcare facilities. Small municipalities are often not able to provide sufficient childcare places, which is a challenge for small municipalities in rural areas (Mitterer and Haindl, 2015a).

Beside the territorial disparities, the gender-specific differences are dominant in Austria and Great Britain. Based on the Social Investment literature, ECEC aims to give especially women the opportunity to pursue full-time employment (Hemerijck, 2017). However, this is not possible due to the institutional structure in Austria and England. First, Austria and Great Britain still show the classic features of the breadwinner model, which is still promoted by the institutional structure (Saraceno and Keck, 2011). In order to enable women to work full-time, there should be at least 30 hours of affordable childcare available per week (Mills et al., 2014). These requirements are not met in both countries. Although there are various measures, especially for children under three years of age, there is not sufficient and cost-effective care.

4.5 Summary of the empirical chapter

In the following chapter, the main results of the empirical analyses are summarized and brought together. The descriptive analysis has shown that women with children in Great Britain and Austria are more often employed in part-time than men. In addition, there has been a change over time. While the proportion of women in part-time employment in Austria has increased, the proportion of women with children in part-time employment has decreased. Furthermore, there are strong differences in the age-specific types of care. Children in the age group from three years to compulsory schooling have a higher care rate in Austria and Great Britain than children in the age group from zero to three years. If we consider the difficulty of financing childcare, there are differences between urban, suburban and rural areas in Austria and Great Britain. In sum, parents in rural areas have the greatest problems financing childcare. The most common reason why formal childcare is not used is because it is not needed. There is also no

variation between the individual urban, suburban and rural areas in Austria. In order to measure the influence of childcare on parental employment, a total of 7 logistic regression models were calculated. In the first regression model, the influence of formal and informal childcare on parental employment in Austria and Great Britain was analysed. Here, persons with informal childcare in Austria are more likely to be employed than persons without childcare in the UK. This influence is highly significant. In order to analyse the country-specific conditions, the influence of childcare on parental employment in Great Britain and Austria was analysed separately in the second step. In Austria it can be seen that women with childcare are more likely to be employed with childcare than fathers without childcare. The interaction between informal childcare and gender is highly significant. In Great Britain, the picture is different. It appears that woman with informal childcare are more likely to be employed than men with no informal childcare. In respect to the interaction between formal childcare and the sex, a different picture emerges. Woman with formal childcare are less likely to be unemployed than men without formal childcare. In the third step of the analysis, the models for the respective sexes were analysed separately. Since in the last models there is a significant influence between gender and childcare. In addition, the interaction between childcare and the degree of urbanisation was taken into account. A significant influence of childcare on female employment in Great Britain and Austria was observed. Although the interaction between childcare and the degree of urbanisation has different effects on the employment relationships of men and women, there are no significant influences. These circumstances can have different causes. Firstly, the data situation did not allow for a deeper regional subdivision. Second, different analyses show that the coverage rates of childcare facilities vary very strongly between the individual regions in Austria and Great Britain. In particular, rural regions show a lack of formal childcare facilities.

In order to understand the gender impact of ECEC policies on parental employment and to analyse why there are regional and territorial differences in the impact of childcare on parental employment and why rural areas are undersupplied with formal childcare facilities, the institutional structure of ECEC policies in England and Austria was analysed in the second part. In particular, the focus was on the organisation the set up and the funding of ECEC policies. The reason why I focused in the past analysis on ECEC policies in England is that ECEC policies are

differing between England, Scotland, Wales and North Ireland (Campbell-Barr and Nygård, 2014). In Austria, the ECEC policies also differ between the individual federal states. For this reason, the institutional analysis focused on the Austrian multi-level governance of ECEC and analyses the institutional conditions of ECEC in Vienna and Lower Austria in detail. As already discussed in detail in the theoretical part, the organisation of childcare in Austria and England varies greatly. First of all it can be seen that cheap or free childcare is only available to a small extent in the individual countries, which made full employment difficult especially for women. Secondly, although the institutional structure and England and Austria are very different, local actors have the main responsibility to provide adequate child care. In England, the private care market is showing a dominance. Observing the role of private and public ECEC providers, England shows a mixed economy approach (Penn, 2012). However, local authorities have remained mandated to ensure and improve the quality of local childcare. Due to budget cuts, however, they are often unable to carry out these tasks. This leads to the fact that no extensive childcare is guaranteed in remote parts of England. Although the effects are similar in Austria, the causes are different. In Austria, the main responsibility for childcare lies with the communities supported by various subsidies from the provinces or the federal state. However, research shows that due to the financial regulation the main burden for the financing of childcare still lies with the individual municipalities. This leads to the fact that especially small municipalities are not able to provide adequate childcare.

In order to answer the research question and to combine the results with the theoretic part, the next and last part is the conclusion.

5 Conclusion

The starting point of the present thesis was the dramatic rise of regional inequality in Europe (Iammarino et al., 2018). These trends lead to new challenges for the welfare state and call for a reorientation of social policies (Ranci, 2010a). In this respect, Social Investment belongs to the most dominant social policy paradigm in the 21st century and has been developed in order to prepare the welfare state for the challenges of the 21st century (Hemerijck, 2018). Therefore, ECEC is a dominate part of the Social Investment paradigm (Esping-Andersen, 2002; León, 2017; Morel et al., 2012). In this regard, ECEC should promote female labour force participation as well increase the educational opportunities for children (Bonoli, 2013; Esping-Andersen, 2002).

However, research shows that Social Investment measures only have a positive impact under certain contextual preconditions (Kazepov and Ranci, 2017). Furthermore, increasing regional inequality is leading to a deterioration in living conditions throughout European regions (Iammarino et al., 2018). The complex institutional circumstances and the changing socio-economic and regional conditions in Europe foster a complex network of different Social Investment outcomes throughout Europe. These areas are strongly interrelated, engendering complex cross-cutting topics whose understanding requires an interdisciplinary, multi-scalar and multi-method approach (Scandurra et al., 2019). In particular, ECEC should lead to an increase of parental employment but the outcomes of ECEC depend on a plurality of circumstances and varies between the European member states (León, 2017). However, implementation of ECEC in a country depends on political, economic and cultural circumstances (León, 2017).

For this reason, the goal of the present thesis was to examine what influence do ECEC policies have on territorial employment patterns, and can the institutional structure of ECEC within a country explain different territorial employment patterns of parents?

In summary, it can be said that territorial circumstances have an impact on parental employment. But apart from territorial differences, gender differences are dominant and are reinforced by the institutional structure. Although the interaction effect has no significant

influence, the degree of urbanization in combination with childcare has different effects on the employment of women and men. There is also evidence that the coverage rate of childcare facilities varies massively in Austria (Mitterer and Haindl, 2015a) and Great Britain (Butler and Hardy, 2016). In Austria and England, the rural regions have an inadequate provision of childcare facilities (Mitterer and Haindl, 2015a). The institutional starting position of ECEC policies varies greatly in both countries, but local political actors have the primary responsibility for the provision or quality control of childcare facilities. Furthermore, the importance of local actors in the provision of childcare services became evident. In England (Butler and Hardy, 2016) and in Austria individual local administrative units (England local authorities Austria municipalities) play a crucial role in the provision of ECEC (Mitterer and Haindl, 2015a). However, due to the institutional structure in Austria and Great Britain, small regions are often not able to provide adequate childcare services.

Nevertheless, apart from territorial differences, gender differences are the most dominant findings of the master thesis. First, women are still more responsible for raising children in Austria and Great Britain (Brewster and Rindfuss, 2000). Although the use of childcare has a positive impact on maternal employment, it is evident that when a mother is employed, she is mostly working part-time. Based on the institutional analysis, the cause of these differences lies in the combination of a breadwinner model (Lewis, 1992) and an institutional discrimination of women (Bergqvist, 2016). Reason for this became apparent in the institutional analysis. The institutional analysis has shown that although Austria and England provide low-cost or non-contributory childcare, the claim does not allow the full employment of women. Since this offer only includes a minimum number of hours of care per week for a specific age group. Therefore, a combination between full-time employment and affordable childcare is not possible. In addition, it has been shown that there is little support for inexpensive care for children under the age of three. In order to enable women to work full-time, it is necessary to build up low-cost childcare measures in both countries.

These results also coincide with research results from other projects. In this context, Saraceno and Keck (2011) have shown which measures support gender equality in paid work and care. It shows that childcare policies in Austria rather support a traditional family image. Due to the

low coverage of universal childcare, it is difficult for women to return into employment (Saraceno and Keck, 2011). According to Saraceno and Keck (2011), Britain is not easy to classify in terms of the extent to which public policies support gender justice in paid work and care. Although the childcare rate is comparatively high, parental leave is rather low, leading to complications in reconciling work and family life (Saraceno and Keck, 2011). Furthermore, the childcare regimes do not only vary between the countries. As the case of Austria shows, childcare policies vary between federal states and have different focuses. In Lower Austria, on the one hand, the Christian education in the kindergarten is emphasized and on the other hand, it is shown that there is, in contrast to Vienna, no free childcare with the exception of the obligatory kindergarten year. Thus, different political preferences show up in one country.

The thesis has shown that it is necessary to take into account the institutional characteristics and territorial conditions of a country to understand different impacts of Social investment policies.

Unfortunately, this is often not possible at the territorial level due to the lack of data (Kazepov and Barberis, 2017). In order to understand the contextual conditions and the country-specific impacts of Social Investment better, regional specific data must first be collected to enable a more in-depth analysis. To understand the exact territorial and regional impacts of Social Investment measures, it is important to explore the exact regional living conditions in combination with social policy measures.

6 References

6.1 Literature

Amin A (ed.) (1994) *Post-Fordism: A Reader*. Studies in urban and social change. Oxford ; Cambridge, Mass: Blackwell.

Andreotti A, Mingione E and Polizzi E (2012) Local Welfare Systems: A Challenge for Social Cohesion. *Urban Studies* 49(9): 1925–1940. DOI: 10.1177/0042098012444884.

Backhaus K, Erichson B, Plinke W, et al. (2016) *Multivariate Analysemethoden: eine anwendungsorientierte Einführung*. 14., überarbeitete und aktualisierte Auflage. Berlin Heidelberg: Springer Gabler.

Baierl A and Kaindl M (2011) Kinderbetreuung in Österreich. *Österreichisches Institut für Familienforschung* (77). Working Paper:1 - 91.

Bauer H, Biwald P, Mitterer K, et al. (eds) (2017) *Finanzausgleich 2017: ein Handbuch – mit Kommentar zum FAG 2017*. Öffentliches Management und Finanzwirtschaft 19. Wien Graz: NWV Verlag GmbH.

Bergqvist C (2016) *The Welfare State and Gender Equality*. Pierre J (ed.). Oxford University Press. DOI: 10.1093/oxfordhb/9780199665679.013.3.

BGBl. I Nr. 99/2009 (2009) Vereinbarung gemäß Art. 15a B-VG über die Einführung der halbtägig kostenlosen und verpflichtenden frühen Förderung in institutionellen Kinderbetreuungseinrichtungen. 20006448. Available at: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20006448 (accessed 22 October 2019).

BGBl. Nr. 1/1930 (2004) Bundes-Verfassungsgesetz. 10000138.

Biesenbender S and Héritier A (2014) Mixed-Methods Designs in Comparative Public Policy Research: The Dismantling of Pension Policies. In: Engeli I and Allison CR (eds) *Comparative Policy Studies: Conceptual and Methodological Challenges*. Research Methods Series. London: Palgrave Macmillan UK, pp. 237–264. DOI: 10.1057/9781137314154_11.

Blum S (2015) Ausbau der Kinderbetreuung in Österreich: Regionale Unterschiede und politisches Lernen. *SWS-Rundschau* (2): 191–210.

Boje TP and Ejrnœs A (2011) Family Policy and Welfare Regimes. In: Dahl HM, Keränen M, and Kovalainen A (eds) *Europeanization, Care and Gender: Global Complexities*. London: Palgrave Macmillan UK, pp. 77–93. DOI: 10.1057/9780230321021_5.

Bonoli G (2013) *The Origins of Active Social Policy: Labour Market and Childcare Polices in a Comparative Perspective*. 1st ed. Oxford: Oxford University Press.

Bouget D, Frazer H, Marlier E, et al. (2015) *Social Investment in Europe: A Study of National Policies 2015*. Luxembourg: Publications Office.

Brenner N (2004) Urban governance and the production of new state spaces in western Europe, 1960–2000. *Review of International Political Economy* 11(3): 447–488. DOI: 10.1080/0969229042000282864.

Brewster KL and Rindfuss RR (2000) Fertility and Women's Employment in Industrialized Nations. *Annual Review of Sociology* 26(1): 271–296. DOI: 10.1146/annurev.soc.26.1.271.

Brind R, McGinigal S, Lewis J, et al. (2013) *Childcare and Early Years Providers Survey*. TNS BMRB Report JN 117328. Department of Education. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/355075/SFR33_2014_Main_report.pdf (accessed 27 January 2019).

