Explaining Local Variation in Childcare Coverage:

A Crisp-Set Analysis of Italy and France

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Summary

Using crisp-set Qualitative Comparative Analysis (csQCA), this thesis aims to explain local variation in childcare coverage in Italy and France. It is guided by the research question: Which (combinations of) conditions lead to comparatively high/low childcare coverage in Italian provinces and French departments? In order to answer the research question, the thesis reviews previous findings from the broader literature on local variation of welfare provision in Europe, focusing on childcare in Italy and France. It categorizes factors expected to affect childcare coverage into demand-side, supply-side, and contextual conditions. The various types of condition are linked to broader theoretical discourses with a view to formulate concrete expectations regarding their favorability or unfavorability for high childcare coverage. The theoretical framework accounts for system-specific features of each country's childcare system, that is, a large private sector in Italy and a large childminding sector in France. The thesis then employs csQCA methods to identify necessary and sufficient conditions for comparatively high/low childcare coverage in Italian provinces and French departments. The main results are the identification of two contrasting sufficient paths to high childcare coverage in each country. In Italian provinces, a public path marked by high public childcare expenditure and a comparatively small private sector dominates. This path is linked to a left-leaning political orientation. In addition, there is a less common private path, marked by low public childcare expenditure and a large private sector. This path is linked to a right-leaning political orientation. The findings for Italy thus confirm a theoretically expected left-leaning preference for the public sector and a right-leaning preference for the private sector. In French departments, the predominant path is characterized by a large childminding sector and comparatively low poverty. The less common path is characterized by a smaller childminding sector and higher poverty, as well as high economic development and declining fertility. Findings for France show that a large childminding sector in high-coverage departments depends on favorable socioeconomic conditions due to higher user costs of childminders compared to public crèches. The alternative path further illustrates that in some cases the absence of a large childminding sector can be compensated for by two conditions in order to still achieve high coverage: (1) high economic development, which presumably leads to higher tax revenue and thus allows larger investments in public crèches, and (2) declining fertility, which decreases demand and therefore makes it easier to cover a larger share of the target population. In sum, system-specific features are thus key to understanding local variation in both Italy and France.

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Regarding my motivation for this thesis, my interest in the topic of childcare was first sparked during my studies at the University of Nantes in France. My social policy professor at the time, Dr. Clémence Ledoux, invited me to support her as a research assistant. While working with her, I started diving into the comparative welfare state literature. Work-life reconciliation policies soon became the focus of my own research and I ended up writing a thesis about the childcare system of my native Germany. Many thanks therefore go to Dr. Clémence Ledoux for introducing me to the exciting field of comparative social policy.

Finally, my deepest gratitude goes to my family and friends. I can always count on their full and unconditional support. Especially my brother and my parents have enabled me to pursue and reach many goals, including writing this thesis. My achievements are also theirs.

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List of Abbreviations

CNAF	French National Family Allocation Office
csQCA	crisp-set Qualitative Comparative Analysis
CMG	Complément de Mode de Garde
EU	European Union
EUR	Euro
fsQCA	fuzzy-set Qualitative Comparative Analysis
GDP	Gross Domestic Product
INSEE	French National Institute of Statistics and Economic Studies
ISTAT	Italian National Statistics Institute
ONAPE	French National Early Childhood Observatory
PISA	Program for International Student Assessment
PSU	Prestation Service Unique
QCA	Qualitative Comparative Analysis
TFR	Total Fertility Rate

List of Boolean Symbols

*	Logical AND
+	Logical OR
←	Relationship of Necessity
→	Relationship of Sufficiency
1	Presence of Outcome/Condition
0	Absence of Outcome/Condition

1 Introduction

1.1 Setting the Context

The provision of formal childcare for children under the age of three has become a European priority since the turn of the twenty-first century. One of the reasons for this development is the fact that Program for International Student Assessment (PISA) studies periodically link socioeconomic background to school attainment in European countries (European Commission, 2019a, pp. 24-25). One of the aims of formal childcare is to break this relationship by providing equal learning environments to all children from the earliest age.

Consequently, the European Union (EU) has been promoting the expansion of formal childcare with increased intensity as part of its social agenda (for example, see the recent Council Recommendation on High-Quality Early Childhood Education and Care Systems; EUR-Lex, 2019). The eleventh principle of the European Pillar of Social Rights proclaims affordable and high-quality childcare a right of every child (European Commission, 2021). Formal childcare is thus increasingly related to questions of equal opportunities and social justice.

Expanding formal childcare also serves economic interests. In particular, it may boost female employment by facilitating work-life reconciliation, thus also making it a valuable tool for promoting gender equality in the labor market. The economic rationale behind childcare is perhaps best articulated by the increasingly influential social investment paradigm (Esping-Andersen et al., 2002; Hemerijck, 2017; Morel et al., 2012). This approach emphasizes that childcare not only helps alleviate child poverty by enabling parents (especially mothers) to pick up work, but that it also constitutes an investment in human capital by stimulating the (non-)cognitive development of children, thus improving their future education and labor market outcomes. Public investment in early childhood is argued to pay off long-term through a rise in tax revenue and a drop in social transfers, as future workers will be able to provide for themselves and their families with higher and more stable market incomes.

In sum, the socially relevant objectives of childcare policies are therefore interrelated and concern the promotion of female (especially maternal) employment, work-life reconciliation, gender equality, the improvement of children's wellbeing and capacities, as well as the reduction of poverty and social inequalities. Accordingly, childcare is increasingly construed as a universal social right which should be granted to all citizens equally, since unequal access may lead to the

unintended consequence of further increasing, rather than decreasing, social inequalities (Van Lancker, 2013).

As a result, scholarly and political interest in territorial inequalities related to the provision of formal childcare has grown. With regard to territorial differences, research has traditionally focused on explaining cross-national variation in childcare systems, highlighting variation in coverage rates (Bonoli & Reber, 2010), governance structures (European Commission, 2019b), and policy packages (Saraceno, 2011). However, in light of an increasingly decentralized provision of welfare services in European countries (Andreotti et al., 2012; Kazepov, 2010; Kutsar & Kuronen, 2015), the local dimension of childcare has garnered more importance (Hlepas et al., 2016). The study of local variation in childcare provision has thus become an integral part of the larger theoretical debate surrounding the decentralized provision of welfare services.

Yet, comparative studies tend to be either small-n case studies of municipalities from different countries (e.g., Kampichler et al., 2015; Kuronen et al., 2015) or medium-n regional-level analyses (e.g., Busemeyer & Seitzl, 2018; Da Roit et al., 2019). In order to more comprehensively explain local variation in childcare provision, however, a systematic larger-n analysis below the broad regional level but above the fragmented municipal level is necessary, as such an approach allows identifying nuanced patterns of local variation while still accounting for local context. This thesis fills this gap by analyzing local variation in childcare coverage on the provincial/departmental level in the decentralized childcare systems of Italy and France.

Since provision of formal childcare is decentralized in both Italy and France, key decisions are made at the local level. This arrangement has led to significant local variation in childcare coverage. In Italy, cross-provincial variation in childcare coverage ranges from 46.8% in Ravenna (Emilia-Romagna) to 6.2% in Caltanissetta (Sicily) (ISTAT, 2021). In France, cross-departmental variation ranges from 30.8% in Seine-Saint-Denis (Ile-de-France) to 87.8% in Haute-Loire (Auvergne-Rhône-Alps) (ONAPE, 2020). While childcare coverage rates in Italy and France noticeably differ in absolute terms, they are thus similar in their local variation. Italy, as a low-coverage, high-variation country, and France, as a high-coverage, high-variation country, are therefore challenging case studies, raising questions as to whether similar or context-specific causal conditions and dynamics are at play. In particular, this study thus aims to answer the question: Which (combinations of) conditions lead to comparatively high/low childcare coverage in Italian provinces and French departments?

1.2 Outline of the Thesis

After the introduction, Chapter 2 reviews prior research into the local variation of welfare provision in Europe, focusing on childcare in Italy and France. The review categorizes previous findings into demand-side, supply-side, and contextual causal conditions. In addition, it highlights a research gap regarding the lack of systematic studies exploring local variation in childcare coverage as well as a methodological gap concerning the overwhelming use of mainstream statistical methods. A configurational method is argued to be more appropriate to grasp interdependent causal effects of various conditions.

In Chapter 3, the findings of the literature review are linked to broader theoretical debates, complemented by own theoretical reflections, and transformed into a coherent theoretical framework. Concrete expectations are formulated about the effect of various conditions on childcare coverage in Italy and France. Theoretical elaborations adopt the categorization into demand-side, supply-side, and contextual conditions. Demand-side theory addresses the role of rising female employment and fertility in creating childcare needs and to what extent this leads to higher or lower childcare coverage. Supply-side theory focuses on the relationship between the political orientation of ruling parties and public childcare expenditure. Finally, context-related theories specific to each country's childcare system are elaborated.

Chapter 4 presents the research design. First, it repeats the main research question and formulates sub-research questions based on the categorization into demand-side, supply-side, and contextual conditions. Sub-research questions also inquire whether conditions are necessary or sufficient. After justifying the case selection in favor of the local level, the chapter then details the methods applied in this study. It introduces crisp-set Qualitative Comparative Analysis (csQCA) as a suitable method for explaining local variation in childcare coverage, highlighting its advantages over mainstream statistical methods. Lastly, the chapter operationalizes the outcome and condition variables and presents the data tables underlying software analysis.

Chapter 5 presents the results. It identifies necessary and sufficient conditions for high and low childcare coverage in Italy and France. Where possible, necessary conditions for high and low childcare coverage are identified for specific outcome constellations. Moreover, necessary conditions are identified for the *highest* and *lowest* childcare coverage in order to allow for a more nuanced discussion of the results. Finally, the chapter identifies multiple sufficient combinations of conditions for high and low childcare coverage in both countries.

Chapter 6 interprets the results in light of theoretical expectations and findings from prior research. It further discusses the observation that there are multiple combinations of conditions leading to high or low childcare coverage, focusing on the two main contrasting paths to high coverage in each country. The chapter also explores how various conditions interact to produce the observed outcome.

Chapter 7 concludes this study. It provides concise answers to the main research question based on the sub-research questions formulated in Chapter 4. It further offers some final reflections regarding the causal implications of the provided answers, focusing on the interdependence and relative weight of demand-side, supply-side, and contextual conditions. In addition, it highlights similarities and differences between local variation in Italy and France. Finally, it points to limitations of this study and ends with recommendations for future research.

2 Literature Review

The debate surrounding local variation in childcare coverage needs to be embedded in a wider European debate concerning decentralized welfare provision. Consequently, this chapter first reviews key findings of the European literature on local variation of welfare provision. It then looks specifically at the childcare coverage in Italy and France, highlighting specific features of the respective childcare systems. A brief summary concludes the chapter.

2.1. Local Variation of Welfare Provision in Europe

Welfare services are often administered by the local level, leading to significant variation in provision and take-up depending on local political, financial, demographic, and socioeconomic context. The dynamics of local welfare provision in European countries have been the subject of increased academic interest since scholars identified a "rescaling" of social policies resulting from neoliberal reforms starting in the 1980s (Kazepov, 2010). In line with the neoliberal tenets of national government reduction and individualization/localization of responsibilities, this rescaling process saw the transfer of regulatory, financial, and administrative responsibilities for various social services from the national to the sub-national level.

The allocation of additional services to the local level allowed scholars to develop a coherent theoretical concept of local welfare systems, defined by Andreotti et al. (2012) as "dynamic arrangements in which the specific local socioeconomic and cultural conditions give rise to different mixes of formal and informal actors, public or not, involved in the provision of welfare resources" (p. 1925). This local embeddedness of local welfare systems, while allowing for tailor-made responses to locally specific needs, is simultaneously a source of territorial variation, since it favors the accentuation of existing differences over (potential) national aims of equality and universalism, even in the much-touted universalistic Nordic welfare states (Burau & Vabo, 2011; Vabo & Burau, 2011).

Studies from across Europe have highlighted different aspects of locally specific contexts that help explain local variation in welfare service provision. The findings are best categorized into demand-side, supply-side, and contextual factors. Demand-side factors relate to the target group of a service or benefit, whereas supply-side factors regard the providers thereof. Contextual factors concern broader socioeconomic, institutional, and financial structures that recipients and providers of services are embedded in. Despite the conceptual boundaries being blurry at times, the three-

category distinction is a useful heuristic, as it captures and structures the multi-dimensionality of local welfare provision. The respective explanatory power assigned to each category of factors varies from study to study.

Thus, analyzing local variation in spending on elderly care services in Danish municipalities, Jensen and Lolle (2013) found that the demographic makeup of municipalities, i.e., their demand structures, helped explain part of the observed variation. In addition, they note that differences in municipal spending capacity also mattered. The authors do not make use of the three-category distinction into demand-side, supply-side, and contextual factors, but in general the financial solvency of a municipality should be considered a contextual factor, as broader economic structures constitute a background condition shaping the scope of action of service providers. Ultimately, these structures lie beyond the immediate control of local service providers.

As a supply-side factor, the share of private providers in a given municipality was further found to influence public elderly care spending. Counterintuitively, a larger share of private provision was associated with higher public spending. Finally, the authors found no influence of the political orientation of municipal councils on local variation. As a potential explanation for this counterintuitive finding, they hypothesize that on the local level, contrary to the national level, practical problem-solving may be more important than ideology. According to the authors' regression models, the combined influence of the identified factors accounted for half of the variation.

The partly counterintuitive findings and only partial explanatory power of this study highlight a general problem regarding the use of standard regression analyses to explain local variation in welfare provision. Local contexts are complex, and measuring the independent impact of single variables does not capture this complexity well, leading to either unsatisfactory results in terms of variation explained or counterintuitive findings that are somewhat hard to theoretically justify. For this reason, the configurational approach taken in this thesis may be better suited to explain local variation, as it allows testing the combined effect of various conditions. As far as regression analyses are concerned, however, the Jensen and Lolle (2013) study was a notable improvement upon previous studies. Thus, a much-cited earlier study of local variation in elderly care services in Swedish municipalities concluded that none of its tested variables explained the variation beyond a very limited extent (Trydegard & Thorslund, 2001).

A recent example of a regression analysis of local variation in welfare service provision arrives at more theoretically robust, but perhaps still surprising, results. The study, conducted by Arlotti et al. (2021), focuses on long-term care policy in Italy. Analyzing provincial-level data concerning the take-up of a national long-term care program, the authors show that the multi-level governance structure of the program, which assigns management duties to the local level, leads to high 'local discretion' in the implementation of the service.

The concept of 'local discretion' refers to the leeway granted to local authorities concerning the claiming, distribution, and delivery of benefits and services. Since the costs of the program are fully covered by the national budget, the authors argue that local authorities in poorly developed provinces apply eligibility criteria more loosely in order to gain access to a larger portion of the program's funds. This conclusion is supported by data indicating that the significantly higher take-up rates in less socioeconomically developed provinces cannot be explained by either their demographic structures (demand) or the political orientation of their ruling parties (supply). In other words, irrespective of political ruling coalition, provinces with similar needs, but with lower levels of socioeconomic development, make considerably more use of the long-term care program. In sum, the authors thus find supply and demand factors to be irrelevant to variation, the sole explanation being the contextual variable of socioeconomic development.

While the interpretation of the results is plausible, the complete dismissal of supply and demand factors in favor of a one-dimensional explanation is surprising. Unexpectedly one-dimensional results are, of course, neither empirically wrong nor undesirable, especially since previous studies have also stressed a strong correlation in Italy between service provision and economic development (Pavolini, 2015). However, one-dimensional results beg the question whether the applied methods allowed detecting causal complexity if it was in fact there. Regardless of methods, the study highlights that even a centrally funded welfare program, which is specifically designed to ensure homogenous application throughout the territory, is prone to local variation due to Italy's high degree of institutional fragmentation.

2.2 Local Variation in Childcare Coverage in Italy

Similar studies exploring provincial-level variation in childcare coverage in Italy are not available. The most comprehensive academic study concerns the regional level. Thus, in order to understand how varying policy legacies, unequal economic development, and cultural differences

interact with the decentralized organization of childcare to produce cross-regional variation in public childcare provision, Da Roit et al. (2019) conducted a fuzzy-set analysis of childcare coverage in all twenty Italian regions. They concluded that economic development and female employment were necessary but insufficient conditions for high coverage rates, whereas familistic values, path dependencies (i.e., lack of early investment in childcare infrastructure), and a lack of social capital were necessary but insufficient conditions for low coverage rates. Similar to the conclusions of Arlotti et al. (2021), the political orientation of ruling parties seemed irrelevant.

One of the advantages of this study is its configurational methodology, which allows grasping causal complexity to a larger degree than studies using mainstream quantitative methods. Thus, the study shows that demand, as measured by female employment, needs to be accompanied by a certain degree of economic development in order to impact on the provision of public childcare. This is a coherent finding, as the public resources that may be spent on childcare are conditioned by tax revenue, which in turn depends on economic development. A combination of favorable demand and contextual factors is therefore conducive to high regional childcare coverage according to the study. However, since the authors only consider the public supply of childcare, the study neglects a substantial part of the Italian childcare system, which is characterized by a large (and growing) private sector (Da Roit & Sabatinelli, 2013). To illustrate, in the school year 2018/2019, private providers accounted for 48.4% of all childcare places for children below the age of three (ISTAT, 2021). Since some regions rely on private provision more than others, solely looking at public supply does not reflect the actual supply structures facing parents and their young children and draws an incomplete picture of the Italian childcare landscape.

A further downside of the study is its unit of analysis. Since municipalities are mainly responsible for childcare in Italy, a lot of local context and variation gets lost in regional data. Italian regions can certainly take on an important role through agenda-setting and financial support, and they have done so historically. Thus, when childcare for children below the age of three was first institutionalized in 1971, the national and regional governments were tasked with the regulation, financing, and programming of the service, whereas municipalities were responsible for the implementation (Sabatinelli, 2016). The goal of this arrangement was free and universal coverage. However, broad financial support from the upper levels of government never materialized as planned, leading to a gradual fragmentation of the childcare system only a decade later.

In particular, the fragmentation process was boosted by a law passed in 1983 making childcare provision an optional municipal service for which municipalities could charge fees. Yet, some regions, such as Tuscany and Emilia-Romagna, which had a strong communist party during the initial stages of the public institutionalization of childcare, prioritized the expansion of the service. In addition to their left-leaning political orientation, these regions profited from high economic development, which allowed them to finance the creation of new childcare places. Economically and institutionally less developed regions in the South, in contrast, fell behind early (Barillà et al., 2020), highlighting the configurational logic characteristic of childcare development.

Path dependencies were thus created, as still today, the current childcare coverage rates of the less developed Southern regions (e.g., Calabria, Sicily, Campania) hover around 10%. Meanwhile, those of the rich Northern-Central pioneer regions, such as Tuscany and Emilia-Romagna, are approaching 40% (Dipartimento per le politiche della famiglia, 2020, p. 9). Analyzing sub-national variation on the regional level therefore has its merits and serves to identify and explain certain macro trends. However, the gradual concentration of responsibility on the municipal level has allowed for local dynamics and catching-up processes that are canceled out in aggregate data by less dynamic localities and are therefore not captured by regional-level analyses.

The local, cross-municipal variation is confirmed by the yearly statistical reports of the national Italian statistics institute (ISTAT) concerning childcare coverage (for the most recent report, see ISTAT, 2020) as well as the first, more detailed report resulting from ISTAT's newly established collaboration with Ca' Foscari University of Venice and the Department for Family Affairs (Dipartimento per le politiche della famiglia, 2020). Yet, these reports remain largely descriptive and lack a systematic search for causal explanations. The latter report does point out, however, that take-up of childcare services is strongly linked to the socioeconomic status, i.e., educational attainment and income, of parents.

2.3 Local Variation in Childcare Coverage in France

French authorities also publish detailed annual reports on the supply of childcare places for children below the age of three. Drafted by the National Early Childhood Observatory (ONAPE), which operates under the auspices of the National Family Allocation Office (CNAF), they highlight the sub-national variation in childcare coverage on all levels – regional, departmental, municipal (for the most recent report, see ONAPE, 2020). Similar to the Italian reports, however, they remain

descriptive. On the macro level, the starkest differences are between the Northwestern regions of Britany and Loire Counties (*Pays de la Loire*), where coverage rates reach between 70% and 88%, and the Mediterranean region spanning departments of the regions Occitania and Provence-Alps-French Riviera, where coverage rates are between 40% and 50% (ONAPE, 2020, p. 19).

French studies focusing on inequality in the childcare sector tend to focus on unequal take-up rather than unequal supply, aggregating survey data from across the country. Thus, since 2002, multiple government departments and agencies collaborate every six to seven years to conduct a large-scale survey involving several thousands of households in order to identify the socioeconomic background of families using childcare (Ananian & Robert-Bobée, 2009; Daniel & Ruault, M., 2003; Villaume & Legendre, 2014). In line with well-established findings from cross-country comparisons which confirm unequal childcare use across European countries (Bonoli et al., 2017; Pavolini & Van Lancker, 2018; Van Lancker & Ghysels, 2016), the French government surveys show a strong pattern of inequality along socioeconomic lines, meaning children of parents with higher educational attainment and income are more likely to attend formal childcare than their less well-off counterparts.

This disparity is largest regarding the use of government-certified childminders (*assistants maternels*), which form an integral part of the French childcare system and accounted for 56% of all childcare places in 2018/2019 (ONAPE, 2020, p. 25). The larger socioeconomic disparity regarding the use of certified childminders may be due to the different public financing mechanisms co-existing in France. Thus, the supply-side subsidy going directly to public departmental and municipal crèches (the PSU, *Prestation Service Unique*) and the demand-side subsidy going directly to parents to help cover the salary of certified childminders (the CMG, *Complément de Mode de Garde*) lead to different total costs for parents (Igas & IGF, 2017). This effect occurs despite the general use of sliding fee scales in France, which charge higher or lower fees according to parents' income and the size of the family. Consequently, the estimated monthly childcare costs for a family earning a minimum income are EUR143 for the use of a childminder, opposed to EUR57 for a place in a departmental or municipal crèche (Collombet, 2018, p. 77).

In European comparison, as Collombet (2018) notes, the pronounced socioeconomic inequalities observed in France are unexpected, since the French childcare system is heavily subsidized. This is usually associated with less inequality, whereas more market provision is linked to higher inequality (Van Lancker & Ghysels, 2016). Although none of the reviewed studies on

France attempt to link patterns of unequal use to the observed territorial inequality of childcare coverage, the fact that there is a reliable geographic dimension to socioeconomic inequalities suggests that the findings could still be helpful in explaining local variation in childcare coverage.

2.4 Summary

The broader European literature on local variation of welfare provision identifies demand-side, supply-side, and contextual factors as potential sources of variation. However, many studies struggle to combine these factors into causally complex explanations due to the use of mainstream statistical methods. This poses the problem that the interaction of conditions cannot be thoroughly explored. Moreover, systematic studies into the local variation of childcare coverage are missing in both Italy and France. Existing studies focus either on regional differences or inequality in take-up. Finally, the review highlights a large private sector in Italy and a large childminding sector in France as important system-specific features of the respective childcare systems.

3 Theory

Building on the findings of the literature review, this chapter elaborates a coherent theoretical framework. It defines important concepts and formulates concrete theoretical expectations concerning the influence of demand-side, supply-side, and contextual factors on childcare coverage. These factors are conceived of as *conditions* that are either favorable or unfavorable to high coverage. Concrete expectations are also formulated regarding the interaction of different conditions. A thorough definition of childcare and childcare coverage precedes the theoretical reflections on demand-side, supply-side, and contextual conditions. A brief summary concludes the chapter.

3.1 Defining Childcare and Childcare Coverage

3.1.1 Childcare

In this study, childcare refers to *formal* childcare. Formal childcare stands in opposition to *informal* childcare. Informal childcare refers to care provided by parents, grandparents, and uncertified childminders, such as au-pairs or other informal 'baby-sitters'. Formal childcare refers to multiple types of professionalized care. In France, the term covers public and private crèches as well as certified childminders. Public crèches are the responsibility of either the departments or the municipalities. Private crèches include both for- and not-for-profit-run establishments. Public and heavily subsidized not-for-profit providers account for about 85% of all places in crèches, but private provision is gradually increasing (Négrier, 2020). Most private crèches are so-called *micro-crèches*, which are only allowed to welcome up to ten children and are therefore smaller than their public counterparts. Certified childminders receive their certification from their respective departmental councils after having successfully completed a well-defined application procedure. They account for the bulk of total childcare supply (60%) (ONAPE, 2020).

In Italy, formal childcare includes different types of *nidi* (crèches) as well as the so-called spring sessions (*sezione primavera*) and innovative childcare services (*servizi integrativi per la prima infanzia*). The spring sessions account for 10% of all childcare places (ISTAT, 2021). They are crèches that have been integrated into preschools and are only allowed to welcome children aged between 24 and 36 months. Innovative childcare services only account for 9% of all childcare places (ISTAT, 2021). These services include certified childminders as well as 'centers for children and parents' (*centri bambini genitori*) and 'playing spaces' (*spazi gioco*). The *spazi gioco* are for

children aged between 12 and 36 months and provide flexible care for up to five hours per day. The *centri bambini genitori* provide pedagogical activities that are jointly used by children aged between 3 and 36 months and their parents at flexible hours.

All types of coverage are provided by both public and private entities. It should be noted, however, that private provision does not preclude public subsidization. Thus, municipalities may outsource the administration of publicly funded crèches. Alternatively, municipalities have the option to reserve a share of the places in private crèches for their residents. In these cases, users pay the smaller public fee instead of the larger private fee and the municipality covers the difference.

3.1.2 Childcare Coverage

Childcare coverage refers to the share of children below the age of three which is covered by the total supply of full-day places in formal childcare. Coverage should not be confused with the actual take-up of these places. To clarify the difference between coverage and take-up, it is perhaps useful to think of the former as a supply-side indicator and the latter as a demand-side indicator. Coverage measures the total supply of places as it relates to the target population, whereas take-up measures the extent to which this supply is used. Another caveat is the fact that one full-day place does not necessarily correspond to the use by one child (ONAPE, 2020). In practice, a full-day place may be divided into two half-day places, thus covering two children instead of one. On the other hand, it is also possible that one child takes up two places (ONAPE, 2020). This happens when a child alternates between two different types of coverage. In France, for example, a child may attend a crèche on some days and see a childminder on others.

3.2 Demand-Side Theory

Demand refers to the childcare needs emanating from the population. Theoretically, there are two key sources of childcare needs, and thus two separate causal mechanisms linking demand and coverage. These two sources are rising female employment and rising fertility.

3.2.1 Female Employment

Childcare needs may grow when female employment increases, as more women taking up paid employment is likely to mean that more *mothers* are taking up paid employment. This stimulates demand for formal out-of-home childcare, because although the gendered division of paid and

unpaid labor characteristic of the traditional male-breadwinner/female-housewife family model has been slowly transforming into more gender-egalitarian arrangements across Europe (at different speeds), women still carry the brunt of the care burden (Esping-Andersen, 2009, 2016). Consequently, the more mothers are in paid employment, the more childcare is externalized. Moreover, high female employment increases the likelihood that grandmothers of very young children are unavailable as informal caregivers. Female employment thus impacts on the need for formal childcare by reducing the time available for informal care by both mothers and grandmothers.

3.2.2 Fertility

Rising fertility and the resulting enlargement of the target population of children below the age of three may also generate childcare needs. According to demand-side theory, in both cases, i.e., high female employment and high and/or increasing fertility, the expectation is an increase in childcare coverage, as the supply of places increases in reaction to rising demand. However, there are two objections to this reasoning.

First, there is the issue of reverse causality. Thus, it may be argued that higher coverage causes higher female employment and higher fertility, instead of vice versa. According to this argument, work-family reconciliation policies condition female employment and fertility. In this view, childcare supply has to increase as a first step so that female employment and fertility can rise in a second step. In favor of this argument speaks the observation that in Scandinavian countries, commonly considered pioneers in terms of gender-egalitarian public policies, female employment and fertility rates have increased at a faster pace and balanced out at higher levels than in other European countries since the second half of the twentieth century (Esping-Andersen, 2016). Furthermore, France, with its extensive childcare system, has the highest fertility rates in Europe (Esping-Andersen, 2016).

Indeed, France started investing into pro-birth policies early in the twentieth century and viewed childcare as a public good before other European countries (Martin & Le Bihan, 2009). This makes it all the more difficult to identify clear causal directionality between the seemingly simultaneously occurring trends of rising female employment, high fertility, and childcare expansion over the course of the twentieth and early twenty-first century in France. The history of childcare in Italy, in contrast, shows rather clearly that demand has preceded public supply due to

an influential Catholic culture that has traditionally viewed childcare as the sole responsibility of the family (Hohnerlein, 2009). In sum, the issue of reverse causality is therefore less pronounced in Italy than in France. However, rather than reverse causality, causal simultaneity, i.e., the reciprocal upward pressure exerted on each other by supply and demand for childcare, may be at play in France. In this case, rising demand would nevertheless produce a positive effect on childcare coverage, regardless of whether it preceded or followed demand in the very beginning.

A second objection that may be raised regards the theoretically expected positive effect of fertility on coverage. Thus, it is uncertain whether high and/or rising fertility, although driving up demand, indeed increase coverage, as the additional demand may outpace the creation of new childcare places. In this scenario, the target population grows faster than the available places, leading to lower coverage rates. Similarly, declining fertility may lead to higher coverage rates if the total supply of places remains equal or increases. In a third scenario, fertility and the total supply of childcare places could both decrease at the same time. Depending on which of the two factors decreases more rapidly, the effect on coverage would either be positive (fertility decreases faster than total supply) or negative (total supply decreases faster than fertility).

In fact, this third scenario of simultaneously declining fertility and supply describes the recent development of childcare in both Italy and France. In France, total supply increased yearly between 2013 and 2015, but decreased between 2016 and 2018 (ONAPE, 2020). Yet, the three years of increasing supply (2013-2015) and the three years of decreasing supply (2016-2018) both witnessed a similar rise in coverage rates (from 55.1% to 56.7% and 57.7% to 59.3%, respectively) (ONAPE, 2020, p. 26). Simultaneously, the total fertility rate (TFR) has dropped over the past decade from 2.2 children per woman in child-bearing age in 2010 to 1.84 in 2018. Similarly, in Italy, although total supply decreased slightly between 2013 and 2017 (-1.6%), coverage increased from 22.5% to 24.7% in the same period thanks to declining fertility (Dipartimento per le politiche delle famiglie, 2020, p. 8). These examples illustrate that fertility can also have a positive impact on coverage when it is low and/or declining. Nevertheless, these are national-level trends and whether they transfer to the local level remains to be seen.

In sum, it is therefore difficult to formulate clear theoretical expectations regarding the effect of fertility on childcare coverage. Studies often overlook this point and tend to assume that rising fertility positively influences coverage rates (e.g., Da Roit et al., 2019). Such reasoning appears to assume that childcare coverage, being primarily a supply-side indicator, mechanically

follows the classical economic rules of supply and demand, i.e., increasing with rising demand and decreasing with falling demand. Yet, the development of coverage is less straightforward, as it depends on both sides of the supply-and-demand dichotomy (total supply of places *and* size of the target population). A more nuanced formulation of causal expectations is thus needed.

Consequently, the effect of high and/or rising fertility on coverage may vary according to context. In general, high/rising fertility can be a favorable condition for high coverage, as it increases the need for childcare and thus may lead to the creation of new places. However, this positive effect on coverage is more likely to occur in the Italian context of low fertility and low coverage. This is so because a rise in fertility starting from low levels, and thus low "baseline demand," does not risk overburdening the less developed Italian system and may instead serve as a trigger for expansion. However, in light of the above-highlighted recent national-level trends of declining fertility and rising coverage co-occurring, it is uncertain whether this theoretically plausible effect can be empirically observed on the local level. Alternatively, low fertility may thus have a positive effect on coverage by making it easier for the less developed Italian childcare system to cover a larger share of the target population.

In the French context of generally high coverage, on the other hand, rising fertility may be expected to negatively influence coverage rates. The reasoning behind this expectation is that a further rise in fertility from already high levels, and thus high "baseline demand," may risk increasing the size of the target population without additional places being created, as the already comprehensive childcare system may be at capacity and lack additional resources. In fact, low and/or declining fertility may therefore serve as a relief for the French childcare system and increase coverage by decreasing the size of the target population it has to cover.

In sum, with reservations, high and/or rising fertility is expected to be a favorable condition for high coverage in Italy. In France, it is expected to be an unfavorable condition. Consequently, declining fertility is expected to be an unfavorable condition in Italy, but a favorable condition in France. However, the caveat should be noted that there are theoretically plausible expectations for both causal directions regarding the impact of rising and declining fertility on childcare coverage.

With regard to female employment, in contrast, the standard expectations apply to this study. High female employment is expected to be a favorable condition for high coverage in both countries, whereas its absence is expected to be an unfavorable condition.

3.3 Supply-Side Theory

In the context of this study, the aim of supply-side theoretical approaches is to identify factors that have a direct impact on the creation or dismantling of childcare places. As such, supply-side factors stand in contrast to demand-side factors, which only indirectly impact on the creation or dismantling of places by causing a corresponding reaction on the supply side. There are two key theoretically relevant supply-side factors: the political orientation of the ruling party and high spending.

Regarding the political orientation of the ruling party, the reviewed literature highlighted that a strong presence of left-leaning parties was key to the early development of childcare systems in the Italian Northern-Central regions (Sabatinelli, 2016). The idea that left-leaning political parties are more inclined to enact generous social policies, including childcare, is first and foremost a product of the seminal works of Korpi (1985) and Esping-Andersen (1990) on the expansion of the post-World War II European welfare states. Tracing welfare state expansion to various left-leaning coalitions, the authors formulated an actor-centered social policy theory, commonly referred to as the 'power resources theory.' According to this theory, those population groups standing to benefit most from a given social policy are likely to assert their political will once their representatives are in power. Since left-leaning parties are associated with workers' movements, these parties are expected to implement work-life reconciliation policies that benefit workers, such as childcare. Consequently, left-leaning parties are also expected to incur higher public expenditure than their right-leaning counterparts in order to finance their social policy initiatives.

However, the power resources tradition is based on cross-national comparisons, so to what extent similar dynamics can be observed on the local level is uncertain. The studies of Arlotti et al. (2021) on local variation in Italian elderly care services and of Da Roit et al. (2019) on regional variation in Italian childcare coverage did not identify political orientation of the ruling party as an important source of variation. Neither did Jensen and Lolle (2013) in their study of local variation in Danish elderly care services.

Nevertheless, the working expectation of this study follows the common assumption that a left-leaning political orientation constitutes a favorable condition for high childcare coverage. The same applies to high childcare spending, which is expected to be more likely to occur in combination with left-leaning than with right-leaning ruling parties. The latter are expected to be an unfavorable condition for high coverage.

3.4 Context-Related Theory

The Italian and French childcare systems are each characterized by a system-specific supply-side feature, i.e., a large private sector and a large childminding sector, respectively. However, in order to formulate theoretical expectations as to how these features may affect coverage, it is necessary to embed them into socioeconomic contextual conditions.