Brown-Lyons M, Robertson A and Layzer J (2001) Kith and Kin—Informal Child Care: Highlights from Recent Research. *Columbia University*. DOI: 10.7916/d82f7x6n.

Budig MJ, Misra J and Boeckmann I (2012) The Motherhood Penalty in Cross-National Perspective: The Importance of Work–Family Policies and Cultural Attitudes. *Social Politics: International Studies in Gender, State & Society* 19(2): 163–193. DOI: 10.1093/sp/jxs006.

Butler A and Hardy G (2016) Driving high quality childcare: the role of local authorities. Available at: https://www.familyandchildcaretrust.org/driving-high-quality-childcare-role-local-authorities (accessed 27 January 2019).

Campbell-Barr V and Nygård M (2014) Losing Sight of the Child? Human Capital Theory and its Role for Early Childhood Education and Care Policies in Finland and England since the Mid-1990s. *Contemporary Issues in Early Childhood* 15(4): 346–359. DOI: 10.2304/ciec.2014.15.4.346.

Cantillon B and Van Lancker W (2013) Three Shortcomings of the Social Investment Perspective. *Social Policy and Society* 12(04): 553–564. DOI: 10.1017/S1474746413000080.

Cleveland G and Krashinsky M (2003) Financing ECEC Services in OECD Countries.

Commission E (2017) *My Region, My Europe, Our Future*. Dijkstra L and Commission E (eds). Report on economic, social and territorial cohesion. Luxembourg: Publications Office of the European Union. Available at: http://ec.europa.eu/regional_policy/sources/docoffic/official/reports/cohesion7/7cr.pdf (accessed 18 November 2019).

Comptroller and Auditor G (2016) *Entitlement to Free Early Education and Childcare*. HC 853 SESSION 2015-16 2. Department for Education. Available at: https://www.nao.org.uk/wp-content/uploads/2016/03/Entitlement-to-free-early-education-and-childcare.pdf (accessed 22 October 2019).

Council of the European Union (2011) Council conclusions on early childhood education and care: providing all our children with the best start for the world of tomorrow. (Official Journal of the European Union): 1–3.

DCSF (2016) Securing Sufficient Childcare: Statutory guidance for local authorities in carrying out their childcare sufficiency duties. Available at: https://webarchive.nationalarchives.gov.uk/20130318203142oe_/https://www.education.gov.uk/publications/standard/AllPublications/Page1/DCSF-00274-2010 (accessed 14 November 2019).

Department of Education (2016) *Childcare and early years providers survey: 2016*. Department of Education. Available at: https://www.gov.uk/government/statistics/childcare-and-early-years-providers-survey-2016 (accessed 14 November 2019).

Drobnič S and León M (2013) Agency freedom for worklife balance in Germany and Spain. In: Hobson B (ed.) *Worklife Balance*. Oxford University Press, pp. 126–150. DOI: 10.1093/acprof:oso/9780199681136.003.0005.

Esping-Andersen G (1990) *The Three Worlds of Welfare Capitalism*. Princeton, N.J.: Princeton University Press.

Esping-Andersen G (2002) Towards the Good Society, Once Again? In: Esping-Andersen G (ed.) *Why We Need a New Welfare State*. Oxford University Press, pp. 1–25. DOI: 10.1093/0199256438.003.0001.

Esping-Andersen G (2011) *Social Foundations of Postindustrial Economies*. Repr. Oxford: Oxford Univ. Press.

European Commission (2000) *Lisbon European Council 23 and 24 March 2000 Presidency Conclusions*. Brussels. Available at: http://www.europarl.europa.eu/summits/lis1_en.htm (accessed 14 November 2019).

European Commission (2011) *Early Childhood Education and Care: Providing all our children with the best start for the world of tomorrow*. Brussels. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0066&from=EN (accessed 14 November 2019).

European Commission (ed.) (2014) *Key Data on Early Childhood Education and Care in Europe*. 2014 ed. Eurydice and Eurostat report. Luxembourg]: Publ. Off. [u.a.].

European Commission, EACEA and Eurydice (2015) *Structural Indicators for Monitoring Education and Training Systems in Europe - 2015: Eurydice Background Report to the Education and Training Monitor 2015.* Luxembourg: Publications Office of the European Union. Available at: http://bookshop.europa.eu/uri?target=EUB:NOTICE:EC0415720:EN:HTML (accessed 27 January 2019).

Eurostat (2016a) Glossary: EU statistics on income and living conditions (EU-SILC) - Statistics Explained. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:EU_statistics_on_income_and_living_conditions_(EU-SILC) (accessed 18 November 2019).

Eurostat (2016b) NUTS - Nomenclature of territorial units for statistics. Available at: https://ec.europa.eu/eurostat/web/nuts/background (accessed 14 November 2019).

Eurostat (2017) EU statistics on income and living conditions (EU-SILC) methodology - Statistics Explained. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/EU_statistics_on_income_and_living_conditions_(EU-SILC)_methodology (accessed 16 November 2019).

Eurostat (2019a) People at risk of poverty or social exclusion by NUTS 2 regions - Eurostat. Available at: https://ec.europa.eu/eurostat/web/products-datasets/-/tgs00107 (accessed 2 December 2019).

Eurostat (2019b) Territorial typologies manual - degree of urbanisation. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Territorial_typologies_manual_-_degree_of_urbanisation (accessed 14 November 2019).

Eurostat (n.d.) Overview - Eurostat. Available at: https://ec.europa.eu/eurostat/about/overview (accessed 18 November 2019).

Evers A, Lewis J and Riedel B (2005) Developing child-care provision in England and Germany: problems of governance. *Journal of European Social Policy* 15(3): 195–209. DOI: 10.1177/0958928705054082.

Flynn L (2017) Childcare markets and maternal employment: A typology. *Journal of European Social Policy* 27(3): 260–275. DOI: 10.1177/0958928716685689.

Great Britain and National Audit Office (2015) *Funding for Disadvantaged Pupils*. HC 90.

Great Britain and Treasury (2003) *Every Child Matters*. London: Stationery Office.

Harkness S and Waldfogel J (2003) The Family Gap in Pay: Evidence From Seven Industrialized Countries. In: *Research in Labor Economics*. Bingley: Emerald (MCB UP), pp. 369–413. DOI: 10.1016/S0147-9121(03)22012-4.

Heckman JJ (2006) Skill Formation and the Economics of Investing in Disadvantaged Children. *Science* 312(5782): 1900–1902. DOI: 10.1126/science.1128898.

Heidenreich M and Wunder C (2008) Patterns of Regional Inequality in the Enlarged Europe. *European Sociological Review* 24(1): 19–36. DOI: 10.1093/esr/jcm031.

Hemerijck A (2012) Two or three waves of welfare state transformation? In: Morel N, Palier B, and Palme J (eds) *Towards a Social Investment Welfare State? Ideas, Policies and Challenges*. Bristol: Policy Press, pp. 33–61.

Hemerijck A (2017) Social Investment and Its Critics. In: Hemerijck A (ed.) *The Uses of Social Investment*. First edition. Oxford: Oxford University Press , pp. 3–42.

Holoubek M, Madner V and Pauer K (2014) *Recht und Verwaltung in Wien Handbuch für Wissenschaft und Praxis*. Wien: MANZ Verlag Wien.

Iammarino S, Rodriguez-Pose A and Storper M (2018) Regional inequality in Europe: Evidence, theory and policy implications. *Journal of Economic Geography* 53: 273–298. DOI: 10.1093/jeg/lby021.

Kazepov Y (2008) Cities of Europe: Changing Contexts, Local Arrangements, and the Challenge to Social Cohesion. In: Kazepov Y (ed.) *Cities of Europe*. Studies in urban and social change. Malden, MA: Blackwell Publishing, pp. 3–42. DOI: 10.1002/9780470694046.ch1.

Kazepov Y (2010) Rescaling Social Policies towards Multilevel Governance in Europe: Some Reflections on Processes at Stake and Actors Involved. In: Kazepov Y (ed.) *Rescaling Social Policies: Towards Multilevel Governance in Europe / Yuri Kazepov, (Ed.)*. Public policy and social welfare. Farnham: Ashgate, pp. 35–73.

Kazepov Y and Barberis E (2017) The territorial dimension of social policies and the new role of cities. In: Kennett P and Lendvai-Bainton N (eds) *Handbook of European Social Policy*. Edward Elgar Publishing, pp. 302–318. DOI: 10.4337/9781783476466.

Kazepov Y and Ranci C (2017) Is every country fit for social investment? Italy as an adverse case. *Journal of European Social Policy* 27(1): 90–104. DOI: 10.1177/0958928716673314.

Kazepov Y and Ranci C (2018) Making Social Investment work: a comparative analysis of the socio-economic preconditions of social investment policies. In: *Annual SISEC Conference*, Università Cattolica del Sacro Cuore, Milano, 2018.

Keeley B (2007) *Human Capital: How What You Know Shapes Your Life*. Reprinted. OECD insights. Paris: OECD.

León M (2017) Social Investment and Childcare Expansion. In: Hemerijck A (ed.) *The Uses of Social Investment*. Oxford University Press, pp. 118–128. DOI: 10.1093/oso/9780198790488.003.0010.

Lewis J (1992) Gender and the Development of Welfare Regimes. *Journal of European Social Policy* 2(3): 159–173. DOI: 10.1177/095892879200200301.

LGBl. Nr. 5065/2-0 (2015) NÖ Tagesbetreuungsverordnung. 20000774. Available at: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrNO&Gesetzesnummer=20000774 (accessed 14 November 2019).

LGBl. Nr. 06/2009 (2008) Art. 15a B-VG; Ausbau Kinderbetreuungsangebots, verpfl. sprachl. Förd. sowie Schaffung eines bundesweiten vorschulischen Bildungsplanes. 20000218.

LGBl. Nr. 35/2019 (2019) Wiener Kindergartengesetz – WKGG. 20000263. Available at: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrW&Gesetzesnummer=20000263 (accessed 12 November 2019).

LGBl. Nr. 40/2016 (2016) Verordnung der Wiener Landesregierung über die Regelung der Tagesbetreuung nach dem Wiener Tagesbetreuungsgesetz 2016 (Wiener Tagesbetreuungsverordnung 2016 – WTBVO 2016). 20000520. Available at: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrW&Gesetzesnummer=20000520 (accessed 14 November 2019).

LGBl. Nr. 44/2019 (2019) NÖ Kindergartengesetz 2006. LGBLA_NI_20190520_44. Available at: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrNO&Gesetzesnummer=20000776 (accessed 14 November 2019).

Lundvall B-Å and Johnson B (2016) THE LEARNING ECONOMY. In: Lundvall B-Å (ed.) *The Learning Economy and the Economics of Hope*. Anthem Press, pp. 107 -130. DOI: 10.26530/OAPEN_626406.

Lundvall B-äke and Johnson B (1994) The Learning Economy. *Journal of Industry Studies* 1(2): 23–42. DOI: 10.1080/13662719400000002.

Mahon R and McBride S (2009) Standardizing and disseminating knowledge: the role of the OECD in global governance. *European Political Science Review* 1(01): 83 - 101. DOI: 10.1017/S1755773909000058.

McEwen N and Moreno L (eds) (2005) *The Territorial Politics of Welfare*. Routledge/ECPR studies in European political science 39. New York: Routledge.

McFadden D (1973) *Conditional Logit Analysis of Qualitative Choice Behavior*. Institute of Urban and Regional Development, University of California.

McLean C (2014) Market managers and market moderators: Early childhood education and care provision, finance and regulation in the United Kingdom and United States. *Journal of European Social Policy* 24(2): 122–134. DOI: 10.1177/0958928713517916.

Mills M, Präg P, Flavia T, et al. (2014) *Use of Childcare in the EU Member States and Progress towards the Barcelona Targets*. Santa Monica, Calif.: RAND Corporation. Available at: http://www.rand.org/pubs/research_reports/RR185.html.

Mitterer K (2015) Kinderbetreuung - Wie entwickelt und finanziert sich der Kinderbetreuungsbereich? | KDZ - Zentrum für Verwaltungsforschung. (2). Forum Public Management: 24–26.

Mitterer K and Haindl A (2015a) *Aufgabenorientierter Finanzausgleich am Beispiel der Elementarbildung*. Zentrum für Verwaltungsforschung. Available at: https://www.arbeiterkammer.at/infopool/wien/Studie_Kinderbetreuung_10_2015.pdf.

Mitterer K and Haindl A (2015b) Finanzierung der Kinderbetreuung. (1). Forum Public Management: 17–20.

Morel N, Palier B and Palme J (2012) Beyond the welfare state as we knew it? In: Morel N, Palier B, and Palme J (eds) *Towards a Social Investment Welfare State? Ideas, Policies and Challenges*. Bristol: Policy Press: pp. 1-30

Moretti E (2013) *The New Geography of Jobs*. 1st Mariner books ed. Boston, Mass: Mariner Books/Houghton Mifflin Harcourt.

OECD (2000) *Early Childhood Education and Care Policy in the United Kingdom*. OECD Country Note. OECD. Available at: http://www.oecd.org/unitedkingdom/2535034.pdf.

OECD (2012) *Education at a Glance 2012: Highlights*. Highlights from Education at a Glance. OECD. DOI: 10.1787/eag_highlights-2012-en.

Parliament of the United Kingdom (2006) An Act to make provision about the powers and duties of local authorities and other bodies in England in relation to the improvement of the well-being of young children; to make provision about the powers and duties of local authorities in England and Wales in relation to the provision of childcare and the provision of information to parents and other persons; to make provision about the regulation and inspection of childcare provision in England; to amend Part 10A of the Children Act 1989 in relation to Wales; and for connected purposes. *2006 c 21*. Available at: http://www.legislation.gov.uk/ukpga/2006/21/pdfs/ukpga_20060021_en.pdf.

Pascal C and Bertram T (2013) *The impact of early education as a strategy in countering socio-economic disadvantage*. 130155-RR-005. Centre for Research in Early Childhood (CREC). Available at: http://www.crec.co.uk/docs/Access.pdf.

Pavolini E and Ranci C (2010) Beyond the Male Breadwinner Family Model. In: Ranci C (ed.) *Social Vulnerability in Europe*. London: Palgrave Macmillan UK, pp. 37–57. DOI: 10.1057/9780230245778_3.

Penn H (2010) Shaping the future: how humancapital arguments aboutinvestment in early childhoodare being (mis)used in poorcountries. In: Yelland N (ed.) *Contemporary Perspectives on Early Childhood Education*. Maidenhead, England: McGraw-Hill Education, pp. 49–65. Available at: http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=466426&site=ehost-live.

Penn H (2012) Childcare markets: do they work? In: Lloyd E and Penn H (eds) *Childcare Markets*. Policy Press, pp. 19–42. DOI: 10.1332/policypress/9781847429339.003.0002.

Pettit B, Hook J and FERBER M (2010) Gendered Tradeoffs: Family, Social Policy, and Economic Inequality in Twenty-One Countries. *Perspectives on Work* 14: 53–54. DOI: 10.2307/41810193.

Plantenga J and Hansen J (1999) Assessing Equal Opportunities in the European Union. *International Labour Review* 138: 351.

Ragin CC (2014) *The Comparative Method: Moving beyond Qualitative and Quantitative Strategies*. Oakland: University of California Press.

Ranci C (2010a) Bringing territory back in social comparative research. In: Ranci C (ed.) Social Vulnerability in Europe. Basingstoke and New York: Palgrave Macmillan, pp. 25–34.

Ranci C (2010b) Social Vulnerability in Europe. In: Ranci C (ed.) Social Vulnerability in Europe. Basingstoke: Palgrave Macmillan, pp. 3–25.

Ranci Constanzo, Brandsen T and Sabatinelli S (2014) New Social Risks and the Role of Local Welfare: An Introduction. In: Ranci Costanzo (ed.) *Social Vulnerability in Europe: The New Configuration of Social Risks*. Basingstoke and New York: Palgrave Macmillan, pp. 3-31

Roberts-Holmes G (2013) The English Early Years Professional Status (EYPS) and the 'split' Early Childhood Education and Care (ECEC) system. *European Early Childhood Education Research Journal* 21(3): 339–352. DOI: 10.1080/1350293X.2012.704304.

Rodríguez-Pose A (2018) The revenge of the places that don't matter (and what to do about it). *Cambridge Journal of Regions, Economy and Society* 11(1): 189–209. DOI: 10.1093/cjres/rsx024.

Saraceno C (2015) A Critical Look to the Social Investment Approach from a Gender Perspective. *Social Politics: International Studies in Gender, State & Society* 22(2): 257–269. DOI: 10.1093/sp/jxv008.

Saraceno C and Keck W (2011) Towards an integrated approach for the analysis of gender equity in policies supporting paid work and care responsibilities. *Demographic Research* 25: 371–406. DOI: 10.4054/DemRes.2011.25.11.

Scandurra R, Cefalo R and Kazepov Y (2019) School to work outcomes during the Great Recession, is the regional scale relevant for young people's life chances? In: *10th ESPAnet Annual Conference*, Florence, 2019.

Statistik Austria and Gumpoldsberger H (2019) *Kindertagesheimstatistik 2018/19*. 20-1630–19. Available at: http://www.statistik-austria.at/web_de/services/publikationen/5/index.html?includePage=detailedView&sectionName=Bildung&pubId=573 (accessed 13 November 2019).

Taylor-Gooby P (2004) New Risks and Social Change. In: Taylor-Gooby P (ed.) *New Risks, New Welfare: The Transformation of the European Welfare State*. Oxford; New York: Oxford University Press, pp. 1–28.

van Belle J (2016) *Early Childhood Education and Care (ECEC) and Its Long-Term Effects on Educational and Labour Market Outcomes*. RAND Corporation. DOI: 10.7249/RR1667.

Waldfogel J and Washbrook E (2011) Early Years Policy. *Child Development Research* 2011: 1–12. DOI: 10.1155/2011/343016.

White LA (2011) The Internationalization of Early Childhood Education and Care Issues: Framing Gender Justice and Child Well-Being: THE INTERNALIZATION OF ECEC ISSUES. *Governance* 24(2): 285–309. DOI: 10.1111/j.1468-0491.2011.01520.x.

Wirth H and Lichtenberger V (2012) Form der Kinderbetreuung stark sozial selektiv: ein europäischer Vergleich der Betreuung von unter 3-jährigen Kindern. *Informationsdienst Soziale Indikatoren* (48): 1–5. DOI: 10.15464/isi.48.2012.1-5.

Wrohlich K (2011) *Labor Supply and Child Care Choices in a Rationed Child Care Market*. ID 1954648, SSRN Scholarly Paper, 1 November. Rochester, NY: Social Science Research Network. Available at: https://papers.ssrn.com/abstract=1954648 (accessed 29 October 2019).

Zimmermann H, Henke K-D and Broer M (2017) *Finanzwissenschaft: eine Einführung in die Staatsfinanzen*. 12., neu gestaltete und überarbeitete Auflage. Vahlens Handbücher der Wirtschafts- und Sozialwissenschaften. München: Verlag Franz Vahlen.

6.2 Eurostat Indikators

Eurostat - Data Explorer (2019a) Children by household type, income group, degree of urbanisation and main reason for not meeting needs for formal childcare services [ilc_ats04]. Available at: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_ats04&lang=en (accessed 2 December 2019).

Eurostat - Data Explorer (2019b) Children in formal childcare or education by age group and duration - % over the population of each age group - EU-SILC survey [ilc_caindformal]. Available at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_caindformal (accessed 2 December 2019).

Eurostat - Data Explorer (2019c) Children receiving formal childcare services by age, income group and degree of urbanisation [ilc_ats01]. Available at: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_ats01&lang=en (accessed 2 December 2019).

Eurostat - Data Explorer (2019d) Children receiving formal childcare services by household type, income group, degree of urbanisation and level of difficulty to afford formal childcare services [ilc_ats03]. Available at: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_ats03&lang=en (accessed 2 December 2019).

Eurostat - Data Explorer (2019e) People at risk of poverty or social exclusion by NUTS regions [ilc_peps11]. Available at:

http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_peps11&lang=en (accessed 2 December 2019).

Eurostat - Data Explorer (2019f) Percentage of part-time employment of adults by sex, age groups, number of children and age of youngest child [lfst_hhptechi]. Available at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfst_hhptechi&lang=en (accessed 2 December 2019).

6.3 R Packages

Behrendt S (2014) *Lm.Beta: Add Standardized Regression Coefficients to Lm-Objects*. Available at: https://CRAN.R-project.org/package=lm.beta.

Bion R (2019) *Ggradar: Create Radar Charts Using Ggplot2*.

Enzmann JAIR source code and/or documentation written by D, Schwartz M, Jain N, et al. (2018) *Descr: Descriptive Statistics*. Available at: https://CRAN.R-project.org/package=descr.

Fox J and Weisberg S (2019) *An R Companion to Applied Regression*. Third. Thousand Oaks CA: Sage. Available at: https://socialsciences.mcmaster.ca/jfox/Books/Companion/.

Goral F and Schellenberg J (2018) *Goeveg: Functions for Community Data and Ordinations*. Available at: https://CRAN.R-project.org/package=goeveg.

Jr FEH, Dupont with contributions from C and others many (2019) *Hmisc: Harrell Miscellaneous*. Available at: https://CRAN.R-project.org/package=Hmisc.

Lahti L, Huovari J, Kainu M, et al. (2017) *Eurostat R Package*. 1. Available at: https://journal.r-project.org/archive/2017/RJ-2017-019/index.html.

R Core Team (2019) *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. Available at: https://www.R-project.org/.

Wickham H (2016) *Ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York. Available at: https://ggplot2.tidyverse.org.

Wickham H (2017) *Tidyverse: Easily Install and Load the 'Tidyverse'*. Available at: https://CRAN.R-project.org/package=tidyverse.

Wickham H and Miller E (2019) *Haven: Import and Export 'SPSS', 'Stata' and 'SAS' Files*. Available at: https://CRAN.R-project.org/package=haven.

7 Appendix

Download Data

```
my.files <-c("ilc_caindformal", "lfst_hhptechi", "ilc_ats01", "ilc_ats02","ilc_ats03", "ilc_ats04")

labels=search_eurostat("")
save(labels,file = "RData/labels.RData")

my.list = as.list(my.files) #create list with vector names
my.list <- lapply(X = my.list, FUN = get_eurostat) #download data
my.labels = list() # create list for labels

# exctract downloaded labels

for (i in seq(length(my.list)))
{
  my.labels[[i]] = label_eurostat(my.list[[i]], fix_duplicated = TRUE)
}

# ad labels to the data frame

for (i in seq(length(my.list))){
  x= colnames(my.list[[i]][,!names(my.list[[i]]) %in% c("time","values")]) #welche Variablen will ich behalten
  for(j in x) {
    my.list[[i]]=as.data.frame(my.list[[i]])
    my.labels[[i]]=as.data.frame(my.labels[[i]])
    my.list[[i]][[paste0("lab",j)]] = my.labels[[i]][,j]
  }
}
```

Percentage of part-time employment of adults by sex, age groups, number of children and age of youngest child

```
indicatorI <- my.list[[2]]

units = c("UnitI","UnitII","UnitIII","UnitIV")
labunits <- c("labUnitI","labUnitII","labUnitIII","labUnitIV")

name <- names(indicatorI)
name[1:4] <-  units
name[8:11] <-  labunits

names(indicatorI) <- name
indicatorI$time <- substr(indicatorI$time, 1, 4)
indicatorI$time <- as.numeric(indicatorI$time)

indI <- indicatorI %>%
  filter(UnitI != "T")%>%
  filter(UnitII== "Y15-64")%>%
  filter(!UnitIII %in% c("TOTAL","GE1"))%>%
  filter(UnitIV== "Y_LT6")%>%
  filter(geo %in% c("AT", "UK"))%>%
  filter(time %in% c("2018"))


plot1 <- ggplot(indI)+
  geom_bar(aes(x= labUnitI, y= values, fill = labUnitIII),stat ="identity",  position= position_dodge(width = .9))+
  facet_grid(~labgeo)+
  xlab("")+
  ylab("%")+
  labs(title = "Percentage of part-time employment of adults by sex, age groups,\nnumber of children and age of youngest child in 2018",
       caption = "Source: Authors own calculation on Eurostat online database")+
  theme_bw()+
  theme(axis.text.x = element_text(hjust = 1,size = 11),
        axis.text.y = element_text(size = 11),
        legend.position="bottom",
        legend.title=element_blank(),
        legend.margin=margin(5,5,5,5),
        legend.text=element_text(size=11),
```

```
      legend.box.margin=margin(0,0,0,0))

ind <- indicatorI %>%
  filter(UnitI != "T")%>%
  filter(UnitII== "Y15-64")%>%
  filter(!UnitIII %in% c("TOTAL","GE1"))%>%
  filter(UnitIV== "Y_LT6")%>%
  filter(geo %in% c("AT", "UK"))%>%
  filter(time %in% c("2005","2018"))

table <- ind[c(6,12,8,10,7)]
table <- spread(table, key = time , value = values)
table$change <- table$`2018`-table$`2005`
table1 <- table%>%
  group_by(labgeo, labUnitI, labUnitIII)%>%
  summarise(Mean= mean(change))
```