3.4.1 Private Provision and Socioeconomic Development in Italy

In line with the expected influence of left-leaning ruling parties and high public spending, a large public sector is generally considered to be a favorable condition for high coverage in the Italian context, as it indicates public investment into affordable childcare places. However, under certain circumstances, a large private sector may also be expected to lead to high coverage. This expectation is based on the findings of cross-national comparative research into the political economy of childcare.

Thus, analyzing different childcare trajectories of liberal market economies and coordinated market economies, Morgan (2005) found that there were two paths to high childcare coverage: one public, the other private. The public path, associated with the coordinated market economies of Northern and Continental Europe, involves high public spending and a correspondingly larger public sector. The private path, in contrast, is characteristic of liberal market economies, where high income inequalities and lax labor market regulations produce a low-skilled, low-wage workforce on the one hand and demand for childcare by wealthier parents on the other hand. These conditions, Morgan (2005) argues, are conducive to the creation of a private childcare market, as demand is easily met by cheap labor supply.

Of course, these findings cannot be transferred one-to-one to the local Italian context. Italy is not a liberal market economy. What is transferable, in contrast, is the idea that two paths – one public, the other private – may lead to the same outcome of high coverage under different combinations of conditions. In particular, since the provision of childcare is a local prerogative, it is thinkable that local actors may use their leeway to promote one type of provision over another.

However, since private childcare fees are considerably higher than public fees, private provision may only be expected to flourish in socioeconomically developed provinces. Less developed provinces are only expected to be able to achieve high coverage through the public path. High socioeconomic development is expected to be a favorable condition in all cases, irrespective

of political orientation, as it enables both the development of a private sector and high public expenditure. Taking into account the political orientation of the ruling party, and in accordance with long observed and commonly expected left-right cleavages regarding private market preferences (Franzese, 2002; Hicks & Swank, 1992), the public path is expected to be associated with a left-leaning political orientation, whereas the private path is expected to be linked to a right-leaning political orientation.

3.4.2 Certified Childminders and Socioeconomic Development in France

In France, the socioeconomic development of departments may also interact with the childcare system's distinct features to influence coverage. Thus, since user costs are higher for certified childminders than for public crèches (Collombet, 2018), the number of childminders in a given department may depend on its socioeconomic development. In this view, the size of the childminding sector varies according to a similar market logic as the private sector in the Italian childcare system. In a more socioeconomically developed department, more parents may be expected to be able to afford childminders, making the profession more attractive in these departments. Given the essential contribution of childminders to high coverage, this is a key advantage of more developed over less developed departments and would help explain local variation.

In contrast, the lack of childminders in less developed departments would have to be compensated for with a correspondingly larger investment into public crèches. However, public crèches are more costly for the public purse than childminders due to the direct financing of crèches (Igas & IGF, 2017). Consequently, less developed departments are at a double disadvantage. On the one hand, they have a difficult time attracting childminders because a large share of the households is priced out of the market. On the other hand, their public institutions are hard-pressed for financial resources to compensate for the lack of childminders with larger public investments.

In this study, a large childminding sector and high socioeconomic development are therefore expected to be favorable conditions for high coverage, whereas the absence of both constitutes an unfavorable condition. High coverage rates despite smaller childminding sectors are only expected in more economically developed departments with high spending capacities.

3.5 Summary

Theoretical reflections emphasizing demand-side, supply-side, and contextual conditions lead to concrete expectations concerning their (un)favorability for high childcare coverage. On the demand side, rising female employment is expected to drive up coverage, whereas the impact of rising fertility is ambiguous. On the supply side, a left-leaning political orientation and high spending are expected to raise coverage. In Italy, a large private sector potentially leads to high coverage under conditions of high socioeconomic development and right-leaning political influence, whereas left-leaning provinces are more likely to follow a public path. In France, large childminding sectors are expected to produce higher coverage, especially in socioeconomically developed departments. Less developed departments are expected to have lower coverage due to a lack of childminders and public resources.

4 Research Design and Methods

This chapter elaborates on the research design as well as the data and methodology of the study. It first repeats the main research question and then formulates sub-research questions. Subsequently, it explains the case selection in favor of the local level and presents the methods used to treat the data. Furthermore, it details the selection and operationalization of the outcome and condition variables. Lastly, the chapter explicates the construction of the final truth tables for Italy and France. These truth tables serve as the basis for software analysis.

4.1 Research Questions

This thesis aims to explain and compare local variation in childcare coverage in the decentralized childcare systems of Italy and France. The territorial units of interest are the Italian provinces (*province*) and the French departments (*départements*). In other words, this thesis analyzes why the childcare systems of certain Italian provinces and French departments cover a comparatively larger, or a comparatively lower, share of children aged 0-3 than their respective counterparts. The general assumption is that different combinations of (un)favorable conditions are responsible for the observed variation. Consequently, the main research question is the following:

RQ: Which (combinations of) conditions lead to comparatively high/low childcare coverage in Italian provinces and French departments?

The main research question can be divided into four sub-research questions according to outcome and type of condition. In line with the theoretical elaborations of the preceding chapter, the conditions are categorized as supply-side, demand-side, and contextual. Furthermore, conditions may be either sufficient or necessary[1], and they may produce either a positive (high coverage) or a negative (low coverage) outcome. Accordingly, the outcome- and condition-specific sub-research questions are the following:

SRQ1: Which demand-side, supply-side, and/or contextual (combinations of) conditions are necessary for comparatively high childcare coverage in Italian provinces and French departments?

[1] A definition of necessary and sufficient conditions follows further below together with other QCA terminology.

SRQ2: Which demand-side, supply-side, and/or contextual (combinations of) conditions are sufficient for comparatively high childcare coverage in Italian provinces and French departments?

SRQ 3: Which demand-side, supply-side, and/or contextual (combinations of) conditions are necessary for comparatively low childcare coverage in Italian provinces and French departments?

SRQ4: Which demand-side, supply-side, and/or contextual (combinations of) conditions are sufficient for comparatively low childcare coverage in Italian provinces and French departments?

Since this study further aims to make a theoretical contribution to the literature, another sub-question regards the *how* dimension, i.e., the underlying mechanisms through which the identified (combinations of) conditions lead to the observed outcome:

SRQ5: How may the (combinations of) conditions coinciding with comparatively high/low childcare coverage produce the observed outcome?

Finally, since Italy represents a low-coverage, high-variation country, while France represents a high-coverage, high-variation country, this study aims to compare the respective patterns of local variation in order to identify potential similarities and/or differences. Hence, a sixth and final sub-research question reads as follows:

SRQ 6: What are the similarities and/or differences between the Italian and the French patterns of local variation in childcare coverage?

4.2 Case Selection

Provision of formal childcare is decentralized in both Italy and France. This means that the key implementing actors of childcare policies are located at the local level and enjoy substantial decision-making powers regarding the creation and cutback of new places. With regard to public provision, the municipalities, i.e., the *comuni* in Italy and the *communes* in France, decide whether to construct a new public crèche. In France, the *communes* share this power with the departments. Concerning non-public provision, it is left to the for- and not-for-profit providers to decide whether and where to open a new facility, making local socioeconomic conditions all the more pertinent.

This distribution of childcare responsibilities in favor of the local level has led to significant variation in childcare coverage not just across regions, but also across provinces/departments within and between regions. Understanding this variation requires an analysis of local conditions. The selected cases for this study are therefore Italian provinces and French departments. These are

not functionally equivalent. Rather, they are analyzed in order to better capture locally specific socioeconomic, demographic, political, and institutional conditions in which decentralized childcare systems are embedded. Although cross-municipal variation within the respective provinces and departments exists, the municipal unit of analysis is too small for a valid comparative analysis. Residents of one municipality are likely to work in, or live close to, a neighboring municipality and therefore enroll their children in childcare facilities outside their home municipality. Cross-municipal mobility thus distorts municipal data. While cross-provincial/cross-departmental mobility also affects provincial/departmental data, the distorting effect is less pronounced thanks to the larger reference territory. Regional data, on the other hand, insufficiently accounts for local context and variation. Accordingly, the benefit of analyzing the provincial/departmental level is that it acknowledges the fundamentally local dimension of childcare provision, while still allowing for the collection of comparable data.

The total number of observed cases is 196: 102 Italian provinces and 94 French departments. The case selection includes the provinces of all Italian regions except Sardinia. The five provinces of Sardinia are not considered due to several territorial reforms over the past twenty years that have redrawn the provincial boundaries and made gathering valid data impossible. Sardinia's geographic distance further hampers comparison. For France, the selection includes all departments of the twelve mainland regions (*France métropolitaine*), excluding Corsica. Corsica is excluded for similar reasons as Sardinia.

4.3 Methods

4.3.1 Qualitative Comparative Analysis (QCA) as a General Research Method

The method of analysis used in this study is crisp-set Qualitative Comparative Analysis (csQCA), a set-theoretic configurational comparative method first introduced by Charles Ragin (1987). QCA as a research method aims to combine the advantages of mainstream small-n qualitative case studies and large-n statistical analysis. It is therefore commonly located between these two methodological poles (Berg-Schlosser et al., 2009, p. 6). QCA aspires to account for the internal complexity of individual cases (the advantage of qualitative case studies), while still making possible a certain degree of generalization (the advantage of statistical analysis). In doing so, it strives to avoid both the lack of generalizability associated with purely qualitative methods and the oversimplification of causation associated with purely quantitative methods.

Consequently, QCA and mainstream statistical analysis have differing concepts of causality. The concept espoused by QCA is known as *multiple conjunctural causation*. It stands in opposition to the concept of additive causation employed in statistical analysis. Multiple conjunctural causation is based on three causal assumptions (Berg-Schlosser et al., 2009, pp. 8-9). The first assumption is *conjunctural causation*, i.e., the assumption that a given outcome is not caused by the additive effect of individual variables with independent influences, but rather by specific combinations, or *configurations*, of factors and their combined, interdependent effects. To highlight these conceptual differences, QCA language avoids using statistical terminology and hence calls these factors *conditions*, or *condition variables*, instead of independent variables. The QCA 'equivalent' of the dependent variable is referred to as the *outcome*, or the *outcome variable*. The second assumption is *equifinality*. This means that the same outcome may be caused by different configurations of conditions, i.e., different paths may lead to the same result. The third assumption is that an outcome may be caused by both the presence and the absence of a condition. In addition to multiple conjunctural causation and its three main causal assumptions, a fourth assumption of QCA is *causal asymmetry*. This means that separate explanations may be needed to account for the presence and the absence of an outcome.

The ultimate goal of QCA can be succinctly defined as the identification of sufficient and necessary (combinations of) conditions for a given outcome (Berg-Schlosser et al., 2009, pp. 10-11). According to Schneider and Wagemann (2012), "a condition is *sufficient* if, whenever the condition is present, the outcome is also present…A condition is *necessary* if, whenever the outcome is present, the condition is also present" (p. 76). Furthermore, a sufficient condition is not automatically necessary, since other conditions may produce the same outcome. Similarly, a necessary condition is not automatically sufficient, since the same necessary condition may lead to varying outcomes depending on the other conditions with which it is combined.

QCA employs specific set-theoretic terminology to describe relations between outcomes and conditions. Thus, as a set-theoretic method, QCA conceives of the outcome and the conditions as different *sets*. The goal is to identify the relations between these sets. For example, a necessary but insufficient condition is a *superset* of the outcome set, because such a condition comprises all the cases that present the outcome (the outcome set) as well as other cases that do not present the outcome (and thus are not part of the outcome set). Similarly, a sufficient but unnecessary condition is a *subset* of the outcome set, since the outcome set covers all cases presenting the sufficient

condition plus other cases not presenting it. In the case of a necessary and sufficient condition, the condition and the outcome set entirely overlap.

An important aspect of applying QCA is the definition and assignment of set membership scores to the observed cases. The elaboration of set membership definitions highlights a qualitative aspect of QCA, as the researcher relies on in-depth case knowledge to draw the boundaries between membership and non-membership of cases in a given set. Depending on which QCA technique is used, there are different possibilities of defining sets. The most fine-grained definitions of sets are possible with fuzzy-set QCA (fsQCA), as it allows for partial membership in a set, whereas csQCA only allows for full membership and full non-membership. Nevertheless, csQCA is applied in this study, as it best fulfills the goal of reducing complexity and arriving at the most parsimonious answers to the research questions.

4.3.2 Crisp-Set QCA (csQCA)

The goal of csQCA is to reduce complexity and arrive at parsimonious answers to the research questions. It is based on sets and Boolean algebra, i.e., it dichotomizes outcome and condition variables into two values, one value denoting membership and the other value denoting non-membership of a set. The dichotomized data is then systematically analyzed to identify relations between sets. Rihoux and De Meur (2009) suggest following six analytical steps to perform a csQCA (pp. 39-66). These steps are the basis for this study. The following six sub-headings are therefore borrowed from Rihoux and De Meur (2009) and represent the six advised steps.

4.3.2.1 Step 1: Building a Dichotomous Data Table

For practical analysis, identifying set relations means that all observed cases have to be assigned set membership scores for the outcome and the various conditions explaining the outcome. Since the only two membership scores are full membership and full non-membership, the raw data for the outcome and the condition variables are dichotomized into membership and non-membership. For each condition, a threshold for set membership is thus defined. Cases falling above the threshold are members of the set. Cases falling below the threshold are non-members of the set. The number [1] denotes membership, whereas the number [0] denotes non-membership.

Setting thresholds for set membership requires qualitative case knowledge. Best practices advise to be cautious with the use of mechanical cut-off points based on statistical measurements (Rihoux and De Meur, 2009, p. 42). However, in large-n studies, such as this one, there are not

always clearly identifiable and qualitatively justifiable 'natural' cut-off points. This is due to the fact that in large-n studies the distribution of values often covers the full range of potential values. Furthermore, this study explicitly deals with *comparative* concepts, referring to certain conditions and outcomes as 'comparatively high' and 'comparatively low'. A certain reliance on averages and means, combined with qualitative considerations, is therefore necessary for threshold-setting.

The qualitative element refers to a back-and-forth between data and cases in order to calibrate thresholds in a way that enables the identification of empirically and theoretically coherent clusters that have not been assembled at random. Especially in a large-n study dealing with comparative concepts, statistical measurements are helpful parameters to limit the range within which the readjustment of thresholds can take place without stretching conceptual boundaries beyond justification.

After the raw data table is converted into a dichotomized data table, this table is used to identify necessary conditions for the outcome, as it suffices to look at cases producing the outcome and discern whether a given condition is always present when the outcome occurs. To identify sufficient conditions, on the other hand, all cases must be considered and the data table has to be further synthesized.

4.3.2.2 Step 2: Constructing a Truth Table

The truth table is a synthesized version of the dichotomized data table. It is constructed using the software TOSMANA (Cronqvist, 2019). Its construction follows three steps. *First*, all logically possible combinations of conditions are listed. These combinations are referred to as configurations. Each truth table row thus represents a logically possible configuration. The total amount of logically possible configurations is calculated by the formula 2^k, k standing for the number of conditions and 2 for the number of values each condition can take on. A truth table with five conditions therefore contains $2^5=32$ configurations. A truth table with ten conditions already comprises $2^{10}=1024$ configurations. Hence, as few conditions as possible are used to avoid individualizing each observed case. *Second,* each observed case is assigned to the truth table row reflecting its combination of conditions. *Third,* each configuration is assigned an outcome value, leading to four different types of configurations: (1) '1-configurations,' when all cases in the same truth table row present the outcome [1], (2) '0-configurations,' when all cases in the same truth table row present the outcome [0], (3) 'C-configurations,' i.e., contradictory configurations, when

cases in the same row present varying outcomes, and (4) ‘R-configurations,’ i.e., logical remainders, when a truth table row is left blank.

Logical remainders occur when there is “limited diversity” in the case selection, meaning that the amount of logically possible configurations outnumbers the amount of empirically observed configurations. How to include logical remainders in the analysis is discussed further below.

Concerning the reading of truth tables, each ‘1-configuration’ is, by definition, a sufficient condition for producing the outcome, since whenever the configuration is present, the outcome is present, as well. However, the configurations listed in the truth table are likely to remain quite complex depending on the number of conditions used. Consequently, the configurations may be further minimized in order to receive more concise results.

4.3.2.3 Step 3: Resolving Contradictory Configurations

Prior to minimizing the truth table, contradictory configurations are resolved as far as possible. To that end, Rihoux and De Meur (2009) suggest eight strategies (pp. 48-49), two of which are used in this study: (1) readjusting the operationalization, i.e., the threshold, of the outcome, and (2) using probabilistic reasoning to manually change the outcome to the most observed outcome among the cases in the contradictory row. The latter depends on a large number of observed cases in the concerned row. Irrespective of strategy, transparency as well as empirically and/or theoretically grounded decision-making are essential to avoid simply fitting conditions and membership definitions to the data.

The process of resolving contradictions is thus a further qualitative aspect of QCA requiring ‘dialoguing’ with data and cases. The more contradictions are resolved, the more configurations and cases are covered by minimization. In this study, unresolved contradictions are excluded from minimization and the corresponding cases are thus not covered by minimization results. The mix of resolution strategies used in this study are discussed further below together with the construction of the final truth tables.

4.3.2.4 Step 4: Boolean Minimization

After truth table construction and resolution of contradictions, TOSMANA software is used to perform *Boolean minimization*. Before explaining the principles of Boolean minimization, it is important to introduce a few basic conventions of Boolean algebra. First, in a Boolean expression,

the [1] value of a variable is denoted by an uppercase letter, whereas the [0] value is denoted by a lowercase letter. Second, the [*] symbol indicates the logical "AND", whereas the [+] symbol indicates the logical "OR". Third, the left-pointing arrow symbol [←] denotes necessity, whereas the right-pointing arrow symbol [→] denotes sufficiency. To illustrate, the Boolean expression "A*B → O" would read as follows: "If conditions A and B are present, then outcome O occurs." The connection of conditions into a single condition through the logical AND symbol [*] is called a *path*. In the preceding example, the expression "A*B" is therefore a path.