Children receiving formal childcare services by age, income group and degree of urbanization

```
indicatorIII <- my.list[[3]]
code <- my.files[3]

units = c("UnitI","UnitII","UnitIII","UnitIV")
labunits <- c("labUnitI","labUnitII","labUnitIII","labUnitIV")

name <- names(indicatorIII)
name[1:4] <-  units
name[9:12] <-  labunits
names(indicatorIII) <- name

indIII <- indicatorIII %>%
  filter(UnitIV %in% c("Y3-CSA", "Y_LT3"))%>%
  filter(geo %in% c("UK", "AT"))%>%
  filter(UnitI %in% c("DEG1", "DEG2", "DEG3"))%>%
  filter(UnitIII == "TOTAL")

indIII$UnitI <- NULL
indIII$UnitII <- NULL
indIII$UnitIII <- NULL
indIII$UnitIV <- NULL
indIII$geo <-NULL
indIII$time <-NULL
indIII$unit<- NULL
indIII$labunit<- NULL
indIII$labUnitIII<- NULL

#x1.2<- indIII%>%
#  group_by(labgeo,labUnitII,labUnitIV) %>%
#  summarize(medi = mean(values, na.rm=TRUE), lower=min(values, na.rm=TRUE), upper=max(values,
#                                                                      na.rm=TRUE))

#plot3 <- ggplot() +
#  geom_pointrange(data=x1.2, mapping=aes(x=labgeo, y=medi, ymin=lower, ymax=upper,colour=labUnitII),
#                  stat = "identity", width = 1, position = position_dodge(width = 0.3), alpha = 0.8)+
#  facet_wrap(~labUnitIV)+
#  xlab("")+
#  ylab("%")+
#  labs(title = "Mean Range",
#       caption = "Source: Authors own calculation on Eurostat online database")+
#  theme_bw()+
#  theme(axis.text.x = element_text(hjust = 1,size = 11),
#        axis.text.y = element_text(size = 11),
#        legend.position="bottom",
#       legend.title=element_blank(),
#        legend.margin=margin(5,5,5,5),
#        legend.text=element_text(size=11),
#        legend.box.margin=margin(0,0,0,0))
```

Children receiving formal childcare services by household type, income group, degree of urbanization and level of difficulty to afford formal childcare services

```
indicatorV <- my.list[[5]]

units = c("UnitI","UnitII","UnitIII","UnitIV")
labunits <- c("labUnitI","labUnitII","labUnitIII","labUnitIV")

name <- names(indicatorV)
name[1:4] <-  units
name[9:12] <-  labunits
names(indicatorV) <- name

indicatorV$time <- substr(indicatorV$time, 1, 4)
indicatorV$time <- as.numeric(indicatorV$time)
indicatorV$labUnitIV <- as.character(indicatorV$labUnitIV)

indicatorV$labUnitIV[indicatorV$labUnitIV == "Single person with dependent children"] <- "Single person with\ndependent children"
indicatorV$labUnitIV[indicatorV$labUnitIV == "Two adults with one dependent child"] <- "Two adults with\none dependent child"
indicatorV$labUnitIV[indicatorV$labUnitIV == "Two adults with three or more dependent children"] <- "Two adults with three or\nmore depe
ndent children"
indicatorV$labUnitIV[indicatorV$labUnitIV == "Two adults with two dependent children"] <- "Two adults with\ntwo dependent children"
indicatorV$labUnitIV[indicatorV$labUnitIV == "Three or more adults with dependent children"] <- "Three or more adults\nwith dependent ch
ildren"

### Chart for Austria
radar <- indicatorV %>%
 filter(geo %in% c("AT"))%>%
 filter(!UnitI %in% c("TOTAL"))%>%
 filter(UnitII %in% c("TOTAL"))%>%
 filter(!UnitIV %in% c("TOTAL","HH_DCH"))%>%
 filter(unit == "PC")

radar <- radar[c(8,9,11,12)]


radar <- radar %>%
 group_by(labUnitI,labUnitIV)%>%
 summarise(variable = (values[labUnitIII== "Great"]+ values[labUnitIII== "Some"]+ values[labUnitIII== "Moderate"]))
radar$variable <- radar$variable/100

r.chart <- spread(radar, key = labUnitIV, value = variable)
r.chart $labUnitI <- as.character(r.chart $labUnitI)

plot4 <- ggradar(r.chart ,plot.title = "Austria",
      axis.label.size = 4,
      grid.label.size = 5,
      legend.text.size = 10)+
 theme(legend.position = 'bottom')

# Table for Austria

total <- indicatorV %>%
 filter(geo %in% c("AT"))%>%
 filter(UnitI %in% c("TOTAL"))%>%
 filter(UnitII %in% c("TOTAL"))%>%
 filter(!UnitIV %in% c("TOTAL","HH_DCH"))%>%
 filter(unit == "PC")

total <- total[c(8,9,11,12)]

total <- total %>%
 group_by(labUnitIV)%>%
 summarise(variable = (values[labUnitIII== "Great"]+ values[labUnitIII== "Some"]+ values[labUnitIII== "Moderate"]))

# mean(total$variable)

DEG <- indicatorV %>%
 filter(geo %in% c("AT"))%>%
```

```
  filter(!UnitI %in% c("TOTAL"))%>%
  filter(UnitII %in% c("TOTAL"))%>%
  filter(!UnitIV %in% c("TOTAL","HH_DCH"))%>%
  filter(unit == "PC")


DEG <- DEG[c(8,9,11,12)]

table2 <- DEG %>%
  group_by(labUnitI,labUnitIV)%>%
  summarise(variable = (values[labUnitIII== "Great"]+ values[labUnitIII== "Some"]+ values[labUnitIII== "Moderate"]))%>%
  spread(key=labUnitI,value = variable)

# mean(total$variable)

# UK

radar <- indicatorV %>%
  filter(geo %in% c("UK"))%>%
  filter(!UnitI %in% c("TOTAL"))%>%
  filter(UnitII %in% c("TOTAL"))%>%
  filter(!UnitIV %in% c("TOTAL","HH_DCH","A_GE3_DCH"))%>%
  filter(unit == "PC")

radar <- radar[c(8,9,11,12)]


radar <- radar %>%
  group_by(labUnitI,labUnitIV)%>%
  summarise(variable = (values[labUnitIII== "Great"]+ values[labUnitIII== "Some"]+ values[labUnitIII== "Moderate"]))
radar$variable <- radar$variable/100

r.chart <- spread(radar, key = labUnitIV, value = variable)
r.chart $labUnitI <- as.character(r.chart $labUnitI)

plot6 <- ggradar(r.chart ,plot.title = "United Kingdom",
       axis.label.size = 4,
       grid.label.size = 5,
       legend.text.size = 10)+
  theme(legend.position = 'bottom')

# Table for United Kingdom

total <- indicatorV %>%
  filter(geo %in% c("AT"))%>%
  filter(UnitI %in% c("TOTAL"))%>%
  filter(UnitII %in% c("TOTAL"))%>%
  filter(!UnitIV %in% c("TOTAL","HH_DCH"))%>%
  filter(unit == "PC")

total <- total[c(8,9,11,12)]

table3 <- total <- total %>%
  group_by(labUnitIV)%>%
  summarise(variable = (values[labUnitIII== "Great"]+ values[labUnitIII== "Some"]+ values[labUnitIII== "Moderate"]))

# mean(total$variable)

DEG <- indicatorV %>%
  filter(geo %in% c("AT"))%>%
  filter(!UnitI %in% c("TOTAL"))%>%
  filter(UnitII %in% c("TOTAL"))%>%
  filter(!UnitIV %in% c("TOTAL","HH_DCH"))%>%
  filter(unit == "PC")


DEG <- DEG[c(8,9,11,12)]

table4 <- DEG %>%
```

```
 group_by(labUnitI,labUnitIV)%>%
 summarise(variable = (values[labUnitIII== "Great"]+ values[labUnitIII== "Some"]+ values[labUnitIII== "Moderate"]))%>%
 spread(key=labUnitI,value = variable)
```

Children by household type, income group, degree of urbanisation and main reason for not meeting needs for formal childcare services

```
indicatorV <- my.list[[6]]

units = c("UnitI","UnitII","UnitIII","UnitIV")
labunits <- c("labUnitI","labUnitII","labUnitIII","labUnitIV")

name <- names(indicatorV)
name[1:4] <-  units
name[9:12] <-  labunits
names(indicatorV) <- name

### AT

radar <- indicatorV %>%
 filter(geo %in% c("AT"))%>%
 filter(UnitII %in% c("TOTAL"))%>%
 filter(UnitIII %in% c("TOTAL"))%>%
 filter(!UnitIV %in% c("TOTAL"))%>%
 filter(unit == "PC")

radar <- radar[c(8,9,12)]


radar$values <- radar$values/100

r.chart <- spread(radar, key = labUnitI, value = values)
r.chart$labUnitIV <- as.character(r.chart $labUnitIV)

plot6 <- ggradar(r.chart ,plot.title = "Austria",
      axis.label.size = 4,
      grid.label.size = 5,
      legend.text.size = 10)+
 theme(legend.position = 'bottom')

total <- indicatorV %>%
 filter(geo %in% c("AT"))%>%
 filter(UnitII %in% c("TOTAL"))%>%
 filter(UnitIII %in% c("TOTAL"))%>%
 filter(UnitIV %in% c("TOTAL"))%>%
 filter(unit == "PC")

total <- total[c(8,9,12)]


### UK

plot7 <- radar <- indicatorV %>%
 filter(geo %in% c("UK"))%>%
 filter(UnitII %in% c("TOTAL"))%>%
 filter(UnitIII %in% c("TOTAL"))%>%
 filter(!UnitIV %in% c("TOTAL"))%>%
 filter(unit == "PC")

radar <- radar[c(8,9,12)]


radar$values <- radar$values/100

r.chart <- spread(radar, key = labUnitI, value = values)
r.chart$labUnitIV <- as.character(r.chart $labUnitIV)

plot1 <- ggradar(r.chart ,plot.title = "United Kingdom",
      axis.label.size = 4,
```

```
      grid.label.size = 5,
      legend.text.size = 10)+
  theme(legend.position = 'bottom')

total <- indicatorV %>%
  filter(geo %in% c("UK"))%>%
  filter(UnitII %in% c("TOTAL"))%>%
  filter(UnitIII %in% c("TOTAL"))%>%
  filter(UnitIV %in% c("TOTAL"))%>%
  filter(unit == "PC")

total <- total[c(8,9,12)]
```