The expression "A*b + A*C → O", on the other hand, reads as follows: "If condition A is present and condition B is absent *or* if condition A and condition C are present, then outcome O occurs." This expression is more complex than the first one, as it includes two different paths leading to the same outcome. Such a combination of paths through the logical OR symbol [+] is called a *solution*. This particular solution represents the conjunctural and equifinal aspects of QCA: Conditions have to be combined in order to exert their outcome-producing effect (conjunctural causation), and different combinations are possible (equifinality).

As the examples demonstrate, Boolean algebra can be used to formulate long and complex expressions. Boolean minimization, then, is "the reduction of a long, complex expression into a shorter, more parsimonious expression" (Rihoux & De Meur, 2009, p. 35). The underlying logic is that "if two Boolean expressions differ in only one causal condition yet produce the same outcome, then the causal condition that distinguishes the two expressions can be considered irrelevant and can be removed to create a simpler, combined expression" (Ragin, 1987, p. 93). For example, the solution "A*B*C + A*B*c → O" can be minimized into "A*B → O", since outcome O occurs regardless of whether condition C is present, as is the case in the first path, or absent, as is the case in the second path. The combined presence of conditions A and B is sufficient.

The more parsimonious expression resulting from Boolean minimization is referred to as a *prime implicant*. The software computes these prime implicants on the basis of the truth table. Subsequently, it combines the prime implicants into the shortest possible solution. In order to receive a solution for the presence of the outcome, all the '1-configurations' are minimized. For the absence of the outcome, the '0-configurations' are minimized. Since truth table rows may be combined and minimized differently, multiple solutions are possible.

4.3.2.5 Step 5: Bringing in the "Logical Remainders" Cases

Logical remainders are included in the minimization procedure in order to achieve more parsimonious solutions. When logical remainders are included, the software makes simplifying assumptions about non-observed cases, meaning that the software assumes that if a given configuration existed, it would present a certain outcome. This allows the software to include these configurations in the minimization, leading to more parsimonious results. It is important to emphasize that the solutions computed under inclusion of logical remainders are always in line with the data of the truth table. It is simply a procedure that allows the software to remove as many conditions as possible from the final Boolean expression in order to arrive at the most parsimonious expression of sufficient conditions.

In sum, best practices therefore state that a standard csQCA study should include four minimizations (Rihoux & De Meur, 2009, p. 64): the 1-configurations with and without logical remainders as well as the 0-configurations with and without logical remainders. As explained further below, this only applies to Italian provinces in this study, as there are no logical remainders for French departments.

4.3.2.6 Step 6: Interpretation

The final step of QCA is the interpretation of the solutions and individual paths resulting from minimization. From a qualitative perspective, each solution and its constituent paths may be valuable. However, especially in a large-n study, it is helpful to calculate the raw and unique coverage of each solution and path in order to better assess their respective relevance (Schneider & Wagemann, 2012, pp. 129-139). *Raw coverage* refers to the share of the outcome set that is covered by a given solution or path. However, since configurations can be minimized with other configurations in various ways, some paths belonging to the same solution may cover the same configurations (and thus cases). This means that *raw* coverage of these paths does not reflect the cases that they *uniquely* cover. Hence, a different measurement, *unique coverage*, is needed. Unique coverage refers to the share of the outcome set *uniquely* covered by a path. In the context of a large-n study, where not every single case is likely to be explained, these measurements help focus attention on the most empirically relevant paths.

Subsequent analysis relies on theory and case knowledge to explain the underlying mechanisms leading from the identified sufficient and necessary conditions to the outcome. In order to highlight certain phenomena, it is also possible to 're-complexify' software-generated solutions. This means reinserting conditions formerly removed by minimization or rewriting specific paths according to the rules of Boolean algebra. This is helpful because the most parsimonious software-generated solution is not automatically best suited for explaining important set relations. Consequently, the interpretation of results does not rely exclusively on software-generated solutions. Where appropriate, solutions are disaggregated and rewritten.

4.4 Operationalization of Outcomes and Conditions

4.4.1 Outcomes: Comparatively High/Low Childcare Coverage

In line with the main research question, the outcome of interest is twofold. It aims to explain both comparatively high and comparatively low childcare coverage. In Italy and France, childcare coverage refers to the share of children aged 0-3 that are covered by the total supply of places in formal childcare. For Italy, this indicator is provided for the provincial level by ISTAT. For France, it is provided for the departmental level by ONAPE (2021a). For both countries, the indicator refers to the school year 2018/2019, i.e., places available at the end of 2018.

The threshold for Italian provinces with comparatively high childcare coverage was initially set at 33%, the EU's official objective set in 2002 (European Council, 2002, p. 12). The vast majority of Italian provinces have yet to reach this goal. However, closer examination of the data tables led to the threshold being lowered to 27% in order to include more variation on the 'political orientation' and 'spending' conditions. This allowed grasping a wider variety of set relations that would otherwise have been missed. The final threshold is still above the provincial median of 26.5% and the observed cases therefore still qualify as having comparatively high coverage rates.

Setting the threshold for French departments is a more complex task, as the variation occurs in a general high-coverage environment, with all but one department displaying coverage rates above the European goal of 33%. Given a departmental median coverage rate of 63%, a lot of technically comparatively low-coverage departments still have objectively very high coverage rates. The threshold was therefore initially set at 60%, but over the course of the analysis a slightly lower threshold was discerned as more conducive to the identification of relevant clusters. The final threshold thus stands at 57%.

4.4.2 Demand-Side Conditions: Female Employment and Fertility

Childcare demand is operationalized using three indicators, one pertaining to female employment and two pertaining to fertility. With regard to female employment, the indicator is the female employment rate of women aged 15-64. To include the time factor in the analysis, the indicator denotes the average of all female employment rates between 2004 and 2018 for Italy. Data availability limits the indicator for France to the average of the female employment rates of the years 2007, 2012, and 2017. By using the average of a longer period of time, the extent of childcare demand that a given childcare system has been exposed to is more accurately portrayed than with an indicator referring to a single year. The threshold for high female employment is set at 55% for Italy (provincial mean: 53.5%) and 60% for France (departmental mean: 61%).

Fertility-related pressure may be exerted by high overall fertility and/or rising fertility. The two fertility indicators are thus (1) the average total fertility rate (TFR) of the years spanning the period 2000-2018 and (2) the development of the TFR between 2000 and 2018. Once again, the indicators consider the time factor. With regard to TFR development, the difference between the years 2000 and 2018 is indicated in percentage. TFR development is coded as either rising or falling, so the threshold is at 0%. The threshold for high TFR average is set at 1.80 for France, which is below the median of 1.88 but nevertheless very high in European comparison. For Italy, it is set at 1.43 (provincial median: 1.33).

For Italy, all three indicators are provided by ISTAT, whereas for France, they are provided by the national statistics institute INSEE.

4.4.3 Supply-Side Conditions: Political Orientation and Spending

The political orientation of Italian provinces is determined by the results of the three provincial elections preceding the year 2017. The party affiliation of the elected president of the provincial council is coded as either left-leaning or right-leaning. If the presidents emerging from the elections have been predominantly from left-leaning parties, the province is coded as left-leaning. If the presidents have been predominantly from right-leaning parties, the province is coded as right-leaning. Since the provincial election cycle is not synchronized across Italian provinces, election years taken into account vary between 2001 and 2017 depending on the province, with a minimum of three elections considered per province. Provincial election results are provided by the Ministry of Interior and Territorial Affairs (Dipartimento per gli Affari Interni e Territoriali, 2021).

In France, the departmental elections of the years 2004, 2008, 2011, and 2015 are considered and the resulting presidents of the departmental councils coded as either left-leaning or right-leaning according to party affiliation. Since the consideration of four elections may lead to an equal division of left-leaning and right-leaning presidents, the departmental elections of 2001 are considered as 'tie-breakers' in some rare cases. Departmental election results are provided by the journalistic website *France Politique* (De Boissieu, 2019).

Concerning the public spending on childcare, ISTAT provides data for the year 2018. This indicator denotes the aggregated public spending of all municipalities within a given province, measured in euros per child below the age of three living in the province. The threshold for high spending is set at EUR800 per resident child, which is slightly above the provincial average of EUR786 and somewhat further above the median of EUR644 (ISTAT, 2021). This data is not available for France.

4.4.4 Contextual Conditions: Socioeconomic Development and System-Specific Features

In both countries, two indicators measure socioeconomic development, one referring to the economic, the other to the social. The first indicator is the provincial/departmental gross domestic product (GDP) per capita. For both countries, Eurostat provides GDP data for the year 2018. The threshold for high economic development is set at EUR30,000 per capita for both countries given an identical provincial/departmental median of EUR26,700 (Eurostat, 2021).

The second indicator is the share of people above the age of fifteen with at least two years of college education. Data concerning educational attainment are provided by ISTAT for Italy (for 2018) and by INSEE for France (for 2017). In terms of educational attainment, the threshold is set at 15% for Italy and 28% for France. The difference is due to stark national differences in educational attainment.

For France, the poverty rate is added as a third socioeconomic indicator. It denotes the share of households living below the poverty rate. The threshold for low poverty is set at 13.5%, a full percentage point below the departmental average and median of 14.5%. This data is taken from INSEE for the year 2018. The same indicator is not available for Italy.

In addition to socioeconomic development, features that are specific to each country's childcare system are considered. For France, this is the share of available childcare places covered by certified childminders. ONAPE (2021b) provides this data. The threshold for a large

childminding sector is set at 62%, which is right at the departmental average and just below the departmental mean of 65%. For Italy, the system-specific feature is the share of available childcare places covered by private providers. ISTAT (2021) provides this data. The threshold for a comparatively large private sector is set at 52%, which is five percentage points above the provincial mean of 47%. In both countries, the indicators refer to the school year 2018/2019.

Table 4.1 summarizes the thresholds set for the outcome and condition variables. It further introduces the Boolean abbreviations of the various conditions, which are used to formulate more concise Boolean expressions.

Table 4.1

Thresholds of Outcome and Condition Variables, Italy and France

ITALY	**Outcome**	**Demand-Side Conditions**			**Supply-Side Conditions**			**Contextual Conditions**	
Boolean Abbreviation	High Cov	Fem Emp	TFR Avg	TFR Dev	Pol Or	Spend	Priv Sec	GDP	High Edu
Threshold	27%	55%	1.43	0%	left/right	€800	52%	€30,000	15%

FRANCE	**Outcome**	**Demand-Side Conditions**			**Supply-Side Conditions**		**Contextual Conditions**		
Boolean Abbreviation	High Cov	Fem Emp	TFR Avg	TFR Dev	Pol Or	Chil Min	GDP	High Edu	Low Pov
Threshold	57%	60%	1.80	0%	left/right	62%	€30,000	28%	13.5%

Source: own illustration

Note: HighCov=high childcare coverage; FemEmp=high female employment; TFRAvg=high fertility; TFRDev=rising fertility; Spend=high spending; PrivSec=large private sector; PolOr=left-leaning political orientation; GDP=high economic development; HighEdu=high share of university graduates; ChilMin=large childminding sector; LowPov=low poverty

4.5 Final Truth Tables

4.5.1 Italy

Truth table construction for Italy can be summarized in three methodological steps. In a first step, a truth table was constructed using all eight variables. In a second step, three of the conditions were removed and a new truth table constructed in order to reduce complexity of the highly individualized explanations. Conditions were not removed randomly. Rather, since there are three conditions denoting the higher-order concept of 'childcare demand' – female employment, average fertility, and fertility development – these were tested in different combinations to ascertain which demand-side condition had the most explanatory value. As a result of this procedure, both fertility conditions were removed because they did not add explanatory value. Following the same logic, the condition 'higher education' was dropped, as GDP was identified as the more important condition representing the higher-order concept of 'socioeconomic development'.

Consequently, the final truth table comprises five conditions and contains 20 of 32 (2^5) possible configurations. However, since it included seven contradictory configurations, these needed to be resolved as far as possible in a third and final step before proceeding with minimization. The truth table containing all contradictions and the details of their resolution are presented in the appendices (Appendix 1). Suffice it to note here that five contradictions were resolved based on probabilistic reasoning. Two contradictions remained unresolved. Table 4.2 displays the final truth table.[2]

Since the final truth table entails two contradictory configurations (rows 14, 19), these are excluded from the minimization procedure. The contradictions only include six of the 102 observed cases, leaving a large case population for minimization.

Minimization of the 1-outcome includes nine configurations covering 47 cases. These explain the presence of high coverage. Minimization of the 0-outcome includes nine configurations covering 49 cases. These explain the absence of high coverage. In total, minimization results account for 96 of 102 observed cases.

[2] The same truth table including case names may be found in the appendices (Appendix 2).

Table 4.2

Final Truth Table, Italy

Row	c1 Fem Emp	c2 GDP	c3 Priv Sec	c4 Spend	c5 Pol Or	o High Cov	Cases n=102
1	0	0	0	0	0	0	6
2	0	0	0	0	1	0	18
3	0	0	0	1	1	1	9
4	0	0	1	0	0	0	7
5	0	0	1	0	1	0	10
6	0	0	1	1	1	1	1
7	0	1	0	0	1	0	1
8	0	1	1	0	0	1	4
9	0	1	1	0	1	0	1
10	0	1	1	1	1	1	3
11	1	0	0	0	0	0	2
12	1	0	0	0	1	0	3
13	1	0	0	1	1	1	4
14	1	0	1	0	1	C	2
15	1	0	1	1	1	1	1
16	1	1	0	1	0	0	1
17	1	1	0	1	1	1	18
18	1	1	1	0	0	1	5
19	1	1	1	0	1	C	4
20	1	1	1	1	1	1	2

Source: own illustration, based on TOSMANA-generated truth table

Note: c = condition; o = outcome; C = contradiction; 1 = presence of condition/outcome; 0 = absence of condition/outcome; FemEmp(c1)=high female employment; GDP(c2)=high economic development; PrivSec(c3)=large private sector; Spend(c4)=high spending; PolOr(c5)=left-leaning political orientation; HighCov(o)=high childcare coverage

4.5.2 France

Similar to the Italian example, the final truth table is the result of a gradual removal of conditions from the initial pool of eight conditions. The 'higher education' condition was removed, as GDP and poverty rate proved to be the socioeconomic conditions with the most explanatory value. Furthermore, two demand-side conditions, female employment and TFR average, were removed, leaving TFR development as the most informative demand-side condition. The potentially important role of fertility development in the French context of high overall fertility and high coverage has been discussed in detail further above (see Chapter 3.2.2). The fact that average fertility and female employment are generally high across French departments likely explains that these two conditions did not add explanatory value when included in the truth table. Finally, political orientation turned out to be irrelevant, as its inclusion in the truth table did not help identify coherent clusters of cases. The potential reasons for the irrelevance of political orientation are discussed at a later stage.

Table 4.3 displays the final truth table, which covers all sixteen (2^4) potential configurations.[3] There are thus no logical remainders. Each potential configuration can be empirically observed. The truth table initially produced eight contradictions. Adjusting the outcome threshold from 60% to the slightly lower, yet still high, level of 57% resolved three contradictions without generating new ones, a sign that this was a qualitatively justifiable procedure. Of the five remaining contradictions, two were resolved using probabilistic reasoning (for details, see Appendix 5), leaving three contradictions in the final truth table (rows 1, 2, 7).

In sum, minimization of the 1-outcome includes nine configurations covering 50 cases. These explain the presence of high coverage. Minimization of the 0-outcome includes four configurations, covering sixteen cases. These explain the absence of high coverage. In total, minimization results account for 66 of 94 observed cases.

[3] The same truth table including case names may be found in the appendices (Appendix 6).

Table 4.3

Final Truth Table, France

Row	c1 TFR Dev	c2 GDP	c3 Low Pov	c4 Chil Min	o High Cov	Cases n=94
1	0	0	0	0	C	11
2	0	0	0	1	C	13
3	0	0	1	0	0	1
4	0	0	1	1	1	22
5	0	1	0	0	1	6
6	0	1	0	1	1	2
7	0	1	1	0	C	4
8	0	1	1	1	1	5
9	1	0	0	0	0	7
10	1	0	0	1	1	7
11	1	0	1	0	1	1
12	1	0	1	1	1	4
13	1	1	0	0	0	6
14	1	1	0	1	1	1
15	1	1	1	0	0	2
16	1	1	1	1	1	2

Source: own illustration, based on TOSMANA-generated truth table

Note: c = condition; o = outcome; C = contradiction; 1 = presence of condition/outcome; 0 = absence of condition/outcome; TFRDev(c1)=rising fertility; GDP(c2)=high economic development; LowPov(c3)=low poverty; ChilMin(c4)=large childminding sector; HighCov(o)=high childcare coverage

4.6 Summary

Condition- and outcome-specific sub-research questions were formulated. csQCA and its six analytical steps were explained and argued to capture interdependent effects of various combinations of conditions better than mainstream statistical methods. Outcome and condition variables were operationalized and final truth tables constructed for software analysis.

5 Results

This chapter presents the results of the data analysis with a view to identify necessary and sufficient conditions. It starts with a survey of necessary and sufficient conditions for high childcare coverage in Italy and France, followed by the same exercise for low childcare coverage. The identification of sufficient conditions results from software-supported truth table-minimization, whereas necessary conditions are deduced from the underlying dichotomized data tables. The latter method allows for a more nuanced identification of necessary conditions according to specific outcome constellations and not only high and low coverage, but also *highest* and *lowest* coverage. Accounting for the extremes lays the groundwork for a more fruitful discussion of the results.