Data Manipulation

```
# Load Data  for Austria
silc_ad  <- read_sav("C:/Users/lippm90/Rstudio/RData/AT_SILC2016_inkladhoc.sav")

df <- silc_ad[c("hh_num","key","year","HY020","RB220","RB230","RL010","RL020","RL030","RL040","RL050","RL060","HB060","HB050","RB0
70","RB080", "RB090","DB100","RB050", "PL031", "PE040", "HC040", "HC050", "HC060")]

# Employment Status

df$employment[df$PL031 == 1] <- 1

## Warning: Unknown or uninitialised column: 'employment'.

df$employment[df$PL031 == 2] <- 1
df$employment[df$PL031 == 3] <- 1
df$employment[df$PL031 == 4] <- 1
df$employment[df$PL031 == 5] <- 1

df$employment[df$PL031 == 5] <- 0
df$employment[df$PL031 == 10] <- 0
df$employment[df$PL031 == 11] <- 0

# Education status recoding

df$education<- as.numeric(df$PE040)
df$education[df$education <= 200] <- "Low_educated"
df$education[df$education > 200 & df$education <= 400] <- "Medium_educated"
df$education[df$education > 400 & df$education <= 800] <- "High_educated"

# calculate AGE

df$AGE <- df$year - df$RB080-1
df$AGE[df$AGE== "-1"] <- "0"
df$AGE <- as.numeric(df$AGE)


# The calculation of the Equivalised household size (EQ_SS) is described below
# Equivalised disposable income after social transfers (EQ_INC20)

# calculate hm13 and hm14

df$hm14[df$AGE  > 13] <- 1

## Warning: Unknown or uninitialised column: 'hm14'.

df$hm13[df$AGE  <= 13] <- 1

## Warning: Unknown or uninitialised column: 'hm13'.

df.I <- df %>%
  group_by(hh_num)%>%
  summarise(sum_hm13 = sum(hm13, na.rm = TRUE),
            sum_hm14 = sum(hm14, na.rm = TRUE),
            HY020 = mean(HY020, na.rm = TRUE),
            EQ_SS = 1+0.5*(sum_hm14 - 1) + 0.3 * sum_hm13)
```

```
df = merge(x = df, y = df.I, by = "hh_num", all.x = TRUE)

#########################################################################

children <-df %>%
 filter(AGE <=6)

# calculate childcare hours for Informal and formal care

children <- children %>%
 mutate(care_fo = rowSums(.[c("RL010","RL020","RL030","RL040")], na.rm = TRUE))%>%
 mutate(care_in = rowSums(.[c("RL050","RL060")], na.rm = TRUE))

# create data set for care hours just for mothers

df.m <- children[,c("RB230","care_in","care_fo")]

# create average care hours of all childrean for mothers

df.mI<-df.m %>%
 group_by(RB230)%>%
 summarise(ca_fo = mean(care_in, na.rm = TRUE),
           ca_in = mean(care_fo, na.rm = TRUE))

# test if there are any duplicates

#table(duplicated(df.mI$RB230))

# Set mother ID to personal ID of a person

df.mI <- df.mI %>%
 rename(key = RB230) # RB230 wird zum Personal key der Mutter

# set an indicators which defines childrean yes or no

df.mI$children <- "yes"

# Add df.mI to the original data set

df = merge(x = df, y = df.mI, by = "key", all.x = TRUE)


#############################################################

# create data set for care hours just for fathers

df.f <- children[,c("RB220","care_in","care_fo")]

# create average care hours of all childrean for mothers

df.fI<-df.f %>%
 group_by(RB220)%>%
 summarise(ca_fo = mean(care_in, na.rm = TRUE),
           ca_in = mean(care_fo, na.rm = TRUE))

# test if there are any duplicates

#table(duplicated(df.fI$RB220))

# Set father ID to personal ID of a person

df.fI <- df.fI %>%
 rename(key = RB220) # RB220 wird zum Personal key der Mutter

# set an indicators which defines childrean yes or no

df.fI$children <- "yes"
```

```
# Add df.mI to the original data set

df = merge(x = df, y = df.fI, by = "key", all.x = TRUE)


# combine care of mothers and fathers in

df.children <- df %>%
  filter(children.x == "yes" |  children.y == "yes" )

df.children<- df.children %>%
  mutate(care_fo = rowSums(.[c("ca_fo.x","ca_fo.y")], na.rm = TRUE),
       care_in = rowSums(.[c("ca_in.x","ca_in.y")], na.rm = TRUE))

df.children$`ca_fo.x` <- NULL
df.children$`ca_fo.y` <- NULL
df.children$`ca_in.x`<- NULL
df.children$`ca_in.y` <- NULL
df.children$children.x <- NULL
df.children$children.y <- NULL

# formal care groups
df.children$care_fo <- as.numeric(df.children$care_fo)
df.children$care_fo_g <- as.numeric(df.children$care_fo)
df.children$care_fo_g[df.children$care_fo == 0] <- 0 # "Zero"
df.children$care_fo_g[df.children$care_fo > 0 & df.children$care_fo <= 41] <- 1 # "One and more"


# informal care groups
df.children$care_in <- as.numeric(df.children$care_in)
df.children$care_in_g <- as.numeric(df.children$care_in)
df.children$care_in_g[df.children$care_in == 0] <- 0 #  "Zero"
df.children$care_in_g[df.children$care_in >  0 & df.children$care_in <=  55] <- 1 #  "One and more"

# Urban
df.children$DB100[df.children$DB100 == 1] <- 1
df.children$DB100[df.children$DB100 == 2] <- 1
df.children$DB100[df.children$DB100 == 3] <- 0

# Load Data for the UK

silc_ad  <- read_sav("RData/UK_SILC2016_inkladhoc.sav")

# shorted data set

df <- silc_ad[c("hh_num","key","year","HY020","RB220","RB230","RL010","RL020","RL030","RL040","RL050","RL060","HB060","HB050","RB0
70","RB080", "RB090","DB100","RB050", "PL031", "PE040", "HC040", "HC050", "HC060")]


# ------------------------------------------------------------------------------------------------------------
# Employment status recoding

#1                          Employee working full-time
#2                          Employee working part-time
#3    Self-employed working full-time (including family worker)
#4    Self-employed working part-time (including family worker)
#5                                  Unemployed
#6     Pupil, student, further training, unpaid work experience
#7 In retirement or in early retirement or has given up business
#8              Permanently disabled or/and unfit to work
#9            In compulsory military community or service
#10        Fulfilling domestic tasks and care responsibilities
#11                         Other inactive person


#df <- df %>%
#  mutate(employment <- as.numeric(PL031)) %>%
#  mutate(employment = recode(employment, "1" = "1", "2" = "1", "3" = "1", "4" ="1", "5" = "0", "10" = "0", "11" = "0"))
```

```
df$employment[df$PL031 == 1] <- 1

## Warning: Unknown or uninitialised column: 'employment'.

df$employment[df$PL031 == 2] <- 1
df$employment[df$PL031 == 3] <- 1
df$employment[df$PL031 == 4] <- 1
df$employment[df$PL031 == 5] <- 1

df$employment[df$PL031 == 5] <- 0
df$employment[df$PL031 == 10] <- 0
df$employment[df$PL031 == 11] <- 0

# Education status recoding

df$education<- as.numeric(df$PE040)
df$education[df$education <= 200] <- "Low_educated"
df$education[df$education > 200 & df$education <= 400] <- "Medium_educated"
df$education[df$education > 400 & df$education <= 800] <- "High_educated"

# calculate AGE

df$AGE <- floor(((df$HB060-df$RB080)*12+df$HB050+6)/12)
df$AGE <- as.numeric(df$AGE)


#############################################################################

# calculate hm13 and hm14

df$hm14 <-NULL
df$hm13 <-NULL

df$hm14[df$AGE  > 13] <- 1

## Warning: Unknown or uninitialised column: 'hm14'.

df$hm13[df$AGE  <= 13] <- 1

## Warning: Unknown or uninitialised column: 'hm13'.

#summary(df$hm14)
#summary(df$hm13)

#table(df$hm14)
#table(df$hm13)

# The calculation of the Equivalised household size (EQ_SS) is described below
# Equivalised disposable income after social transfers (EQ_INC20)

df.I <- df %>%
 group_by(hh_num)%>%
 summarise(sum_hm13 = sum(hm13, na.rm = TRUE),
        sum_hm14 = sum(hm14, na.rm = TRUE),
        HY020 = mean(HY020, na.rm = TRUE),
        EQ_SS = 1+0.5*(sum_hm14 - 1) + 0.3 * sum_hm13)

df = merge(x = df, y = df.I, by = "hh_num", all.x = TRUE)

#############################################################################

children <-df %>%
 filter(AGE <=5)

# calculate childcare hours for Informal and formal care

children <- children %>%
 mutate(care_fo = rowSums(.[c("RL010","RL020","RL030","RL040")], na.rm = TRUE))%>%
```

```
 mutate(care_in = rowSums(.[c("RL050","RL060")], na.rm = TRUE))

# create data set for care hours just for mothers

df.m <- children[,c("RB230","care_in","care_fo")]

# create average care hours of all childrean for mothers

df.mI<-df.m %>%
 group_by(RB230)%>%
 summarise(ca_fo = mean(care_in, na.rm = TRUE),
           ca_in = mean(care_fo, na.rm = TRUE))

# test if there are any duplicates


# Set mother ID to personal ID of a person

df.mI <- df.mI %>%
 rename(key = RB230) # RB230 wird zum Personal key der Mutter

# set an indicators which defines childrean yes or no

df.mI$children <- "yes"

# Add df.mI to the original data set

df = merge(x = df, y = df.mI, by = "key", all.x = TRUE)


############################################################


# create data set for care hours just for fathers

df.f <- children[,c("RB220","care_in","care_fo")]

# create average care hours of all childrean for mothers

df.fI<-df.f %>%
 group_by(RB220)%>%
 summarise(ca_fo = mean(care_in, na.rm = TRUE),
           ca_in = mean(care_fo, na.rm = TRUE))

# test if there are any duplicates

#table(duplicated(df.fI$RB220))

# Set father ID to personal ID of a person

df.fI <- df.fI %>%
 rename(key = RB220) # RB220 wird zum Personal key der Mutter

# set an indicators which defines childrean yes or no

df.fI$children <- "yes"

# Add df.mI to the original data set

df = merge(x = df, y = df.fI, by = "key", all.x = TRUE)


# combine care of mothers and fathers in

df.children <- df %>%
 filter(children.x == "yes" |  children.y == "yes" )

df.children<- df.children %>%
 mutate(care_fo = rowSums(.[c("ca_fo.x","ca_fo.y")], na.rm = TRUE),
```

```
      care_in = rowSums(.[c("ca_in.x","ca_in.y")], na.rm = TRUE))

df.children$`ca_fo.x` <- NULL
df.children$`ca_fo.y` <- NULL
df.children$`ca_in.x`<- NULL
df.children$`ca_in.y` <- NULL
df.children$children.x <- NULL
df.children$children.y <- NULL

# formal care groups

df.children$care_fo <- as.numeric(df.children$care_fo)
df.children$care_fo_g <- as.numeric(df.children$care_fo)
class(df.children$care_fo_g)

## [1] "numeric"

df.children$care_fo_g[df.children$care_fo == 0] <- 0 # "Zero"
df.children$care_fo_g[df.children$care_fo > 0 & df.children$care_fo <= 93] <- 1 # "One and more"
#table(df.children$care_fo_g)

# informal care groups

df.children$care_in <- as.numeric(df.children$care_in)
df.children$care_in_g <- as.numeric(df.children$care_in)
class(df.children$care_in_g)

## [1] "numeric"

df.children$care_in_g[df.children$care_in == 0] <- 0 #  "Zero"
df.children$care_in_g[df.children$care_in > 0 & df.children$care_in <=  86] <- 1 #  "One and more"

# Urban

df.children$DB100[df.children$DB100 == 1] <- 1
df.children$DB100[df.children$DB100 == 2] <- 1
df.children$DB100[df.children$DB100 == 3] <- 0
```

Logistic Regression Analyses

```
# Used packages
library(base)
library(lm.beta)
library(Hmisc)

## Loading required package: lattice

## Loading required package: survival

## Loading required package: Formula

## Loading required package: ggplot2

##
## Attaching package: 'Hmisc'

## The following objects are masked from 'package:base':
##
##     format.pval, units

library(tidyverse)

## -- Attaching packages ---------------------------------------------------------------------------------------------------------------------------------- tidyverse 1.2.1 --

## v tibble  2.1.3     v purrr   0.3.2
## v tidyr   0.8.3     v dplyr   0.8.3
## v readr   1.3.1     v stringr 1.4.0
## v tibble  2.1.3     v forcats 0.4.0

## -- Conflicts ------------------------------------------------------------------------------------------------------------------------------------- tidyverse_conflicts() --
## x dplyr::filter()    masks stats::filter()
## x dplyr::lag()       masks stats::lag()
```

```
## x dplyr::src()       masks Hmisc::src()
## x dplyr::summarize() masks Hmisc::summarize()

library(haven)
library(descr)
library(survey)

## Loading required package: grid

## Loading required package: Matrix

##
## Attaching package: 'Matrix'

## The following object is masked from 'package:tidyr':
##
##     expand

##
## Attaching package: 'survey'

## The following object is masked from 'package:Hmisc':
##
##     deff

## The following object is masked from 'package:graphics':
##
##     dotchart

library(car)

## Loading required package: carData

##
## Attaching package: 'car'

## The following object is masked from 'package:dplyr':
##
##     recode

## The following object is masked from 'package:purrr':
##
##     some
```

UK and Austria

```
# load Data
load("df.children_caregroups_AT_adoc.RData")
df.children_AT <- data.frame(df.children)
df.children_AT <- df.children_AT[c("employment","care_fo_g","care_in_g",
                          "RB090","education","EQ_SS", "DB100","RB050")]
load("df.children_caregroups_UK_adoc.RData")
df.children_UK <- data.frame(df.children)
df.children_UK <- df.children_UK[c("employment","care_fo_g","care_in_g",
                          "RB090","education","EQ_SS", "DB100","RB050")]

# Set country
df.children_UK$co <- 0
df.children_AT$co <- 1

# Set ID
df.children_UK$id <- c(1:2257)
df.children_AT$id <- c(1:1318)

# Join Data frame

df.children <- rbind(df.children_UK,df.children_AT)


##############################################################################################
# Recode employment and gender to numeric data

df.children$employment <- as.numeric(df.children$employment)
df.children$RB090 <- as.numeric(df.children$RB090)
```

```
df.children$RB090[df.children$RB090 == 1] <- 0  # male
df.children$RB090[df.children$RB090 == 2] <- 1  # female

# recalculate care hours into groups
des = svydesign(ids = ~1,
            data = df.children,
            weights = df.children$RB050
)

# Step wise analyses
# Total steps
```

Stage 1

```
modell <- as.formula("employment ~ care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.98293    0.07773  12.645  < 2e-16 ***
## care_in_g    0.42785    0.10282   4.161 3.24e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9983004)
##
## Number of Fisher Scoring iterations: 4


LogRegR2(linear.reg)

## Chi2               27.33214
## Df                 1
## Sig.               1.713397e-07
## Cox and Snell Index  0.007823301
## Nagelkerke Index     0.01191692
## McFadden's R2        0.007350345
```

Stage 2

```
# 2
modell <- as.formula("employment ~ care_fo_g +care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.66699    0.08519   7.829 6.48e-15 ***
## care_fo_g    1.00146    0.11329   8.840  < 2e-16 ***
## care_in_g    0.33785    0.10643   3.174  0.00151 **
```

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9912954)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2               159.5319
## Df                 2
## Sig.               0
## Cox and Snell Index  0.04480761
## Nagelkerke Index     0.06825362
## McFadden's R2        0.0429024
```

Stage 3