5.1 Necessary Conditions for High Childcare Coverage in Italy and France

5.1.1 Italy

Necessary conditions are identified by studying the original set of high-coverage provinces based on the dichotomized data table preceding the truth table (Appendix 7). Before analyzing the complete set of high-coverage provinces, it is helpful for a more nuanced discussion of the results to analyze the smaller subset at the top of this set, i.e., the provinces with the *highest* coverage rates.

Thus, briefly referring to the initial threshold of 33%, it is noteworthy that all 25 provinces located above this threshold are characterized by a left-leaning political orientation. For a childcare coverage rate above 33%, left-leaning political orientation thus constitutes a fully consistent necessary condition. In addition, all except one case above the threshold are characterized by high spending, which therefore qualifies as a slightly inconsistent necessary condition. Together, the combination of left-leaning political orientation and high spending constitutes a slightly inconsistent necessary condition for the highest childcare coverage, covering 24 of 25 cases belonging to the subset of provinces with the *highest* childcare coverage. This statement of necessity is summarized in the following Boolean formula:

POLOR*SPEND ← $HIGHCOV_{(>33\%)}$[4]

[4] For the presentation of results, subscript is used to highlight thresholds deviating from the previously defined, regular thresholds.

However, in total, 77 of the 102 observed cases are classified as left-leaning, so the pool of left-leaning provinces is significantly larger than its right-leaning equivalent to begin with. Furthermore, a right-leaning, low-spending province lies exactly on the threshold. Other right-leaning and/or low-spending provinces lie just below the threshold, which is why the threshold was ultimately lowered to 27% for the minimization procedure.

This allows the analysis to consider right-leaning and low-spending provinces that fare much better on the outcome variable compared to the vast majority of provinces, despite not ranking amongst the top performers. Notwithstanding these qualifications, the observation still holds true that left-leaning political orientation and high spending appear as necessary conditions for achieving the *highest* coverage rates in Italy.

Based on the 27% threshold, further necessary conditions can be identified, albeit in a very nuanced fashion. First, necessary conditions vary according to the political orientation of a province. Thus, in right-leaning provinces, a large private sector and high economic development are individually, and combined therefore as well, fully consistent necessary conditions for high coverage. In left-leaning provinces, in contrast, high coverage occurs regardless of economic development, size of private sector, or amount of spending. No necessary conditions are therefore identified for these provinces.

Furthermore, necessary conditions vary according to economic development. Thus, in less developed provinces, a left-leaning political orientation is a fully consistent necessary condition for high childcare coverage, whereas more developed provinces do not depend on a single necessary condition.

Finally, necessary conditions also depend on the amount of spending of a province. In low-spending provinces, a large private sector is a slightly inconsistent necessary condition for high childcare coverage (13/14 cases).

Table 5.1 summarizes the nuanced necessary conditions that have been identified for the set of provinces with coverage rates above 27%.

Table 5.1

Necessary Conditions for High Childcare Coverage (>27%), by Outcome Constellation, Italy

Boolean expression	Statement of necessity	Consistency	n
PRIVSEC*GDP ← polor*HIGHCOV	A large private sector and high economic development are necessary conditions for high coverage in right-leaning provinces.	100%	8
POLOR ← gdp*HIGHCOV	A left-leaning political orientation is a necessary condition for high coverage in less economically developed provinces.	100%	16
PRIVSEC ← spend*HIGHCOV	A large private sector is a necessary condition for high coverage in low-spending provinces	93%	13

Source: own illustration

5.1.2 France

Necessary conditions are based on the dichotomized data table (Appendix 8). Concerning the complete set of high-coverage departments with coverage rates above 57%, no necessary conditions can be identified. However, there is a necessary condition for a more differentiated outcome constellation. Thus, for departments experiencing rising fertility, a comparatively large childminding sector is a slightly inconsistent necessary condition for achieving high coverage (14/15 cases). This statement of necessity is summarized in the following Boolean formula:

CHILMIN ← TFRDEV*HIGHCOV

Similar to the Italian example, it is further useful to analyze necessary conditions for the small subset at the top of the set of high-coverage French departments, i.e., the departments with the *highest* coverage rates. Setting the bar for the *highest* coverage rates at 75%, four necessary conditions can be identified. Thus, all eleven departments with coverage rates above 75% are characterized by high female employment, declining fertility, low poverty, and a large childminding sector. This statement of necessity is summarized in the following Boolean expression:

FEMEMP*tfrdev*CHILMIN*LOWPOV ← $HIGHCOV_{(>75\%)}$

5.2 Sufficient Conditions for High Childcare Coverage in Italy and France

5.2.1 Italy

Based on the 1-configurations of the final truth table (Table 4.2), and including the logical remainders, the software computes two solutions, each comprising two prime implicants, i.e., two paths leading to the outcome of high childcare coverage rates.[5] All prime implicants are, by definition, sufficient conditions for the outcome. The two solutions read as follows:

Solution I: SPEND*POLOR + GDP*PRIVSEC*polor → HIGHCOV

Solution 2: SPEND*POLOR + GDP*spend*polor → HIGHCOV

The sufficient conditions displayed by the solutions are best structured according to the condition 'political orientation (PolOr)'. Thus, Path I illustrates that the simultaneous presence of left-leaning political orientation (POLOR) and high spending (SPEND) is a sufficient condition for high childcare coverage. In other words, if a province has a left-leaning political orientation (POLOR) and also spends a lot on childcare (SPEND), then it achieves high coverage regardless of the constellation of other conditions.

However, if this path is disaggregated into some of its constituent configurations, then it becomes clear that most of the cases covered by it predominantly rely on public rather than private provision. To illustrate, the path POLOR*SPEND results from the minimization of the somewhat less parsimonious paths privsec*POLOR*SPEND (truth table rows 3, 13, 17 in Table 4.2) on the one hand, and PRIVSEC*POLOR*SPEND (truth table rows 6, 10, 15, 20 in Table 4.2) on the other hand. According to the rules of Boolean minimization, the condition PrivSec can be dropped, which is what the software did. Yet, the configuration characterized by the absence of a large private sector (privsec) accounts for 31 truth table cases, whereas the one characterized by the presence of a large private sector only accounts for seven truth table cases. Analytically, this is an important differentiation because it shows that the combination of left-leaning political orientation and high spending is additionally linked to a smaller private sector in the vast majority of cases.

[5] Minimization results of 1-configurations, excluding logical remainders, are presented in the appendices (Appendix 3). Only the more parsimonious solutions, i.e., the ones including the logical remainders, are considered here.

If a province is right-leaning (polor), in contrast, then Path II of Solution I shows that the simultaneous presence of a large private sector (PRIVSEC) and high economic development (GDP) is a sufficient condition for high childcare coverage.

In fact, Path II of Solution I and Path II of Solution II are based on the same truth table rows, but were minimized differently by the software, with Path II of Solution II highlighting low spending (spend) instead of a large private sector (PRIVSEC).

Although each path II constitutes a most parsimonious Boolean expression of the underlying truth table rows, analytically it is more helpful to combine the two software-generated expressions into one that will henceforth serve as the basis for further analysis.

As the discussion will show, this somewhat longer expression leads to better theoretical interpretations regarding the specific combination of low spending, right-leaning political orientation, high economic development, and a large private sector. After combining Path II of each solution, the new and finalized solution reads as follows:

Solution: SPEND*POLOR + spend*polor*PRIVSEC*GDP → HIGHCOV

Table 5.2 presents the finalized solution as well as the individual prime implicants and their respective raw and unique coverage. In the table, ‘truth table cases’ refer to the number of cases covered by the minimized truth table rows. ‘Original cases’, in contrast, refer to the original set of high-coverage cases (prior to the manual changing of outcomes during the resolution of contradictory configurations), i.e., all empirically observed provinces with a childcare coverage rate above 27% according to the raw data (n=49). Raw and unique coverage refer to the share of original cases covered.

In sum, the Table 5.2 thus illustrates that the solution helps explain roughly 88% (43/49) of the originally identified high-coverage Italian provinces, with path I (35/49) accounting for noticeably more cases than path II (8/49). The minimization results do not account for the missing 12% of cases, as they are tied up in unresolved contradictory configurations.

Table 5.2

Sufficient Conditions for High Childcare Coverage (>27%), Italy

Path	Prime implicant	Truth table rows minimized	Truth table cases covered	Original cases covered	Raw coverage	Unique coverage
I	SPEND*POLOR	3, 6, 10, 13, 15, 17, 20	38	35	71.4%	71.4%
	privsec*SPEND*POLOR	3, 13, 17	31	28	57.1%	57.1%
	PRIVSEC*SPEND*POLOR	6, 10, 15, 20	7	7	14.3%	14.3%
II	spend*polor*PRIVSEC*GDP	8, 18	9	8	16.3%	16.3%
Solution (I + II)	SPEND*POLOR + spend*polor*PRIVSEC*GDP	3, 6, 8, 10, 13, 15, 17, 18, 20	47	43	87.8%	87.8%

Source: own illustration, based on TOSMANA computations and own calculations

5.2.2 France

Based on the 1-configurations of the final truth table (Table 4.3), the software computes one solution comprising three prime implicants[6]:

Solution: CHILMIN*LOWPOV + CHILMIN*TFRDEV + lowpov*GDP *tfrdev → HIGHCOV

Path I shows that the combined presence of a large childminding (CHILMIN) sector and low poverty (LOWPOV) is a sufficient condition for high childcare coverage. Path II illustrates that the combined presence of a large childminding sector (CHILMIN) and rising fertility (TFRDEV) is a further sufficient condition for high childcare coverage. Since Paths I and II share a large childminding sector (CHILIN) as a constituent condition, they may be combined into a single expression according to the following formula:

LOWPOV*CHILMIN + TFRDEV*CHILMIN = CHILMIN*(LOWPOV + TFRDEV)

[6] In fact, the software computes a fourth prime implicant. However, it is deemed irrelevant here because it is theoretically uninformative and its unique coverage comprises only a single case. For the sake of completeness, it is listed here: TFRDEV*gdp*LOWPOV.

The new expression signifies that the combined presence of a large childminding sector (CHILMIN) and *either* low poverty (LOWPOV) *or* rising fertility (TFRDEV) constitutes a sufficient condition.

Path III, on the other hand, has to be disaggregated into its constituent configurations before it becomes useful for further analysis. Thus, Path III results from the minimization of two configurations, one covering six cases, the other one covering two cases. Since the configuration covering six cases constitutes a distinct case cluster with important theoretical implications, it is considered more analytically relevant for this study and is therefore listed in its entirety here:

chilmin*lowpov*GDP*tfrdev → HIGHCOV

This expression is analytically valuable, as, in contrast to Paths I and II, it illustrates a path to high childcare coverage without a large childminding sector. Thus, it states that a smaller childminding sector (chilmin) combined with comparatively high poverty (lowpov) can still lead to high coverage (HIGHCOV) if accompanied by high economic development (GDP) and declining fertility (tfrdev).

Table 5.3 presents the finalized solution as well as the individual prime implicants and their respective raw and unique coverage. To recall, in the table, 'truth table cases' refer to the number of cases covered by the minimized truth table rows. 'Original cases,' in contrast, refer to the original set of high-coverage cases (prior to the manual changing of outcomes during the resolution of contradictory configurations), i.e., all empirically observed departments with a childcare coverage rate above 57% according to the raw data (n=67). Raw and unique coverage refer to the share of original cases covered.

In sum, Table 5.3 illustrates that the solution helps explain more than two-thirds (68.7%) of the originally identified high-coverage French departments (46/67).

Individually, Path I has the most explanatory power, covering roughly half (32/67) of the original set. The combination of Paths I and II, however, accounts for approximately 60% (40/67) of the original set. Path III applies to a tenth of the original set (6/67). The remaining 30% of the cases are tied up in unresolved contradictory configurations and are therefore not explained by minimization results.

Table 5.3

Sufficient Conditions for High Childcare Coverage (>57%), France

Path	Prime implicant	Truth table rows minimized	Truth table cases covered	Original cases covered	Raw coverage	Unique coverage
I	CHILMIN*LOWPOV	4, 8, 12, 16	33	32	47.8%	38.8%
II	CHILMIN*TFRDEV	10, 12, 14, 16	14	14	20.9%	11.9%
I + II	CHILMIN*(LOWPOV+TFRDEV)	4, 8, 10, 12, 14, 16	41	40	59.7%	59.7%
III	chilmin*lowpov*GDP*tfrdev	5	6	6	9%	9%
Solution [(I+II) + III]	CHILMIN*(LOWPOV+TFRDEV) + chilmin*lowpov*GDP*tfrdev	4, 5, 8, 10, 12, 14, 16	47	46	68.7%	68.7%

Source: own illustration, based on TOSMANA computations and own calculations

5.3 Necessary Conditions for Low Childcare Coverage in Italy and France

5.3.1 Italy

The dichotomized data table preceding the truth table is again used to identify necessary conditions for low childcare coverage. For the complete set of low-coverage provinces, i.e., those with coverage rates below 27%, no necessary conditions can be identified. However, it is noteworthy that in the smaller subset of provinces with coverage rates below 20%, i.e., those with the *lowest* childcare coverage, all 30 provinces share three (and hence necessary) conditions: low female employment (fememp), low economic development (gdp), and low spending (spend). This statement of necessity is summarized in the following Boolean expression:

fememp*gdp*spend ← $highcov_{(<20\%)}$

5.3.2 France

Similar to the Italian example, there are no discernible necessary conditions for the complete set of low-coverage departments, i.e., those with coverage rates below 57%. However, all eight departments belonging to the smaller subset of departments with coverage rates below 50%, i.e., those displaying the *lowest* coverage, share the absence of a large childminding sector (chilmin) and rising fertility (TFRDEV). The combination of these two conditions is therefore considered necessary for the *lowest* childcare coverage. This statement of necessity is summarized in the following Boolean expression:

chilmind*TFRDEV ← highcov$_{(<50\%)}$

5.4 Sufficient Conditions for Low Childcare Coverage in Italy and France

5.4.1 Italy

Minimization of the truth table (Table 4.2), including logical remainders, leads to two solutions, each comprising three prime implicants[7]:

Solution I: gdp*polor + privsec*spend + POLOR*fememp*spend → highcov

Solution II: fememp*gdp*spend + privsec*spend + POLOR*fememp*spend → highcov

The only difference between the two solutions is the varying minimization of Path I. Paths II and III are identical. In words, Path I of Solution I indicates that the combination of low economic development (gdp) and a right-leaning political orientation (polor) is a sufficient condition for low childcare coverage. Path I of Solution II indicates that the combination of low female employment (fememp), low economic development (gdp), and low spending (spend) is a sufficient condition for low coverage.

Path II of both solutions denotes that the combination of a smaller private sector (privsec) and low spending (spend) constitutes a sufficient condition for low coverage. Finally, Path III of both solutions signifies that the presence of a left-leaning political party (POLOR), accompanied by low female employment (fememp) and low spending (spend), is a sufficient condition for low coverage.

[7] In fact, a fourth prime implicant is part of the computed solution. However, this prime implicant corresponds to a single case (truth table row 16) and is therefore not presented here. Moreover, minimization results of 0-configurations, excluding logical remainders, are presented in the appendices (Appendix 4).

Table 5.4 displays the raw and unique coverage of the solutions as well as the individual prime implicants. The solutions account for roughly 87% of the originally identified low-coverage provinces (46/53). Regarding the prime implicants, both Path II and Path III cover slightly more than half of the original cases, whereas Path I of Solution I (Sol I) covers somewhat more than one-fourth. Path I of Solution II (Sol II) achieves the highest raw coverage at approximately 60%. The remaining cases are tied up in contradictory configurations and thus not considered by minimization.

Table 5.4

Sufficient Conditions for Low Childcare Coverage (<27%), Italy

Path	Prime implicant	Truth table rows minimized	Truth table cases covered	Original cases covered	Raw coverage	Unique coverage
I (Sol I)	gdp*polor	1, 4, 11	15	15	28.3%	13.2%
I (Sol II)	fememp*gdp*spend	1, 2, 4, 5	33	31	58.5%	13.2%
II	privsec*spend	1, 2, 7, 11, 12	30	29	54.7%	5.7%
III	fememp*gdp*POLOR	2, 5, 7, 9	30	28	52.8%	18.9%
Solution I (I+II+III)	gdp*polor + privsec*spend + fememp*gdp*POLOR	1, 2, 4, 5, 7, 9, 11, 12	48	46	86.8%	86.8%
Solution II (I+II+III)	fememp*gdp*spend + privsec*spend + fememp*gdp*POLOR	1, 2, 4, 5, 7, 9, 11, 12	48	46	86.8%	86.8%

Source: own illustration, based on TOSMANA computations and own calculations

Note: Truth table cases refer to the number of cases covered by the minimized truth table rows. Original cases, in contrast, refer to the original set of low-coverage cases, prior to the manual changing of outcomes during the resolution of contradictory configurations, i.e., all empirically observed provinces with a childcare coverage rate below 27% according to the raw data (n=53). Raw and unique coverage refer to the share of original cases covered.

5.4.2 France

Minimization of the truth table (Table 4.3), leads to a solution comprising two prime implicants[8]:

Solution: chilmin*TFRDEV*lowpov + chilmin*TFRDEV*GDP → highcov

Since both paths share two constituent conditions, the solution is shortened into one expression:

Solution: chilmin*TFRDEV*(lowpov + GDP) → highcov

The solution denotes that the absence of a large childminding sector (chilmin), coupled with rising fertility (TFRDEV) and *either* higher poverty (lowpov) *or* high economic development (GDP), is a sufficient condition for low childcare coverage.