```
# 3
modell <- as.formula("employment ~ care_fo_g +care_in_g + RB090")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.3386     0.1558  15.014  < 2e-16 ***
## care_fo_g     1.2000     0.1231   9.749  < 2e-16 ***
## care_in_g     0.3911     0.1182   3.309 0.000946 ***
## RB090        -2.5313     0.1564 -16.181  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.01372)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               774.3832
## Df                 3
## Sig.               0
## Cox and Snell Index  0.1995041
## Nagelkerke Index     0.3038966
## McFadden's R2        0.2082524
```

Stage 4

```
# 4
modell <- as.formula("employment ~ care_fo_g +  care_in_g + RB090 + education ")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
```

```
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)              3.0793     0.1899  16.212  < 2e-16 ***
## care_fo_g                1.2223     0.1284   9.517  < 2e-16 ***
## care_in_g                0.3043     0.1219   2.496   0.0126 *
## RB090                   -2.6636     0.1646 -16.180  < 2e-16 ***
## educationLow_educated    -1.4620     0.1591  -9.189  < 2e-16 ***
## educationMedium_educated -0.7871     0.1367  -5.757 9.29e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.019799)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               913.8853
## Df                 5
## Sig.               0
## Cox and Snell Index  0.2329488
## Nagelkerke Index     0.3547745
## McFadden's R2        0.2481091
```

Stage 5

```
# 5
modell <- as.formula("employment ~ care_fo_g+care_in_g
                + RB090 + education + EQ_SS")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.66699    0.08519   7.829 6.48e-15 ***
## care_fo_g    1.00146    0.11329   8.840  < 2e-16 ***
## care_in_g    0.33785    0.10643   3.174  0.00151 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9912954)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2               159.5319
## Df                 2
## Sig.               0
## Cox and Snell Index  0.04480761
## Nagelkerke Index     0.06825362
## McFadden's R2        0.0429024
```

Stage 6

```
# 6
modell <- as.formula("employment ~ care_fo_g +care_in_g
                + RB090+ education + EQ_SS + DB100")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.66699    0.08519   7.829 6.48e-15 ***
## care_fo_g    1.00146    0.11329   8.840  < 2e-16 ***
## care_in_g    0.33785    0.10643   3.174  0.00151 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9912954)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2               159.5319
## Df                 2
## Sig.               0
## Cox and Snell Index  0.04480761
## Nagelkerke Index     0.06825362
## McFadden's R2        0.0429024
```

Stage 7

```
# 7
modell <- as.formula("employment ~ care_fo_g+care_in_g  + RB090 + education
                + EQ_SS + DB100+DB100:care_fo_g+DB100:care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)               3.0793     0.1899  16.212  < 2e-16 ***
## care_fo_g                 1.2223     0.1284   9.517  < 2e-16 ***
## care_in_g                 0.3043     0.1219   2.496   0.0126 *
## RB090                    -2.6636     0.1646 -16.180  < 2e-16 ***
## educationLow_educated    -1.4620     0.1591  -9.189  < 2e-16 ***
## educationMedium_educated  -0.7871     0.1367  -5.757 9.29e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.019799)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               913.8853
## Df                 5
## Sig.               0
## Cox and Snell Index  0.2329488
## Nagelkerke Index     0.3547745
## McFadden's R2        0.2481091
```

Stage 8

```
# 8
modell <- as.formula("employment ~ care_fo_g+care_in_g +co + RB090
                + education + EQ_SS + co:care_fo_g+co:care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.4358     0.1601  15.210  < 2e-16 ***
## care_fo_g     1.2187     0.1247   9.775  < 2e-16 ***
## care_in_g     0.4411     0.1200   3.676  0.00024 ***
## co           -0.8201     0.1074  -7.636 2.87e-14 ***
## RB090        -2.5707     0.1581 -16.260  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.007241)
##
## Number of Fisher Scoring iterations: 5

LogRegR2(linear.reg)

## Chi2               808.4078
## Df                 4
## Sig.               0
## Cox and Snell Index  0.2072926
## Nagelkerke Index     0.3157605
## McFadden's R2        0.2174025
```

Austria Total Data Set

```
#load data
# Used packages

load("df.children_caregroups_AT_adoc.RData")
df.children <- data.frame(df.children)

#############################################################################################
# employment and gender to numeric data

df.children$employment <- as.numeric(df.children$employment)
df.children$RB090 <- as.numeric(df.children$RB090)

df.children$RB090[df.children$RB090 == 1] <- 0 # male
df.children$RB090[df.children$RB090 == 2] <- 1 # female
# recalculate care hours into groups
des = svydesign(ids = ~1,
            data = df.children,
            weights = df.children$RB050
)
```

Stage 1

```
# Total steps

# 1
modell <- as.formula("employment ~ care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.1055     0.1219   0.866    0.387
## care_in_g     1.0091     0.1523   6.626 5.05e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.00302)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2               62.42487
## Df                 1
## Sig.               2.775558e-15
## Cox and Snell Index  0.04695496
## Nagelkerke Index     0.06588292
## McFadden's R2        0.03855966
```

Stage 2

```
# 2
modell <- as.formula("employment ~ care_fo_g +care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.2102     0.1365  -1.540    0.124
## care_fo_g     0.8589     0.1552   5.534 3.79e-08 ***
## care_in_g     0.9502     0.1571   6.047 1.93e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9949997)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2               108.4565
## Df                 2
## Sig.               0
## Cox and Snell Index  0.08016103
## Nagelkerke Index     0.1124747
## McFadden's R2        0.0669933
```

Stage 3

```
# 3
modell <- as.formula("employment ~ care_fo_g +care_in_g + RB090")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.2073     0.2176   5.548 3.50e-08 ***
## care_fo_g     1.1397     0.1873   6.086 1.53e-09 ***
## care_in_g     1.3892     0.2076   6.691 3.30e-11 ***
## RB090        -2.8436     0.2629 -10.816  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.174054)
##
## Number of Fisher Scoring iterations: 5

LogRegR2(linear.reg)

## Chi2               465.2826
## Df                 3
## Sig.               0
## Cox and Snell Index  0.3012493
## Nagelkerke Index     0.4226855
## McFadden's R2        0.2874038
```

Stage 4

```
# 4
modell <- as.formula("employment ~ care_fo_g +  care_in_g + RB090 + education ")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)              1.5618     0.2507   6.230 6.29e-10 ***
## care_fo_g                1.0852     0.1909   5.684 1.62e-08 ***
## care_in_g                1.4646     0.2103   6.963 5.29e-12 ***
## RB090                   -2.8684     0.2658 -10.793  < 2e-16 ***
## educationLow_educated    -1.4394     0.2916  -4.936 9.02e-07 ***
## educationMedium_educated  -0.3263     0.1919  -1.701   0.0893 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.212712)
##
## Number of Fisher Scoring iterations: 5

LogRegR2(linear.reg)
```

```
## Chi2               503.5996
## Df                 5
## Sig.               0
## Cox and Snell Index  0.3215749
## Nagelkerke Index     0.4512046
## McFadden's R2        0.3110721
```

Stage 5

```
# 5
modell <- as.formula("employment ~ care_fo_g+care_in_g+ RB090 + education + EQ_SS")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)               3.6956     0.5177   7.139 1.57e-12 ***
## care_fo_g                 1.1659     0.1814   6.426 1.83e-10 ***
## care_in_g                 1.6866     0.2111   7.991 2.94e-15 ***
## RB090                    -3.0335     0.2532 -11.978  < 2e-16 ***
## educationLow_educated    -1.3436     0.3045  -4.412 1.11e-05 ***
## educationMedium_educated -0.2336     0.1892  -1.234    0.217
## EQ_SS                    -1.0249     0.2367  -4.329 1.61e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.186621)
##
## Number of Fisher Scoring iterations: 5

LogRegR2(linear.reg)

## Chi2               551.7198
## Df                 6
## Sig.               0
## Cox and Snell Index  0.3462654
## Nagelkerke Index     0.485848
## McFadden's R2        0.3407958
```

Stage 6

```
# 6
modell <- as.formula("employment ~ care_fo_g +care_in_g + RB090+ education + EQ_SS + DB100")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)               4.0135     0.5524   7.265 6.43e-13 ***
## care_fo_g                 1.1620     0.1828   6.356 2.86e-10 ***
## care_in_g                 1.7202     0.2061   8.347  < 2e-16 ***
```

```
## RB090                  -3.0448     0.2523 -12.067  < 2e-16 ***
## educationLow_educated    -1.2898     0.3067  -4.206 2.78e-05 ***
## educationMedium_educated  -0.2393     0.1866  -1.282    0.200
## EQ_SS                  -1.0825     0.2373  -4.562 5.56e-06 ***
## DB100                  -0.3414     0.1778  -1.921    0.055 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.169709)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               555.834
## Df                 7
## Sig.               0
## Cox and Snell Index  0.3485493
## Nagelkerke Index     0.4895422
## McFadden's R2        0.3442858
```

Stage 7

```
# 7
modell <- as.formula("employment ~ care_fo_g+care_in_g  + RB090
                + education + EQ_SS + DB100+DB100:care_fo_g+DB100:care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.2073     0.2176   5.548 3.50e-08 ***
## care_fo_g     1.1397     0.1873   6.086 1.53e-09 ***
## care_in_g     1.3892     0.2076   6.691 3.30e-11 ***
## RB090        -2.8436     0.2629 -10.816  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.174054)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               465.2826
## Df                 3
## Sig.               0
## Cox and Snell Index  0.3012493
## Nagelkerke Index     0.4226855
## McFadden's R2        0.2874038
```

Stage 8

```
# 8
modell <- as.formula("employment ~ care_fo_g+care_in_g  + RB090
                + education + EQ_SS + RB090:care_fo_g+ RB090:care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.2073     0.2176   5.548 3.50e-08 ***
## care_fo_g     1.1397     0.1873   6.086 1.53e-09 ***
## care_in_g     1.3892     0.2076   6.691 3.30e-11 ***
## RB090        -2.8436     0.2629 -10.816  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.174054)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               465.2826
## Df                 3
## Sig.               0
## Cox and Snell Index  0.3012493
## Nagelkerke Index     0.4226855
## McFadden's R2        0.2874038
```

Austria just man

```
load("df.children_caregroups_AT_adoc.RData")
df.children <- data.frame(df.children)

#############################################################################################
# employment to numeric data

# employment and gender to numeric data

df.children$employment <- as.numeric(df.children$employment)
df.children$RB090 <- as.numeric(df.children$RB090)

df.children$RB090[df.children$RB090 == 1] <- 0 # man
df.children$RB090[df.children$RB090 == 2] <- 1 # woman
df.children <- df.children[df.children$RB090 == "0",]

# Use weights
des = svydesign(ids = ~1,
            data = df.children,
            weights = df.children$RB050
)
```

Stage 1

```
# Total steps

# 1
modell <- as.formula("employment ~ care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
```

```
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.0277     0.3479   5.828 9.03e-09 ***
## care_in_g     0.5236     0.4244   1.234    0.218
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.002552)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               3.058791
## Df                 1
## Sig.               0.08030138
## Cox and Snell Index  0.004929315
## Nagelkerke Index     0.01113393
## McFadden's R2        0.008451296
```

Stage 2

```
# 2
modell <- as.formula("employment ~ care_fo_g +care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.8532     0.3678   5.038 6.19e-07 ***
## care_fo_g     0.5290     0.4218   1.254    0.210
## care_in_g     0.4664     0.4280   1.090    0.276
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9976275)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               6.178816
## Df                 2
## Sig.               0.04552889
## Cox and Snell Index  0.009932279
## Nagelkerke Index     0.02243421
## McFadden's R2        0.01707178
```

Stage 3

```
# 3
modell <- as.formula("employment ~ care_fo_g +care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
```

```
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.8532     0.3678   5.038 6.19e-07 ***
## care_fo_g     0.5290     0.4218   1.254    0.210
## care_in_g     0.4664     0.4280   1.090    0.276
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9976275)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               6.178816
## Df                 2
## Sig.               0.04552889
## Cox and Snell Index  0.009932279
## Nagelkerke Index     0.02243421
## McFadden's R2        0.01707178
```

Stage 4

```
# 4
modell <- as.formula("employment ~ care_fo_g +  care_in_g  + education ")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)              2.1221     0.4006   5.298 1.64e-07 ***
## care_fo_g                0.5167     0.4174   1.238    0.216
## care_in_g                0.4978     0.4246   1.172    0.241
## educationLow_educated    -1.0231    0.6284  -1.628    0.104
## educationMedium_educated  -0.2801    0.4419  -0.634    0.526
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.010185)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               11.31748
## Df                 4
## Sig.               0.02321842
## Cox and Snell Index  0.01811736
## Nagelkerke Index     0.040922
## McFadden's R2        0.03126966
```

Stage 5

```
# 5
modell <- as.formula("employment ~ care_fo_g+care_in_g + education + EQ_SS")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)             4.4770     0.8036   5.571  3.8e-08 ***
## care_fo_g               0.6355     0.3890   1.634  0.10286
## care_in_g               0.6885     0.4194   1.642  0.10115
## educationLow_educated    -1.1014     0.5997  -1.837  0.06675 .
## educationMedium_educated  -0.3087     0.4011  -0.770  0.44184
## EQ_SS                   -1.0731     0.3817  -2.812  0.00509 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.050596)
##
## Number of Fisher Scoring iterations: 6
```