Table 5.5 shows the raw and unique coverage of the solution and its prime implicants. The solution accounts for about half of the originally identified low-coverage departments (14/27). Path I is the more relevant explanation, as it covers 44.5% of the cases belonging to the original set (12/27). The remaining cases are not considered by minimization results, as they are tied up in contradictory configurations.

Table 5.5

Sufficient Conditions for Low Childcare Coverage (<57%), France

Path	Prime implicant	Truth table rows minimized	Truth table cases covered	Original cases covered	Raw coverage	Unique coverage
I	chilmin*TFRDEV*lowpov	9, 13	13	12	44.4%	22.2%
II	chilmin*TFRDEV*GDP	13, 15	8	8	29.6%	7.4%
Solution (I + II)	chilmin*TFRDEV*(lowpov+GDP)	9, 13, 15	15	14	51.9%	51.9%

Source: own illustration, based on TOSMANA computations and own calculations

Note: Truth table cases refer to the number of cases covered by the minimized truth table rows. Original cases, in contrast, refer to the original set of low-coverage cases, prior to the manual changing of outcomes during the resolution of contradictory configurations, i.e., all empirically observed departments with a childcare coverage rate below 57% according to the raw data (n=27). Raw and unique coverage refer to the share of original cases covered.

[8] In fact, a third prime implicant is part of the computed solution. However, this prime implicant corresponds to a single case (truth table row 3) and is therefore not presented here.

5.5 Summary

There are two main sufficient paths leading to high childcare coverage in both countries. In Italy, the vast majority of high-coverage provinces follow a path marked by high public childcare expenditure and left-leaning political orientation. This path is predominantly linked to a smaller private sector. A small minority of high-coverage provinces follow an alternative path characterized by low public childcare expenditure, a larger private sector, right-leaning political orientation, and high economic development. In France, the majority of high-coverage departments follow a path marked by the combination of a large childminding sector and either low poverty or rising fertility. A small minority of high-coverage departments follow an alternative path characterized by higher poverty, a smaller childminding sector, high economic development, and declining fertility.

Regarding low coverage, the two main sufficient paths in Italy are (1) the combination of low female employment, low economic development, and low spending and (2) the combination of low spending and a comparatively small private sector. In France, the sufficient path to low coverage comprises the combination of a smaller childminding sector and rising fertility, accompanied by either high economic development or high poverty. Overall, the finalized solutions account for 88% of high-coverage provinces and 87% of low-coverage provinces, and for 69% of high-coverage departments and 52% of low-coverage departments.

6 Discussion

This chapter discusses the results, weighing them against findings from previous research and theoretical expectations. It further discusses underlying mechanisms leading from the identified necessary and sufficient conditions to the observed outcomes. The results are first discussed separately for each country and then more systematically compared in the following chapter.

6.1 Italy

Regarding Italy, the two paths to high coverage – one marked by high public sector involvement and little private provision, the other by little public involvement and high reliance on private provision – resemble those identified by Morgan (2005) on the national level. However, unlike Morgan (2005), who linked these paths to nationally specific labor market regimes, this study links them to locally specific political orientations. Thus, almost three-fourths of high-coverage provinces are characterized by left-leaning political orientation and high public childcare expenditure (Path I, Table 5.2). More than half are additionally marked by a smaller private sector, indicating that they assign more importance to public provision. In contrast, the second (and considerably less common) path features low public expenditure and a large private sector (Path II, Table 5.2). This path is specific to right-leaning provinces and is further characterized by high economic development, indicating that successful reliance on private provision depends on favorable economic context. This is an expected finding, since the residents of wealthier provinces are more likely to be able to afford the more expensive private provision.

Taking into account the subset of provinces with the highest childcare coverage (see Chapter 5.1.1), it is possible to draw conclusions about the relative success of each of the two main high-coverage paths. Thus, within the complete set of high-coverage provinces, the upper half is covered by the left-leaning, high-expenditure path, whereas the cases included in the right-leaning, low-expenditure path are located in the bottom half of the set. Hence, it appears as though the former path achieves high childcare coverage more reliably than the latter path.

The pronounced link between left-leaning political orientation and high public childcare expenditure on the one hand, and right-leaning political orientation and low public childcare expenditure on the other hand, is an expected finding in the eyes of power resource theorists (e.g., Korpi, 1985). However, the importance of partisan politics contradicts findings from other studies exploring local variation of welfare service provision (Arlotti et al., 2021; Jensen & Lolle, 2013).

Concerning childcare provision in Italy, the hypothesis of Jensen and Lolle (2013) that local politics might be more about practical solutions than ideology does therefore not apply.

The partisan political-ideological component is further highlighted by the theoretically expected observation that the path to high childcare coverage of right-leaning provinces necessarily leads through a large private sector. Although a small number of left-leaning provinces also rely predominantly on private provision, these provinces nevertheless have high public expenditure. In right-leaning provinces, on the other hand, low public expenditure is the norm without exception. This might mean that private provision is more actively encouraged in right-leaning than in left-leaning provinces, resulting in a large private sector.

It is noteworthy, however, that while there seems to be a clear connection between right-leaning political orientation, low public expenditure, and a large private sector, it could be argued that the large private sector is less due to the right-leaning political orientation than to the fact that public expenditure is low, thus making a large private sector the only viable option for achieving high coverage. This argument is supported by the finding that the combination of low public expenditure and the *lack* of a large private sector is a sufficient condition for low coverage irrespective of political orientation (Path II, Table 5.4). However, against this argument speaks the observation that right-leaning provinces with high coverage are characterized not only by a large private sector but *additionally* by high economic development. This leads to the conclusion that the lack of public expenditure in these provinces is a deliberate choice rather than an unfortunate circumstance caused by economic constraints.

6.2 France

Similar to Italy, the two main opposing paths in France also revolve around its system-specific feature. Whereas in Italy the main distinction concerns the reliance on either public or private provision, in France the distinction regards the reliance on certified childminders. Consequently, the main path leading to comparatively high childcare coverage in France is characterized by a large childminding sector and low poverty (Path I, Table 5.3). This path represents half of all high-coverage departments. In contrast, the path to high coverage with a smaller childminding sector is additionally marked by comparatively higher poverty, higher economic development, and declining fertility (Path III, Table 5.3). This path only accounts for roughly one-tenth of all high-coverage departments, however.

The expected connection highlighted by Path I between a large childminding sector and a low poverty rate is likely due to the fact that childminders are more expensive than public crèches (Collombet, 2018). Hence, a low poverty rate might indicate that a larger share of the households are financially capable of using childminding services, leading to a correspondingly larger childminding sector. Consequently, the higher poverty in the departments belonging to the alternative Path III might explain their smaller childminding sectors. In this view, these departments have to invest more in public crèches in order to compensate for the lack of childminders and cover the existing childcare demand. However, since the supply-side funding of public crèches entails larger public expenditures than the demand-side funding of childminders (Igas & IGF, 2017), the financial burden on the public purse is larger in this scenario. This would explain why all of these departments are further marked by high economic development, since more produced wealth likely leads to higher tax income, giving the departments the necessary financial resources to invest in public crèches.

Additionally, these departments experience declining pressure on the demand side thanks to falling fertility rates, making it easier to cover the remaining demand without childminders. *Declining* fertility is crucial to the comparative success of these departments, as other results show that a large childminding sector is a necessary condition for high coverage in departments experiencing *rising* fertility (see Chapter 5.1.2). It seems, thus, that fertility-related demand pressure can only be met by departments with a large childminding sector. This finding highlights the theoretical expectations that fertility can influence childcare coverage either positively or negatively depending on context.

Results regarding low-coverage departments further support these interpretations, as they show that in over half of low-coverage departments, the combination of *rising* fertility and a smaller childminding sector was a sufficient condition for low coverage when accompanied either higher poverty (Path I, Table 5.5) or high economic development (Path II, Table 5.5). Path I confirms that smaller childminding sectors tend to come in combination with higher poverty due to the smaller pool of financially well-off households able to afford childminding services. Path II, on the other hand, indicates that when these two unfavorable conditions (smaller childminding sector and higher poverty) are met with fertility-related demand pressure, the result is sufficient for producing low coverage.

Moreover, the observation that the combination of a smaller childminding sector and rising fertility, accompanied by high economic development, is sufficient for low coverage indicates that even economic development and the likely resulting higher tax income cannot meet fertility-related demand pressure without the help of a large childminding sector. Finally, further evidence that an extensive childminding sector is essential for covering fertility-related demand is the finding that a *smaller* childminding sector and *rising* fertility are necessary conditions for the *lowest* coverage, indicating that these conditions are particularly *unfavorable* for high coverage (see Chapter 5.3.2).

6.3 Summary

. For high-coverage Italian provinces, the results illustrate a theoretically coherent link between left-leaning political orientation, high spending, and public provision on the one hand, and right-leaning political orientation, low spending, and private provision on the other hand. For France, the results highlight the central importance of a large childminding sector to achieving high coverage. The presence of a large childminding sector in high-coverage departments appears to depend on favorable socioeconomic conditions due to higher user costs of childminders compared to public crèches. The alternative path further illustrates that in some cases the absence of a large childminding sector can be compensated for by two conditions in order to still achieve high coverage: (1) high economic development, which presumably leads to higher tax revenue and thus allows larger investments in public crèches, and (2) declining fertility, which decreases demand and therefore makes it easier to cover a larger share of the target population. The findings are consistent with theoretical expectations but contradict some findings from previous research.

7 Conclusion

7.1 Answering the Research Question

This study set out to explain local variation in childcare coverage on the provincial/departmental level in Italy and France, guided by the main research question: Which (combinations of) conditions lead to comparatively high/low childcare coverage in Italian provinces and French departments?

To answer this question, the study first categorized findings from previous research into demand-side, supply-side, and contextual conditions. These conditions were then linked to broader theoretical discourses in order to formulate concrete theoretical expectations about their effect on childcare coverage. The theoretical framework accounted for specific features of each country's childcare system – a large private sector in Italy and a large childminding sector in France. After operationalization of the conditions, csQCA methods were employed to treat the data, assuming interdependent causal effects of various combinations of conditions. The raw data was dichotomized and the resulting dichotomized data tables further synthesized into truth tables. Dichotomized data tables were used to identify necessary conditions. QCA software was applied to the truth tables in order to compute parsimonious expressions of sufficient conditions. The resulting answer to the main research question is based on the condition- and outcome-specific sub-research questions that were formulated in Chapter 4.1.

Thus, regarding necessity for comparatively high childcare coverage in Italian provinces, a large private sector and high economic development are necessary conditions in right-leaning provinces. A left-leaning political orientation is a necessary condition in less economically developed provinces. A large private sector is a necessary condition in low-spending provinces. Finally, left-leaning political orientation and high spending are necessary conditions for the *highest* childcare coverage.

Concerning sufficiency for comparatively high childcare coverage in Italian provinces, the combination of left-leaning political orientation and high spending is the most common sufficient condition, and it is often accompanied by a smaller private sector. A further sufficient condition is the combination of right-leaning political orientation, a large private sector, low spending, and high economic development.

With regard to comparatively low childcare coverage in Italy, no necessary conditions were identified for the complete set of low-coverage provinces. However, low female employment, low economic development, and low spending are necessary conditions for the *lowest* childcare coverage.

Concerning sufficiency for comparatively low childcare coverage in Italian provinces, the combination of low female employment, low economic development, and low spending is a sufficient condition. A further sufficient condition is the combination of low spending and a smaller private sector. Additionally, the combination of low economic development and right-leaning political orientation is a sufficient condition. Finally, the combination of low female employment, low economic development, and left-leaning political orientation is a sufficient condition.

In France, a large childminding sector is a necessary condition for high childcare coverage in departments experiencing rising fertility. Furthermore, a large childminding sector, low poverty, high female employment, and falling fertility are necessary conditions for the *highest* childcare coverage.

Also in France, the combination of a large childminding sector with either low poverty or rising fertility is a sufficient condition for comparatively high childcare coverage. A less common sufficient condition for high coverage is the combination of a smaller childminding sector, higher poverty, higher economic development, and falling fertility.

Regarding comparatively low childcare coverage in France, no necessary conditions were identified for the complete set of low-coverage departments. However, the combination of rising fertility and a smaller childminding sector is a necessary condition for the *lowest* childcare coverage.

Lastly, the combination of rising fertility, higher poverty, and a smaller childminding sector is a sufficient condition for comparatively low childcare coverage in French departments. Additionally, the combination of rising fertility, high economic development, and a smaller childminding sector is a sufficient condition for comparatively low childcare coverage.

7.2 Reflections: Interdependence of Demand, Supply, and Context

As the preceding enumeration of necessary and sufficient conditions illustrates, childcare coverage is contingent upon complex configurations of demand-side, supply-side, and contextual conditions. The results further illustrate that equifinality, configurational causation, and causal asymmetry are at play in the studied countries. Thus, in both Italy and France, there are two main contrasting paths leading to comparatively high childcare coverage (equifinality), each path comprising different combinations of conditions (configurational causation). In addition, low coverage is caused by different combinations of conditions than high coverage (causal asymmetry)

In Italy, supply-side conditions seem dominant. Thus, the more common of the two identified high-coverage paths consists of supply-side conditions (left-leaning political orientation and high spending). The same supply-side conditions are also necessary for achieving the *highest* coverage. Supply-side conditions are also essential to the second, less common path, which highlights the right-leaning preference for less public spending and more private provision. Yet, this second path additionally depends on the contextual condition of economic development, showing that a large private sector needs to be embedded in a favorable economic environment in order to achieve high coverage.

Demand-side conditions, in contrast, are noticeably absent from both paths. This does not mean, however, that demand-side conditions are irrelevant to childcare coverage in Italy, as all provinces with the *lowest* childcare coverage share low female employment as a necessary condition (together with low economic development and low spending). This latter combination is also sufficient for low coverage. This reflects the interdependence of supply, demand, and context. Thus, low economic development likely signifies less tax revenue, leading to low spending in the absence of employment-related demand-pressure. Thus, while the presence of favorable demand-side conditions may not be key to high coverage in Italy, their absence is certainly conducive to very low coverage.

Yet, even under economic constraints, public childcare expenditure could receive political prioritization. However, the findings suggest that, especially in right-leaning provinces, this is not the case, because all right-leaning provinces display low coverage when accompanied by low economic development. That this finding only applies to right-leaning but not left-leaning provinces shows that some left-leaning provinces prioritize childcare spending despite low economic development and correspondingly restrained budgets.

In France, on the other hand, the demand side takes on a more prominent role, helping explain both high and low coverage. Thus, rising fertility coupled with a large childminding sector constitutes a sufficient condition for high coverage. This shows that demand-pressure can impact positively on coverage as long as supply is flexible enough to respond. This flexibility appears to be only possible with a large childminding sector. If supply cannot keep pace with demand, as appears to be the case in departments without a large childminding sector, the positive impact of demand pressure on coverage turns negative. The combination of a smaller childminding sector and rising fertility therefore constitutes a particularly unfavorable condition for high coverage in France.

It is further noteworthy that the dynamics of childcare coverage in France show no connection to a particular political orientation. This is in contrast to the Italian example, where partisan politics represents a key condition. This is perhaps due to the different overall demand structures facing the respective systems. Thus, in France, both fertility and female employment are considerably higher than in Italy. This could explain why French coverage rates are more susceptible to changes in fertility than in Italy, as changes starting from a higher "baseline fertility" are likely to have a more palpable effect than those starting from a lower "baseline fertility." This interpretation assumes that the supply side might already be working at (or close to) capacity in a high-demand environment such as France, meaning that further increases in demand easily overburden the system, whereas decreases in demand provide immediate relief. Furthermore, in the Italian context of low demand-pressure, the childcare system may be more responsive to supply-side attempts at shaping it, leading to the observed importance of political orientation.

Finally, on the contextual side, economic development plays a similar supporting role in both Italy and France. In both cases, high economic development is essential for constructing an alternative path. In Italy, high economic development allows right-leaning, low-spending provinces to rely on private provision for achieving high coverage. In France, it enables departments with smaller childminding sectors to invest more in public crèches. Also in France, the distribution of wealth, as measured by the poverty rate, appears to be relevant. This is likely due to its effect on the percentage of households with sufficient financial resources to afford the more expensive childminders. In sum, supply-and-demand dynamics are thus firmly embedded into country- and system-specific contexts.

7.3 Limitations and Recommendations for Future Research

The main limitation of this study is the issue of unaccounted cases. Since some cases were tied up in contradictory configurations, the minimization results did not account for them. In the Italian example, unaccounted high-coverage and low-coverage cases only made up a little over 10% of each set. In France, however, 30% of high-coverage and 48% of low-coverage cases remained unaccounted for. The disparity between unaccounted cases in Italy and France may be due to the differing degrees of development of the respective childcare systems.

Thus, since childcare coverage is generally low in Italy, low coverage in low-ranking provinces is not only low in relative, but also in absolute terms. In France, in contrast, generally high childcare coverage means that comparatively low coverage is only low in relative, but not in absolute terms. Consequently, comparatively low coverage in French departments may not follow the theoretical expectations of low coverage to the same extent as comparatively low coverage in Italian provinces, as coverage in the concerned French departments is only low in relative but not in absolute terms. This would explain why comparatively low coverage in France proved the most difficult to account for, whereas it neatly fit theoretical expectations in Italy.

Unaccounted cases may also be related to the calibration of outcome and condition variables. Thus, the use of csQCA limits calibration to the crisp distinction of cases into either full members or full non-members of a set. Other QCA methods, such as fsQCA, allow for partial membership scores, thus differentiating between cases in a more fine-grained manner. Without the ‘hard’ cut-offs between cases required by csQCA, the study might have been able to explain some of the unaccounted cases.

Yet, this limitation is also a strength, as the use of csQCA delivered concise and coherent answers to the research questions for almost 90% of high- and low-coverage cases in Italy and more than two-thirds of high-coverage cases in France. Even the weakest result still managed to account for more than half of the cases (low coverage in France). There is thus a trade-off between accounting for all observed cases with individualized explanations and reducing the complexity of empirical phenomena into parsimonious statements. The latter is unlikely to cover all observed cases, but is certainly deemed preferable in this study.

However, unaccounted cases also offer opportunities for future research, as each unresolved contradictory configuration opens the door for more qualitative research into the sources of the contradiction. The internal complexity of some unexplained cases might be better captured by small-n qualitative case studies than by the large-n research design underlying this study. Especially in France, where the political orientation of parties did not appear to play a role, it could be fruitful to interview local childcare actors to better grasp the dynamics which are seemingly beyond partisan political considerations. In France, future studies could also focus on the childminding sector. Particularly promising may be a systematic analysis of 'childminding markets,' as they appear to be sensitive to local socioeconomic conditions and follow market dynamics.

In Italy, further research is needed into the social consequences of each of the two identified paths to high coverage. Future studies could therefore explore whether the higher-fee private path leads to more socioeconomic unequal childcare outcomes than the lower-fee public path. Further research could also more systematically explore the dynamics of private childcare markets.

Finally, the broader literature on the local variation of welfare provision, in particular childcare, could benefit from studies similar to this for other countries. This would allow for more comprehensive cross-national comparisons of patterns of local variation in childcare coverage.

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Appendices

Appendix 1: Truth Table Including All Contradictions and Explanation of Resolution, Italy

Row	c1 Fem Emp	c2 GDP	c3 Priv Sec	c4 Spend	c5 Pol Or	o High Cov	Provinces (REGION)[9]	Cases n=102
1	0	0	0	0	0	0	Viterbo (LAZ), Isernia (MOL), Messina (SIC), Ragusa (SIC), Catania (SIC), Palermo (SIC)	6
2	0	0	0	0	1	C	Chieti (ABR) (1), Macerata (MAR) (0), Ascoli Piceno (MAR) (0), Teramo (ABR) (0), Campobasso (MOL) (0), Brindisi (PUG) (0), Taranto (PUB) (0), Potenza (BAS) (0), Frosinone (LAZ) (0), Agrigento (SIC) (0), Salerno (CAM) (0), Siracusa (SIC) (0), Enna (SIC) (0), Benevento (CAM) (0), Avellino (CAM) (0), Trapani (SIC) (0), Cosenza (CAL) (0), Caltanissetta (SIC) (0)	18
3	0	0	0	1	1	C	Gorizia (FRI) (1), Livorno (TOS) (1), Grosseto (TOS) (1), Savona (LIG) (1), Lucca (TOS) (1), Massa-Carrara (TOS) (1), Pistoia (TOS) (1), Imperia (LIG) (0), Rieti (LAZ) (0)	9
4	0	0	1	0	0	0	Lecce (PUG), Sondrio (LOM), Latina (LAZ), Crotone (CAL), Catanzaro (CAL), Barletta-Adri-Trani (PUG), Caserta (CAM)	7
5	0	0	1	0	1	C	Rovigo (VEN) (1), Lodi (LOM) (0), Pescara (ABR) (0), L'Aquila (ABR) (0), Matera (BAS) (0), Bari (PUG) (0), Foggia (PUG) (0), Reggio di Calabria (CAL) (0), Vibo Valentia (CAL) (0), Napoli (CAM) (0)	10
6	0	0	1	1	1	1	Terni (UMB)	1
7	0	1	0	0	1	0	Mantova (LOM)	1
8	0	1	1	0	0	1	Bergamo (LOM), Padova (VEN), Udine (FRI), Vicenza (VEN)	4
9	0	1	1	0	1	0	Brescia (LOMB)	1
10	0	1	1	1	1	1	Rome (LAZ), La Spezia (LIG), Venice (VEN)	3
11	1	0	0	0	0	0	Vercelli (PIE), Asti (PIE)	2
12	1	0	0	0	1	0	Fermo (MAR), Alessandria (PIE), Verbano-Cusio-Ossola (PIE)	3
13	1	0	0	1	1	1	Ferrarra (EMI), Biella (PIE), Arezzo (TOS), Pesaro e Urbino (MAR)	4
14	1	0	1	0	1	C	Pavia (LOM) (1), Como (LOM) (0)	2

[9] Since abbreviations of Italian regions are not used in the main text of the thesis, a list is only provided here in the appendices (Appendix 9).

Row	c1 Fem Emp	c2 GDP	c3 Priv Sec	c4 Spend	c5 Pol Or	o High Cov	Provinces (REGION)[9]	Cases n=102
15	1	0	1	1	1	1	Perugia (UMB)	1
16	1	1	0	1	0	0	Bolzano	1
17	1	1	0	1	1	C	Ravenna (EMI) (1), Aosta Valley (1), Bologna (EMI) (1), Trieste (FRI) (1), Florence (TOS) (1), Forli-Cesena (EMI) (1), Siena (TOS) (1), Reggio Emilia (EMI) (1), Trento (1), Modena (EMI) (1), Pisa (TOS) (1), Parma (EMI) (1), Milan (LOM) (1), Ancona (MAR) (1), Novara (PIE) (1), Turin (PIE) (1), Rimini (EMI) (1), Piacenza (EMI) (0)	18
18	1	1	1	0	0	C	Verona (VEN) (1), Varese (LOM) (1), Treviso (VEN) (1), Pordenone (FRI) (1), Cuneo (PIE) (0)	5
19	1	1	1	0	1	C	Monza e della Brianza (LOM) (1), Cremona (LOM) (1), Lecco (LOM) (1), Belluno (VEN) (0)	4
20	1	1	1	1	1	1	Prato (TOS), Genova (LIG)	2

Source: own illustration, based on TOSMANA-generated truth table

Note: c = condition; o = outcome; C = contradiction; 1 = presence of condition/outcome; 0 = absence of condition/outcome; FemEmp (c1) = high female employment; GDP (c2) = high economic development; PrivSec (c3) = large private sector; Spend (c4) = high spending; PolOr (c5) = left-leaning political orientation; HighCov (o) = high childcare coverage

The truth table contains 20 of 32 (2^5) possible configurations. However, seven configurations are contradictory and need to be resolved as far as possible before minimization (Rows 2, 3, 5, 14, 17, 18, 19). The probabilistic resolution strategy is used. This method relies on the "use [of] frequency criteria to 'orientate' the outcome," meaning that the most frequently observed outcome is adopted for all cases in the contradictory row (Rihoux & De Meur, 2009, p. 49). Thus, Row 2 covers eighteen cases: seventeen 0-configurations and only one 1-configuration. Given the large number of cases in the row and the presence of one single 'outlier', a probabilistic resolution strategy is justified and the outcome value for the province of Chieti changed from [1] to [0]. The same probabilistic reasoning is applied to rows 3, 5,17, and 18. In row 3, seven of nine cases present the outcome [1]. Consequently, the outcome values of the two outliers, Rieti and Imperia, are changed from [0] to [1]. In row 5, nine of ten cases display the outcome [0]. The outcome value of the sole outlier, Rovigo, is thus changed from [1] to [0]. In row 17, seventeen of eighteen cases show the outcome [1]. Once again, the outcome value of the sole outlier, Piacenza, is therefore changed from [0] to [1].

In row 18, four of five cases display the [1] outcome and the outcome of Cuneo is therefore changed from [0] to [1]. Although five observed cases in a given row might not be considered sufficient to apply probabilistic reasoning, it is applied here based on qualitative considerations. Thus, Row 18 resembles the configuration of Row 8, deviating in only one of the five conditions (female employment). When this condition is removed according to the rules of Boolean minimization, the four remaining conditions – high economic development, large private sector, low spending, right-leaning political orientation – illustrate an important theoretical relation. This relation is discussed at length in Chapter 6 and Chapter 7 of the thesis. Combined, the theoretically coherent cluster including Rows 8 and 18 covers nine cases: eight presenting the [1] outcome and one case, Cuneo, the [0] outcome. This is a large enough number of cases to justify probabilistic reasoning. If Row 18 was left unresolved and excluded from minimization, this important cluster of cases would be missed.

Rows 14 and 19, on the other hand remain unresolved. Row 14 only covers two cases, meaning only one case of each outcome set is unaccounted for by excluding this row. Similarly, Row 19 only covers four cases, three of which presenting the [1] outcome. The exclusion of these two rows from minimization therefore means that only four cases of the [1] outcome set and two cases of the [0] outcome set are unaccounted for by the results. Given the large-n design of the study (n=102), this does not pose a significant methodological problem.

To summarize, five of the seven configurations were resolved following a probabilistic logic, which is also qualitatively justified upon closer examination of the concerned cases. This reasoning is justified by the large total of observed cases in the respective truth table rows and in the study as a whole.

Appendix 2: Final Truth Table Including Case Names, Italy

Row	c1 Fem Emp	c2 GDP	c3 Priv Sec	c4 Spend	c5 Pol Or	o High Cov	Provinces (REGION)	Cases n=102
1	0	0	0	0	0	0	Viterbo (LAZ), Isernia (MOL), Messina (SIC), Ragusa (SIC, Catania (SIC), Palermo (SIC)	6
2	0	0	0	0	1	0	Chieti (ABR), Macerata (MAR), Ascoli Piceno (MAR), Teramo (ABR), Campobasso (MOL), Brindisi (PUG), Taranto (PUB), Potenza (BAS), Frosinone (LAZ), Agrigento (SIC), Salerno (CAM), Siracusa (SIC), Enna (SIC), Benevento (CAM), Avellino (CAM), Trapani (SIC), Cosenza (CAL), Caltanissetta (SIC)	18
3	0	0	0	1	1	1	Gorizia (FRI), Livorno (TOS), Grosseto (TOS), Savona (LIG), Lucca (TOS), Massa-Carrara (TOS), Pistoia (TOS), Imperia (LIG), Rieti (LAZ)	9
4	0	0	1	0	0	0	Lecce (PUG), Sondrio (LOM), Latina (LAZ), Crotone (CAL), Catanzaro (CAL), Barletta-Adri-Trani (PUG), Caserta (CAM)	7
5	0	0	1	0	1	0	Rovigo (VEN), Lodi (LOM), Pescara (ABR), L'Aquila (ABR), Matera (BAS), Bari (PUG), Foggia (PUG), Reggio di Calabria (CAL), Vibo Valentia (CAL), Napoli (CAM)	10
6	0	0	1	1	1	1	Terni (UMB)	1
7	0	1	0	0	1	0	Mantova (LOM)	1
8	0	1	1	0	0	1	Bergamo (LOM), Padova (VEN), Udine (FRI), Vicenza (VEN)	4
9	0	1	1	0	1	0	Brescia (LOM)	1
10	0	1	1	1	1	1	Rome (LAZ), La Spezia (LIG), Venice (VEN)	3
11	1	0	0	0	0	0	Vercelli (PIE), Asti (PIE)	2
12	1	0	0	0	1	0	Fermo (MAR), Alessandria (PIE), Verbano-Cusio-Ossola (PIE)	3
13	1	0	0	1	1	1	Ferrarra (EMI), Biella (PIE), Arezzo (TOS), Pesaro e Urbino (MAR)	4
14	1	0	1	0	1	C	Pavia (LOM) (1), Como (LOM) (0)	2
15	1	0	1	1	1	1	Perugia (UMB)	1
16	1	1	0	1	0	0	Bolzano	1
17	1	1	0	1	1	1	Ravenna (EMI), Aosta Valley, Bologna (EMI), Trieste (FRI), Florence (TOS), Forli-Cesena (EMI), Siena (TOS), Reggio Emilia (EMI), Trento, Modena (EMI), Pisa (TOS), Parma (EMI), Milan	18

Row	c1 Fem Emp	c2 GDP	c3 Priv Sec	c4 Spend	c5 Pol Or	o High Cov	Provinces (REGION)	Cases n=102
							(LOM), Ancona (MAR), Novara (PIE), Turin (PIE), Rimini (EMI), Piacenza (EMI)	
18	1	1	1	0	0	1	Verona (VEN), Varese (LOM), Treviso (VEN), Pordenone (FRI), Cuneo (PIE)	5
19	1	1	1	0	1	C	Monza e della Brianza (LOM) (1), Cremona (LOM) (1), Lecco (LOM) (1), Belluno (VEN) (0)	4
20	1	1	1	1	1	1	Prato (TOS), Genova (LIG)	2

Source: own illustration, based on TOSMANA-generated truth table

Note: c = condition; o = outcome; C = contradiction; 1 = presence of condition/outcome; 0 = absence of condition/outcome; FemEmp (c1) = high female employment; GDP (c2) = high economic development; PrivSec (c3) = large private sector; Spend (c4) = high spending; PolOr (c5) = left-leaning political orientation; HighCov (o) = high childcare coverage

Appendix 3: Minimization Results for 1-Outcome, Excluding Logical Remainders, Italy

Path	Prime implicant	Truth table rows minimized	Truth table cases covered	Original cases covered	Raw coverage	Unique coverage
I	FEMEMP*SPEND*POLOR	15, 17, 20	21	20	40.8%	34.7%
II	gdp*SPEND*POLOR	3, 6, 13, 15	15	13	26.5%	22.4%
III	PRIVSEC*SPEND*POLOR	6, 10, 15, 20	7	7	14.3%	6.1%
IV	GDP*PRIVSEC*spend*polor	8, 18	9	8	16.3%	16.3%
Solution (I+II+ III+IV)	FEMEMP*SPEND*POLOR + gdp*SPEND*POLOR + PRIVSEC*SPEND*POLOR + GDP*PRIVSEC*spend*polor	3, 6, 8, 10, 13, 15, 17, 18, 20	47	43	87.8%	87.8%

Source: own illustration, based on TOSMANA computations and own calculations

Note: Truth table cases refer to the number of cases covered by the minimized truth table rows. Original cases, in contrast, refer to the original set of high-coverage cases, prior to the manual changing of outcomes during the resolution of contradictory configurations, i.e., all empirically observed provinces with a childcare coverage rate above 27% according to the raw data (n=49). Raw and unique coverage refer to the share of original cases covered.

Appendix 4: Minimization Results for 0-Outcome, Excluding Logical Remainders, Italy

Path	Prime implicant	Truth table rows minimized	Truth table cases covered	Original cases covered	Raw coverage	Unique coverage
I	fememp*spend*POLOR	2, 5, 7, 9	30	28	52.8%	3.8%
II	fememp*gdp*spend	1, 2, 4, 5	33	31	58.5%	13.2%
III	gdp*privsec*spend	1, 2, 11, 12	29	28	52.8%	9.4%
Solution I (I+II+III)	Fememp*spend*POLOR + fememp*gdp*spend + gdp*privsec*spend	1, 2, 4, 5, 7, 9, 11, 12	48	46	86.8%	86.8%

Source: own illustration, based on TOSMANA computations and own calculations

Note: Truth table cases refer to the number of cases covered by the minimized truth table rows. Original cases, in contrast, refer to the original set of low-coverage cases, prior to the manual changing of outcomes during the resolution of contradictory configurations, i.e., all empirically observed provinces with a childcare coverage rate below 27% according to the raw data (n=53). Raw and unique coverage refer to the share of original cases covered.

Appendix 5: Truth Table Including All Contradictions and Explanation of Resolution, France

Row	c1 TFR Dev	c2 GDP	c3 Low Pov	c4 Chil Min	o High Cov	Departments (REGION)[10]	Cases n=94
1	0	0	0	0	C	Lozère (OCC) (1), Ardèche (ARA) (1), Meurthe-et-Moselle (GES) (0), Hautes-Alpes (PAC) (0), Territoire de Belfort (BFC) (0), Hautes-Pyrénées (OCC) (0), Tarn (OCC) (0), Pas-de-Calais (HDF) (0), Ariège (OCC) (0), Alpes-de-Haute-Provence (PAC) (0), Var (PAC) (0)	11
2	0	0	0	1	C	Gers (OCC) (1), Indre (CVL) (1), Haute-Marne (GES) (1), Charente (NAQ) (1), Vosges (GES) (1), Orne (NOR) (1), Meuse (GES) (1), Haute-Saône (BFC) (1), Lot (OCC) (1), Dordogne (NAQ) (0), Aube (GES) (0), Aisne (HDF) (0), Moselle (GES) (0)	13
3	0	0	1	0	0	Haut-Rhin (GES)	1
4	0	0	1	1	C	Haute-Loire (ARA) (1), Vendée (PDL) (1), Mayenne (PDL) (1), Morbihan (BRE) (1), Sarthe (PDL) (1), Finistère (BRE) (1), Manche (NOR) (1), Maine-et-Loire (PDL) (1), Calvados (NOR) (1), Saône-et-Loire (BFC) (1), Côtes-d'Armor (BRE) (1), Chrente-Maritime (NAQ) (1), Landes (NAQ) (1), Cantal (ARA) (1), Doubs (BFC) (1), Somme (HDF) (1), Yonne (BFC) (1), Ain (ARA) (1), Ardennes (GES) (1), Eure (NOR) (1), Oise (HDF) (0), Seine-et-Marne (IDF) (0)	22
5	0	1	0	0	C	Paris (IDF) (1), Pyrénées-Atlantiques (NAQ) (1), Bas-Rhin (GES) (1), Marne (GES) (1), Yvelines (IDF (0), Nord (HDF) (0)	6
6	0	1	0	1	1	Savoie (ARA), Seine-Maritime (NOR)	2
7	0	1	1	0	C	Côte-d'Or (BFC) (1), Gironde (NAQ) (1), Hauts-de-Seine (IDF) (1), Haute-Savoie (ARA) (0)	4
8	0	1	1	1	1	Loire-Atlantique (PDL), Indre-et-Loire (CVL), Ille-et-Vilaine (BRE), Deux-Sèvres (NAQ), Puy-de-Dôme (ARA),	5
9	1	0	0	0	C	Loire (ARA) (1), Lot-et-Garonne (NAQ) (0), Tarn-et-Garonne (OCC) (0), Hérault (OCC) (0), Gard (OCC) (0), Pyrénées-Orientales (OCC) (0), Aude (OCC) (0)	7
10	1	0	0	1	C	Vienne (NAQ) (1), Aveyron (OCC) (1), Cher (CVL) (1), Allier (ARA) (1), Haute-Vienne (NAQ) (1), Nièvre (BFC) (1), Creuse (NAQ) (0)	7
11	1	0	1	0	1	Corrèze (NAQ)	1
12	1	0	1	1	1	Jura (BFC), Loir-et-Cher (CVL), Loiret (CVL), Eure-et-Loir (CVL)	4

[10] Since abbreviations of French regions are not used in the main text of the thesis, a list is only provided here in the appendices (Appendix 9).