```
LogRegR2(linear.reg)
```

```
## Chi2               30.55507
## Df                 5
## Sig.               1.146569e-05
## Cox and Snell Index  0.04816349
## Nagelkerke Index     0.1087877
## McFadden's R2        0.08442222
```

Stage 6

```
# 6
modell <- as.formula("employment ~ care_fo_g +care_in_g + education
                + EQ_SS + DB100")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)             2.1221     0.4006   5.298 1.64e-07 ***
## care_fo_g               0.5167     0.4174   1.238    0.216
## care_in_g               0.4978     0.4246   1.172    0.241
## educationLow_educated    -1.0231     0.6284  -1.628    0.104
## educationMedium_educated  -0.2801     0.4419  -0.634    0.526
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.010185)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               11.31748
## Df                 4
## Sig.               0.02321842
## Cox and Snell Index  0.01811736
```

```
## Nagelkerke Index    0.040922
## McFadden's R2       0.03126966
```

Stage 7

```
# 7
modell <- as.formula("employment ~ care_fo_g+care_in_g  + education
                + EQ_SS + DB100+DB100:care_fo_g+DB100:care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)              2.1221     0.4006   5.298 1.64e-07 ***
## care_fo_g                0.5167     0.4174   1.238    0.216
## care_in_g                0.4978     0.4246   1.172    0.241
## educationLow_educated    -1.0231    0.6284  -1.628    0.104
## educationMedium_educated  -0.2801    0.4419  -0.634    0.526
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.010185)
##
## Number of Fisher Scoring iterations: 5

LogRegR2(linear.reg)

## Chi2               11.31748
## Df                 4
## Sig.               0.02321842
## Cox and Snell Index  0.01811736
## Nagelkerke Index     0.040922
## McFadden's R2        0.03126966
```

Austria just women

```
# Used packages

load("df.children_caregroups_AT_adoc.RData")
df.children <- data.frame(df.children)

#############################################################################################
# employment to numeric data

# employment and gender to numeric data

df.children$employment <- as.numeric(df.children$employment)
df.children$RB090 <- as.numeric(df.children$RB090)

df.children$RB090[df.children$RB090 == 1] <- 0 # man
df.children$RB090[df.children$RB090 == 2] <- 1 # woman
df.children <- df.children[df.children$RB090 == "1",]
# Use weights
des = svydesign(ids = ~1,
            data = df.children,
            weights = df.children$RB050
)
```

Stage 1

```
# Total steps

# 1
modell <- as.formula("employment ~ care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -1.4698     0.2272  -6.468 1.90e-10 ***
## care_in_g     1.8502     0.2508   7.378 4.72e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.004912)
##
## Number of Fisher Scoring iterations: 4

LogRegR2(linear.reg)

## Chi2               99.35695
## Df                 1
## Sig.               0
## Cox and Snell Index  0.136126
## Nagelkerke Index     0.1813594
## McFadden's R2        0.105375
```

Stage 2

```
# 2
modell <- as.formula("employment ~ care_fo_g +care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -2.1263     0.2846  -7.471 2.47e-13 ***
## care_fo_g     1.3731     0.2112   6.501 1.55e-10 ***
## care_in_g     1.8845     0.2747   6.860 1.56e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.004884)
##
## Number of Fisher Scoring iterations: 4

LogRegR2(linear.reg)

## Chi2               164.14
## Df                 2
## Sig.               0
## Cox and Snell Index  0.214738
```

```
## Nagelkerke Index    0.2860935
## McFadden's R2       0.1740819
```

Stage 3

```
# 3
modell <- as.formula("employment ~ care_fo_g +care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -2.1263     0.2846  -7.471 2.47e-13 ***
## care_fo_g     1.3731     0.2112   6.501 1.55e-10 ***
## care_in_g     1.8845     0.2747   6.860 1.56e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.004884)
##
## Number of Fisher Scoring iterations: 4

LogRegR2(linear.reg)

## Chi2               164.14
## Df                 2
## Sig.               0
## Cox and Snell Index  0.214738
## Nagelkerke Index    0.2860935
## McFadden's R2       0.1740819
```

Stage 4

```
# 4
modell <- as.formula("employment ~ care_fo_g +  care_in_g  + education ")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)              -1.7566     0.2916  -6.025 2.78e-09 ***
## care_fo_g                 1.3056     0.2183   5.981 3.59e-09 ***
## care_in_g                 1.9858     0.2827   7.025 5.26e-12 ***
## educationLow_educated    -1.6490     0.3310  -4.982 8.01e-07 ***
## educationMedium_educated  -0.3778     0.2233  -1.692   0.0911 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9826797)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2               198.3223
## Df                 4
## Sig.               0
## Cox and Snell Index  0.2532912
## Nagelkerke Index     0.3374576
## McFadden's R2        0.2103347
```

Stage 5

```
# 5
modell <- as.formula("employment ~ care_fo_g+care_in_g + education + EQ_SS")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)            0.08681    0.56759   0.153 0.878494
## care_fo_g              1.38488    0.21336   6.491 1.66e-10 ***
## care_in_g              2.21633    0.28062   7.898 1.16e-14 ***
## educationLow_educated    -1.49681    0.34333  -4.360 1.51e-05 ***
## educationMedium_educated -0.26900    0.22270  -1.208 0.227526
## EQ_SS                  -0.97456    0.25144  -3.876 0.000117 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9822512)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2               227.1115
## Df                 5
## Sig.               0
## Cox and Snell Index  0.2842894
## Nagelkerke Index     0.3787563
## McFadden's R2        0.2408677
```

Stage 6

```
# 6
modell <- as.formula("employment ~ care_fo_g +care_in_g + education
                + EQ_SS + DB100")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)            -1.7566     0.2916  -6.025 2.78e-09 ***
```

```
## care_fo_g               1.3056     0.2183   5.981 3.59e-09 ***
## care_in_g               1.9858     0.2827   7.025 5.26e-12 ***
## educationLow_educated    -1.6490     0.3310  -4.982 8.01e-07 ***
## educationMedium_educated  -0.3778     0.2233  -1.692   0.0911 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9826797)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2               198.3223
## Df                 4
## Sig.               0
## Cox and Snell Index  0.2532912
## Nagelkerke Index     0.3374576
## McFadden's R2        0.2103347
```

Stage 7

```
# 7
modell <- as.formula("employment ~ care_fo_g+care_in_g  + education
                + EQ_SS + DB100+DB100:care_fo_g+DB100:care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)              -1.7566     0.2916  -6.025 2.78e-09 ***
## care_fo_g                 1.3056     0.2183   5.981 3.59e-09 ***
## care_in_g                 1.9858     0.2827   7.025 5.26e-12 ***
## educationLow_educated    -1.6490     0.3310  -4.982 8.01e-07 ***
## educationMedium_educated  -0.3778     0.2233  -1.692   0.0911 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9826797)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2               198.3223
## Df                 4
## Sig.               0
## Cox and Snell Index  0.2532912
## Nagelkerke Index     0.3374576
## McFadden's R2        0.2103347
```

UK Total Data Set

```
#load data
# Used packages
load("df.children_caregroups_UK_adoc.RData")
df.children <- data.frame(df.children)

#############################################################################################
# employment and gender to numeric data

df.children$employment <- as.numeric(df.children$employment)
```

```
df.children$RB090 <- as.numeric(df.children$RB090)

df.children$RB090[df.children$RB090 == 1] <- 0 #man
df.children$RB090[df.children$RB090 == 2] <- 1 # woman
# recalculate care hours into groups
des = svydesign(ids = ~1,
            data = df.children,
            weights = df.children$RB050
)
```

Stage 1

```
# Total steps
# 1
modell <- as.formula("employment ~ care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  1.07741    0.08708  12.373  < 2e-16 ***
## care_in_g    0.38404    0.11703   3.281  0.00105 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.003322)
##
## Number of Fisher Scoring iterations: 4

LogRegR2(linear.reg)

## Chi2               13.46403
## Df                 1
## Sig.               0.0002431813
## Cox and Snell Index  0.006151499
## Nagelkerke Index     0.009485865
## McFadden's R2        0.005901844
```

Stage 2

```
# 2
modell <- as.formula("employment ~ care_fo_g +care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.75565    0.09479   7.972 2.50e-15 ***
## care_fo_g    1.04143    0.13229   7.873 5.43e-15 ***
## care_in_g    0.29024    0.12123   2.394   0.0167 *
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.996589)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2               99.23796
## Df                 2
## Sig.               0
## Cox and Snell Index  0.04446155
## Nagelkerke Index     0.06856154
## McFadden's R2        0.04350013
```

Stage 3

```
# 3
modell <- as.formula("employment ~ care_fo_g +care_in_g + RB090")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.4725     0.1834  13.480   <2e-16 ***
## care_fo_g     1.2383     0.1420   8.721   <2e-16 ***
## care_in_g     0.3276     0.1331   2.461   0.0139 *
## RB090        -2.5493     0.1836 -13.883   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.004662)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               470.2054
## Df                 3
## Sig.               0
## Cox and Snell Index  0.193856
## Nagelkerke Index     0.2989339
## McFadden's R2        0.2061106
```

Stage 4

```
# 4
modell <- as.formula("employment ~ care_fo_g +  care_in_g + RB090
                + education ")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
```

```
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.4725     0.1834  13.480   <2e-16 ***
## care_fo_g     1.2383     0.1420   8.721   <2e-16 ***
## care_in_g     0.3276     0.1331   2.461   0.0139 *
## RB090        -2.5493     0.1836 -13.883   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.004662)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               470.2054
## Df                 3
## Sig.               0
## Cox and Snell Index  0.193856
## Nagelkerke Index     0.2989339
## McFadden's R2        0.2061106
```

Stage 5

```
# 5
modell <- as.formula("employment ~ care_fo_g+care_in_g+ RB090
                + education + EQ_SS")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.4725     0.1834  13.480   <2e-16 ***
## care_fo_g     1.2383     0.1420   8.721   <2e-16 ***
## care_in_g     0.3276     0.1331   2.461   0.0139 *
## RB090        -2.5493     0.1836 -13.883   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.004662)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               470.2054
## Df                 3
## Sig.               0
## Cox and Snell Index  0.193856
## Nagelkerke Index     0.2989339
## McFadden's R2        0.2061106
```

Stage 6

```
# 6
modell <- as.formula("employment ~ care_fo_g +care_in_g + RB090
                + education + EQ_SS + DB100")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.4725     0.1834  13.480   <2e-16 ***
## care_fo_g     1.2383     0.1420   8.721   <2e-16 ***
## care_in_g     0.3276     0.1331   2.461   0.0139 *
## RB090        -2.5493     0.1836 -13.883   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.004662)
##
## Number of Fisher Scoring iterations: 5
```

```
LogRegR2(linear.reg)
```

```
## Chi2               470.2054
## Df                 3
## Sig.               0
## Cox and Snell Index  0.193856
## Nagelkerke Index     0.2989339
## McFadden's R2        0.2061106
```

Stage 7

```
# 7
modell <- as.formula("employment ~ care_fo_g+care_in_g  + RB090 +
                education + EQ_SS + DB100+DB100:care_fo_g+DB100:care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)              4.3786     0.5155   8.494  < 2e-16 ***
## care_fo_g                0.7728     0.4053   1.907   0.0567 .
## care_in_g                0.5591     0.3979   1.405   0.1602
## RB090                   -2.7305     0.1971 -13.854  < 2e-16 ***
## educationLow_educated    -1.4358     0.1763  -8.144 6.44e-16 ***
## educationMedium_educated  -0.8000     0.1593  -5.021 5.55e-07 ***
## EQ_SS                    -0.3736     0.1561  -2.394   0.0168 *
## DB100                    -0.3358     0.3461  -0.970   0.3320
## care_fo_g:DB100           0.5057     0.4357   1.161   0.2459
## care_in_g:DB100          -0.3901     0.4244  -0.919   0.3581
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9912803)
##
## Number of Fisher Scoring iterations: 6
```

```
LogRegR2(linear.reg)
```

```
## Chi2               577.8684
## Df                 9
```

```
## Sig.               0
## Cox and Snell Index  0.2358768
## Nagelkerke Index     0.3627112
## McFadden's R2        0.2560388
```

Stage 8

```
# 8
modell <- as.formula("employment ~ care_fo_g+care_in_g  + RB090 +
                education + EQ_SS + RB090:care_fo_g+ RB090:care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)            4.09345    0.47562   8.607  < 2e-16 ***
## care_fo_g              0.96639    0.42446   2.277   0.0229 *
## care_in_g              0.27427    0.34832   0.787   0.4311
## RB090                 -2.75377    0.29646  -9.289  < 2e-16 ***
## educationLow_educated    -1.45231    0.17562  -8.270 2.33e-16 ***
## educationMedium_educated -0.80295    0.15992  -5.021 5.56e-07 ***
## EQ_SS                 -0.37546    0.15634  -2.402   0.0164 *
## care_fo_g:RB090          0.30348    0.45060   0.673   0.5007
## care_in_g:RB090         -0.08135    0.37890  -0.215   0.8300
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9762217)
##
## Number of Fisher Scoring iterations: 6

LogRegR2(linear.reg)

## Chi2               573.8825
## Df                 8
## Sig.               0
## Cox and Snell Index  0.2344576
## Nagelkerke Index     0.3605288
## McFadden's R2        0.2542727
```

UK just man

```
# Used packages

load("df.children_caregroups_UK_adoc.RData")
df.children <- data.frame(df.children)

#############################################################################################
# employment to numeric data


# employment and gender to numeric data

df.children$employment <- as.numeric(df.children$employment)
df.children$RB090 <- as.numeric(df.children$RB090)

df.children$RB090[df.children$RB090 == 1] <- 0 # man
df.children$RB090[df.children$RB090 == 2] <- 1 # woman
df.children <- df.children[df.children$RB090 == "0",]
# Use weights
des = svydesign(ids = ~1,
```

```
        data = df.children,
        weights = df.children$RB050
)
```

Stage 1

```
# Total steps

# 1
modell <- as.formula("employment ~ care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.7664     0.2451   11.29   <2e-16 ***
## care_in_g     0.4687     0.3301    1.42    0.156
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.004061)
##
## Number of Fisher Scoring iterations: 6

LogRegR2(linear.reg)

## Chi2               2.347895
## Df                 1
## Sig.               0.1254523
## Cox and Snell Index  0.002435135
## Nagelkerke Index     0.007732714
## McFadden's R2        0.006446432
```

Stage 2

```
# 2
modell <- as.formula("employment ~ care_fo_g +care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.4871     0.2445  10.172   <2e-16 ***
## care_fo_g     1.0444     0.4203   2.485   0.0131 *
## care_in_g     0.3776     0.3415   1.106   0.2692
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9758924)
##
## Number of Fisher Scoring iterations: 6
```

```
LogRegR2(linear.reg)
```

```
## Chi2               11.47452
## Df                 2
## Sig.               0.003223581
## Cox and Snell Index  0.01184469
## Nagelkerke Index     0.03761253
## McFadden's R2        0.03150471
```

Stage 3

```
# 3
modell <- as.formula("employment ~ care_fo_g +care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.4871     0.2445  10.172   <2e-16 ***
## care_fo_g     1.0444     0.4203   2.485   0.0131 *
## care_in_g     0.3776     0.3415   1.106   0.2692
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9758924)
##
## Number of Fisher Scoring iterations: 6
```

```
LogRegR2(linear.reg)
```

```
## Chi2               11.47452
## Df                 2
## Sig.               0.003223581
## Cox and Snell Index  0.01184469
## Nagelkerke Index     0.03761253
## McFadden's R2        0.03150471
```

Stage 4

```
# 4
modell <- as.formula("employment ~ care_fo_g +  care_in_g  + education ")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)             3.3996     0.4939   6.883 1.07e-11 ***
## care_fo_g               1.0237     0.4162   2.460 0.014088 *
## care_in_g               0.2729     0.3536   0.772 0.440441
## educationLow_educated    -1.6116     0.4676  -3.446 0.000594 ***
## educationMedium_educated  -1.0422     0.5023  -2.075 0.038284 *
```

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9393038)
##
## Number of Fisher Scoring iterations: 6
```

```
LogRegR2(linear.reg)
```

```
## Chi2               29.88417
## Df                 4
## Sig.               5.167492e-06
## Cox and Snell Index  0.03119365
## Nagelkerke Index     0.09777022
## McFadden's R2        0.08247002
```

Stage 5

```
# 5
modell <- as.formula("employment ~ care_fo_g+care_in_g + education + EQ_SS")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)              3.7056     1.1216   3.304 0.000990 ***
## care_fo_g                1.0059     0.4391   2.291 0.022214 *
## care_in_g                0.2716     0.3540   0.767 0.443099
## educationLow_educated    -1.5860     0.4602  -3.447 0.000593 ***
## educationMedium_educated  -1.0313     0.4941  -2.087 0.037117 *
## EQ_SS                    -0.1448     0.4185  -0.346 0.729420
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9413383)
##
## Number of Fisher Scoring iterations: 6
```

```
LogRegR2(linear.reg)
```

```
## Chi2               30.08798
## Df                 5
## Sig.               1.417198e-05
## Cox and Snell Index  0.03140301
## Nagelkerke Index     0.09842644
## McFadden's R2        0.08303247
```

Stage 6

```
# 6
modell <- as.formula("employment ~ care_fo_g +care_in_g + education + EQ_SS + DB100")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
```

```
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)             4.5245     1.1607   3.898 0.000104 ***
## care_fo_g               0.9620     0.4421   2.176 0.029794 *
## care_in_g               0.2882     0.3552   0.811 0.417316
## educationLow_educated    -1.5918     0.4584  -3.473 0.000539 ***
## educationMedium_educated  -1.0221     0.4947  -2.066 0.039080 *
## EQ_SS                   -0.1434     0.4135  -0.347 0.728895
## DB100                   -0.8843     0.5437  -1.626 0.104205
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9018478)
##
## Number of Fisher Scoring iterations: 6
```

```
LogRegR2(linear.reg)
```

```
## Chi2               31.98342
## Df                 6
## Sig.               1.643748e-05
## Cox and Snell Index  0.03334794
## Nagelkerke Index     0.1045224
## McFadden's R2        0.08826321
```

Stage 7

```
# 7
modell <- as.formula("employment ~ care_fo_g+care_in_g  + education +
                EQ_SS + DB100+DB100:care_fo_g+DB100:care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                         Estimate Std. Error t value Pr(>|t|)
## (Intercept)              3.60844    1.18091   3.056 0.002310 **
## care_fo_g                2.08112    1.20318   1.730 0.084016 .
## care_in_g               15.20644    0.59294  25.646  < 2e-16 ***
## educationLow_educated    -1.58306    0.45874  -3.451 0.000584 ***
## educationMedium_educated  -1.03639    0.49678  -2.086 0.037231 *
## EQ_SS                   -0.12584    0.41635  -0.302 0.762534
## DB100                    0.04463    0.67464   0.066 0.947270
## care_fo_g:DB100         -1.15590    1.27219  -0.909 0.363801
## care_in_g:DB100        -15.00405    0.69103 -21.712  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.888879)
##
## Number of Fisher Scoring iterations: 17
```

```
LogRegR2(linear.reg)
```

```
## Chi2               34.79874
## Df                 8
## Sig.               2.909227e-05
## Cox and Snell Index  0.03622957
## Nagelkerke Index     0.1135543
## McFadden's R2        0.09603253
```

UK just Women

```
# Used packages
load("df.children_caregroups_UK_adoc.RData")
df.children <- data.frame(df.children)

##############################################################################################


# employment and gender to numeric data

df.children$employment <- as.numeric(df.children$employment)
df.children$RB090 <- as.numeric(df.children$RB090)

df.children$RB090[df.children$RB090 == 1] <- 0 # man
df.children$RB090[df.children$RB090 == 2] <- 1 # woman
df.children <- df.children[df.children$RB090 == "1",]

# Use weights
des = svydesign(ids = ~1,
            data = df.children,
            weights = df.children$RB050
)
```

Stage 1

```
# Total steps

# 1
modell <- as.formula("employment ~ care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.3505     0.1037   3.381 0.000746 ***
## care_in_g     0.4292     0.1370   3.134 0.001768 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.003313)
##
## Number of Fisher Scoring iterations: 4

LogRegR2(linear.reg)

## Chi2               12.63386
## Df                 1
## Sig.               0.0003788223
## Cox and Snell Index  0.0103106
## Nagelkerke Index     0.0141461
## McFadden's R2        0.007941015
```

Stage 2

```
# 2
modell <- as.formula("employment ~ care_fo_g +care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.0805     0.1204  -0.669   0.5039
## care_fo_g     1.2625     0.1497   8.435   <2e-16 ***
## care_in_g     0.3195     0.1451   2.202   0.0278 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9984191)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2                 110.8941
## Df                   2
## Sig.                 0
## Cox and Snell Index  0.08695613
## Nagelkerke Index     0.1193035
## McFadden's R2        0.06970249
```

Stage 3

```
# 3
modell <- as.formula("employment ~ care_fo_g +care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
summary(linear.reg)
```

```
##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.0805     0.1204  -0.669   0.5039
## care_fo_g     1.2625     0.1497   8.435   <2e-16 ***
## care_in_g     0.3195     0.1451   2.202   0.0278 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 0.9984191)
##
## Number of Fisher Scoring iterations: 4
```

```
LogRegR2(linear.reg)
```

```
## Chi2                 110.8941
## Df                   2
## Sig.                 0
## Cox and Snell Index  0.08695613
## Nagelkerke Index     0.1193035
## McFadden's R2        0.06970249
```

Stage 4

```
# 4
modell <- as.formula("employment ~ care_fo_g +  care_in_g  + education ")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)             0.5500     0.1536   3.580 0.000357 ***
## care_fo_g               1.3093     0.1577   8.301 2.76e-16 ***
## care_in_g               0.2027     0.1512   1.340 0.180368
## educationLow_educated    -1.5246     0.1972  -7.729 2.27e-14 ***
## educationMedium_educated  -0.7975     0.1684  -4.736 2.44e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.001784)
##
## Number of Fisher Scoring iterations: 3

LogRegR2(linear.reg)

## Chi2               195.4216
## Df                 4
## Sig.               0
## Cox and Snell Index  0.1497081
## Nagelkerke Index     0.2052753
## McFadden's R2        0.1241052
```

Stage 5

```
# 5
modell <- as.formula("employment ~ care_fo_g+care_in_g + education + EQ_SS")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)             1.4359     0.3871   3.709 0.000218 ***
## care_fo_g               1.2640     0.1577   8.017 2.56e-15 ***
## care_in_g               0.1948     0.1517   1.285 0.199110
## educationLow_educated    -1.4372     0.1944  -7.394 2.66e-13 ***
## educationMedium_educated  -0.7740     0.1695  -4.567 5.46e-06 ***
## EQ_SS                   -0.4278     0.1740  -2.459 0.014064 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.004423)
##
## Number of Fisher Scoring iterations: 4

LogRegR2(linear.reg)
```

```
## Chi2               204.6315
## Df                 5
## Sig.               0
## Cox and Snell Index  0.1561822
## Nagelkerke Index     0.2141523
## McFadden's R2        0.129954
```

Stage 6

```
# 6
modell <- as.formula("employment ~ care_fo_g +care_in_g +
                education + EQ_SS + DB100")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)             1.6571     0.4428   3.742 0.000191 ***
## care_fo_g               1.2531     0.1575   7.954 4.15e-15 ***
## care_in_g               0.1988     0.1517   1.310 0.190519
## educationLow_educated    -1.4330     0.1948  -7.356 3.51e-13 ***
## educationMedium_educated  -0.7725     0.1693  -4.562 5.60e-06 ***
## EQ_SS                   -0.4285     0.1753  -2.444 0.014658 *
## DB100                   -0.2433     0.2361  -1.030 0.303004
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.006155)
##
## Number of Fisher Scoring iterations: 4

LogRegR2(linear.reg)

## Chi2               205.8239
## Df                 6
## Sig.               0
## Cox and Snell Index  0.1570168
## Nagelkerke Index     0.2152967
## McFadden's R2        0.1307113
```

Stage 7

```
# 7
modell <- as.formula("employment ~ care_fo_g+care_in_g  + education +
                EQ_SS + DB100+DB100:care_fo_g+DB100:care_in_g")
linear.reg = svyglm(modell, family = binomial, design = des)

## Warning in eval(family$initialize): non-integer #successes in a binomial glm!

summary(linear.reg)

##
## Call:
## svyglm(formula = modell, design = des, family = binomial)
##
## Survey design:
## svydesign(ids = ~1, data = df.children, weights = df.children$RB050)
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)             1.7689     0.5203   3.400 0.000697 ***
```

```
## care_fo_g                0.7169     0.4332   1.655 0.098194 .
## care_in_g                0.4514     0.4294   1.051 0.293392
## educationLow_educated    -1.4239     0.1956  -7.279 6.09e-13 ***
## educationMedium_educated  -0.7754     0.1696  -4.572 5.33e-06 ***
## EQ_SS                    -0.4265     0.1744  -2.445 0.014632 *
## DB100                    -0.3625     0.3855  -0.940 0.347261
## care_fo_g:DB100           0.6051     0.4654   1.300 0.193799
## care_in_g:DB100          -0.2890     0.4589  -0.630 0.528902
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1.003868)
##
## Number of Fisher Scoring iterations: 4
```

LogRegR2(linear.reg)

```
## Chi2               208.1379
## Df                 8
## Sig.               0
## Cox and Snell Index  0.158634
## Nagelkerke Index     0.2175142
## McFadden's R2        0.1321808
```