Row	c1 TFR Dev	c2 GDP	c3 Low Pov	c4 Chil Min	o High Cov	Departments (REGION)[10]	Cases n=94
13	1	1	0	0	0	Val-de-Marne (IDF), Alpes-Maritimes (PAC), Bouches-du-Rhône (PAC), Vaucluse (PAC), Val-d'Oise (IDF), Seine-Saint-Denis (IDF)	6
14	1	1	0	1	1	Rhône (ARA)	1
15	1	1	1	0	0	Haute-Garonne (OCC), Essone (IDF)	2
16	1	1	1	1	C	Isère (ARA) (1), Drôme (ARA) (0)	2

Source: own illustration, based on TOSMANA-generated truth table

Note: c = condition; o = outcome; C = contradiction; 1 = presence of condition/outcome; 0 = absence of condition/outcome; TFRDev (c1) = rising fertility; GDP (c2) = high economic development; LowPov (c3) = low poverty; ChilMin (c4) = large childminding sector; HighCov (o) = high childcare coverage

The truth table is initially based on a 60% threshold for the outcome 'high childcare coverage.' It contains all 16 (2^4) possible configurations. However, eight configurations are contradictory and need to be resolved as far as possible before minimization (Rows 1, 2, 4, 5, 7, 9, 10, 16). Upon closer examination of the contradictory cases, the threshold for high childcare coverage is lowered to 57%. As a result, three contradictions are resolved: Row 5 (Yvelines and Nord), Row 10 (Creuse), and Row 16 (Drôme). Whereas the concerned cases were below the initial 60% threshold, they are now above the 57% and their outcome is consequently changed from [0] to [1]. In addition, four other cases change the outcome as a result of the new threshold: Meurthe-et-Moselle and Hautes-Alpes (both Row 1), Dordogne (Row 2), and Oise (Row 4). Their outcome is thus changed from [0] to [1], as well. However, this does not produce new contradictions.

Based on the 57%, probabilistic reasoning is used to resolve two further contradictions. Thus, Row 4 now covers 22 cases, 21 of which presenting the [1] outcome (even with the initial 60% threshold, 20 of 22 cases presented the [1] outcome). The outcome of the remaining 'outlier' case, Seine-et-Marne, is changed from [0] to [1]. Moreover, Row 9 covers seven cases, six of which presenting the [0] outcome. The outcome of the contradictory case, Loire, is therefore changed from [1] to [0]. Rows 1, 2, and 7, on the other hand, remain unresolved, as the outcome distribution amongst the cases is not deemed sufficiently tilted towards one outcome or the other to justify probabilistic resolution. In sum, three of eight contradictions were resolved by adjusting the outcome definition and two more were resolved using probabilistic reasoning.

Appendix 6: Final Truth Table Including Case Names, France

Row	c1 TFR Dev	c2 GDP	c3 Low Pov	c4 Chil Min	o High Cov	Departments (REGION)	Cases n=94
1	0	0	0	0	C	Lozère (OCC) (1), Ardèche (ARA) (1), Meurthe-et-Moselle (GES) (1), Hautes-Alpes (PAC) (1), Territoire de Belfort (BFC) (0), Hautes-Pyrénées (OCC) (0), Tarn (OCC) (0), Pas-de-Calais (HDF) (0), Ariège (OCC) (0), Alpes-de-Haute-Provence (PAC) (0), Var (PAC) (0)	11
2	0	0	0	1	C	Gers (OCC) (1), Indre (CVL) (1), Haute-Marne (GES) (1), Charente (NAQ) (1), Vosges (GES) (1), Orne (NOR) (1), Meuse (GES) (1), Haute-Saône (BFC) (1), Lot (OCC) (1), Dordogne (NAQ) (1), Aube (GES) (0), Aisne (HDF) (0), Moselle (GES) (0)	13
3	0	0	1	0	0	Haut-Rhin (GES)	1
4	0	0	1	1	1	Haute-Loire (ARA), Vendée (PDL), Mayenne (PDL), Morbihan (BRE), Sarthe (PDL), Finistère (BRE), Manche (NOR), Maine-et-Loire (PDL), Calvados (NOR), Saône-et-Loire (BFC), Côtes-d'Armor (BRE), Chrente-Maritime (NAQ), Landes (NAQ), Cantal (ARA), Doubs (BFC), Somme (HDF), Yonne (BFC), Ain (ARA), Ardennes (GES), Eure (NOR), Oise (HDF), Seine-et-Marne (IDF)	22
5	0	1	0	0	1	Paris (IDF), Pyrénées-Atlantiques (NAQ), Bas-Rhin (GES), Marne (GES), Yvelines (IDF), Nord (HDF)	6
6	0	1	0	1	1	Savoie (ARA), Seine-Maritime (NOR)	2
7	0	1	1	0	C	Côte-d'Or (BFC) (1), Gironde (NAQ) (1), Hauts-de-Seine (IDF) (1), Haute-Savoie (ARA) (0)	4
8	0	1	1	1	1	Loire-Atlantique (PDL), Indre-et-Loire (CVL), Ille-et-Vilaine (BRE), Deux-Sèvres (NAQ), Puy-de-Dôme (ARA),	5
9	1	0	0	0	0	Loire (ARA), Lot-et-Garonne (NAQ), Tarn-et-Garonne (OCC), Hérault (OCC), Gard (OCC), Pyrénées-Orientales (OCC), Aude (OCC)	7
10	1	0	0	1	1	Vienne (NAQ), Aveyron (OCC), Cher (CVL), Allier (ARA), Haute-Vienne (NAQ), Nièvre (BFC), Creuse (NAQ)	7
11	1	0	1	0	1	Corrèze (NAQ)	1
12	1	0	1	1	1	Jura (BFC), Loir-et-Cher (CVL), Loiret (CVL), Eure-et-Loir (CVL)	4
13	1	1	0	0	0	Val-de-Marne (IDF), Alpes-Maritimes (PAC), Bouches-du-Rhône (PAC), Vaucluse (PAC), Val-d'Oise (IDF), Seine-Saint-Denis (IDF)	6
14	1	1	0	1	1	Rhône (ARA)	1
15	1	1	1	0	0	Haute-Garonne (OCC), Essone (IDF)	2
16	1	1	1	1	1	Isère (ARA), Drôme (ARA)	2

Source: own illustration, based on TOSMANA-generated truth table

Note: c = condition; o = outcome; C = contradiction; 1 = presence of condition/outcome; 0 = absence of condition/outcome; TFRDev (c1) = rising fertility; GDP (c2) = high economic development; LowPov (c3) = low poverty; ChilMin (c4) = large childminding sector; HighCov (o) = high childcare coverage

Appendix 7: Dichotomized Data Table, Italy

Province (REGION)	Outcome		Demand-Side Conditions			Contextual Conditions		Supply-Side Conditions		
	Chil Cov (%)	High Cov	Fem Emp	TFR Avg	TFR Dev	GDP	High Edu	Priv Sec	Spend	Pol Or
Ravenna (EMI)	**46.8**	**1**	1	0	1	1	0	0	1	1
Aosta Valley	**45.7**	**1**	1	1	0	1	0	0	1	1
Ferrarra (EMI)	**45.0**	**1**	1	0	1	0	0	0	1	1
Bologna (EMI)	**44.5**	**1**	1	0	1	1	1	0	1	1
Perugia (UMB)	**43.8**	**1**	1	0	0	0	1	0	1	1
Prato (TOS)	**42.2**	**1**	1	1	0	1	0	1	1	1
Trieste (FRI)	**40.9**	**1**	1	0	1	1	1	0	1	1
Florence (TOS)	**40.2**	**1**	1	0	0	1	1	0	1	1
Forlì-Cesena (EMI)	**39.8**	**1**	1	0	1	1	0	0	1	1
Siena (TOS)	**39.6**	**1**	1	0	0	1	1	0	1	1
Gorizia (FRI)	**39.2**	**1**	0	0	1	0	0	0	1	1
Reggio Emilia (EMI)	**39.1**	**1**	1	1	0	1	0	0	1	1
Biella (PIE)	**39.0**	**1**	1	0	0	0	0	0	1	1
Terni (UMB)	**38.7**	**1**	0	0	0	0	1	1	1	1
Trento	**38.4**	**1**	1	1	0	1	1	0	1	1
Modena (EMI)	**37.6**	**1**	1	1	1	1	0	0	1	1
Pisa (TOS)	**36.9**	**1**	1	0	1	1	1	0	1	1
Livorno (TOS)	**36.2**	**1**	0	0	1	0	0	0	1	1
Grosseto (TOS)	**36.1**	**1**	0	0	1	0	0	0	1	1
Parma (EMI)	**35.9**	**1**	1	0	1	1	1	0	1	1
Rome (LAZ)	**35.7**	**1**	0	0	0	1	1	1	1	1
Rovigo (VEN)	**35.4**	**1**	0	0	1	0	0	1	0	1
Genova (LIG)	**34.6**	**1**	1	0	1	1	1	0	1	1
Milan (LOM)	**34.4**	**1**	1	0	1	1	1	0	1	1
Ancona (MAR)	**33.5**	**1**	1	0	0	1	1	0	1	1
Bergamo (LOM)	**33.0**	**1**	0	1	0	1	0	1	0	0
Arezzo (TOS)	**32.7**	**1**	1	0	0	0	0	0	1	1
Novara (PIE)	**31.7**	**1**	1	0	1	1	0	0	1	1
Turin (PIE)	**31.5**	**1**	1	0	0	1	1	0	1	1
Padova (VEN)	**31.2**	**1**	1	0	1	1	1	1	0	0
Pavia (LOM)	**30.8**	**1**	1	0	1	0	0	1	0	1
Verona (VEN)	**30.7**	**1**	1	1	0	1	0	1	0	0
Savona (LIG)	**30.5**	**1**	0	0	1	0	0	0	1	1
Udine (FRI)	**30.4**	**1**	1	0	1	1	0	1	0	0
Monza e della Brianza (LOM)	**30.0**	**1**	1	0	1	1	1	1	0	1

Province (REGION)	Outcome		Demand-Side Conditions			Contextual Conditions		Supply-Side Conditions		
	Chil Cov (%)	High Cov	Fem Emp	TFR Avg	TFR Dev	GDP	High Edu	Priv Sec	Spend	Pol Or
Lucca (TOS)	**29.9**	**1**	0	0	1	0	0	0	1	1
Massa-Carrara (TOS)	**29.3**	**1**	0	0	1	0	0	0	1	1
Pistoia (TOS)	**29.3**	**1**	0	0	1	0	0	0	1	1
Rimini (EMI)	**29.1**	**1**	1	0	0	1	1	0	1	1
Cremona (LOM)	**29.0**	**1**	1	0	1	1	0	1	0	1
Varese (LOM)	**28.9**	**1**	1	0	1	1	0	1	0	0
La Spezia (LIG)	**28.8**	**1**	0	0	1	1	0	0	0	1
Pesaro e Urbino (MAR)	**28.4**	**1**	1	0	0	0	1	0	1	1
Chieti (ABR)	**28.4**	**1**	0	0	0	0	1	0	0	1
Treviso (VEN)	**28.1**	**1**	1	1	0	1	0	1	0	0
Pordenone (FRI)	**28.1**	**1**	1	0	1	1	0	1	0	0
Lecco (LOM)	**27.7**	**1**	1	0	0	1	0	1	0	1
Venice (VEN)	**27.4**	**1**	0	0	1	1	0	1	1	1
Vicenza (VEN)	**27.1**	**1**	1	1	0	1	0	1	0	0
Bolzano	**26.8**	**0**	1	1	1	1	0	0	1	0
Lodi (LOM)	**26.6**	**0**	1	0	1	0	0	1	0	1
Mantova (LOM)	**26.4**	**0**	1	0	1	1	0	0	0	1
Fermo (MAR)	**26.4**	**0**	1	0	0	0	0	0	0	1
Macerata (MAR)	**26.3**	**0**	1	0	0	0	1	0	0	1
Piacenza (EMI)	**25.8**	**0**	1	0	0	1	0	0	1	1
Vercelli (PIE)	**25.5**	**0**	1	0	1	0	0	0	0	0
Como (LOM)	**24.1**	**0**	1	0	0	0	0	1	0	1
Ascoli Piceno (MAR)	**24.1**	**0**	0	0	0	0	1	0	0	1
Belluno (VEN)	**24.0**	**0**	1	0	0	1	0	1	0	1
Alessandria (PIE)	**23.9**	**0**	1	0	1	0	0	0	0	1
Teramo (ABR)	**23.6**	**0**	0	0	0	0	0	0	0	1
Campobasso (MOL)	**23.5**	**0**	0	0	0	0	1	0	0	1
Asti (PIE)	**22.8**	**0**	1	0	0	0	0	0	0	0
Viterbo (LAZ)	**22.7**	**0**	0	0	0	0	0	0	0	0
Brescia (LOM)	**22.7**	**0**	0	1	0	1	0	1	0	1
Lecce (PUG)	**22.4**	**0**	0	0	0	0	0	1	0	0
Imperia (LIG)	**22.4**	**0**	0	0	0	0	0	0	1	1
Rieti (LAZ)	**22.3**	**0**	0	0	0	0	0	0	1	1
Cuneo (PIE)	**21.6**	**0**	1	1	0	1	0	1	0	0
Verbano-Cusio-Ossola (PIE)	**21.3**	**0**	1	0	0	0	0	0	0	1
Isernia (MOL)	**21.0**	**0**	0	0	0	0	1	0	0	0
Sondrio (LOM)	**20.1**	**0**	0	0	1	0	0	1	0	0

Province (REGION)	Outcome		Demand-Side Conditions			Contextual Conditions		Supply-Side Conditions		
	Chil Cov (%)	High Cov	Fem Emp	TFR Avg	TFR Dev	GDP	High Edu	Priv Sec	Spend	Pol Or
Pescara (ABR)	**19.9**	**0**	0	0	0	0	1	1	0	1
Latina (LAZ)	**18.9**	**0**	0	0	0	0	0	1	0	0
L'Aquila (ABR)	**18.8**	**0**	0	0	1	0	1	1	0	1
Brindisi (PUG)	**18.7**	**0**	0	0	0	0	0	0	0	1
Taranto (PUG)	**18.3**	**0**	0	0	0	0	0	0	0	1
Messina (SIC)	**17.0**	**0**	0	0	0	0	1	0	0	0
Potenza (BAS)	**16.9**	**0**	0	0	0	0	0	0	0	1
Matera (BAS)	**16.4**	**0**	0	0	0	0	0	1	0	1
Crotone (CAL)	**16.3**	**0**	0	0	0	0	0	1	0	0
Bari (PUG)	**15.3**	**0**	0	0	0	0	0	1	0	1
Frosinone (LAZ)	**15.2**	**0**	0	0	0	0	0	0	0	1
Foggia (PUG)	**14.3**	**0**	0	0	0	0	0	1	0	1
Agrigento (SIC)	**13.9**	**0**	0	0	0	0	0	0	0	1
Catanzaro (CAL)	**13.1**	**0**	0	0	0	0	1	1	0	0
Salerno (CAM)	**13.0**	**0**	0	0	0	0	0	0	0	1
Siracusa (SIC)	**12.4**	**0**	0	0	0	0	0	0	0	1
Barletta-Andria-Trani (PUG)	**12.2**	**0**	0	0	0	0	0	1	0	0
Reggio di Calabria (CAL)	**12.1**	**0**	0	0	0	0	0	1	0	1
Enna (SIC)	**11.7**	**0**	0	0	0	0	0	0	0	1
Benevento (CAM)	**10.5**	**0**	0	0	0	0	0	0	0	1
Avellino (CAM)	**10.0**	**0**	0	0	0	0	0	0	0	1
Vibo Valentia (CAL)	**10.0**	**0**	0	0	0	0	0	1	0	1
Trapani (SIC)	**9.7**	**0**	0	0	0	0	0	0	0	1
Napoli (CAM)	**8.9**	**0**	0	1	0	0	0	1	0	1
Ragusa (SIC)	**8.7**	**0**	0	1	0	0	0	0	0	0
Catania (SIC)	**8.1**	**0**	0	1	0	0	0	0	0	0
Palermo (SIC)	**8.0**	**0**	0	1	0	0	0	0	0	0
Cosenza (CAL)	**7.7**	**0**	0	0	0	0	0	0	0	1
Caserta (CAM)	**6.6**	**0**	0	1	0	0	0	1	0	0
Caltanissetta (SIC)	**6.2**	**0**	0	1	0	0	0	0	0	1

Source: own illustration; childcare coverage for the school year 2018/2019 by ISTAT, 2021

Note: 1 = presence of condition/outcome; 2 = absence of condition/outcome; ChilCov = childcare coverage; HighCov = high childcare coverage; Fem Emp = high female employment; TFRAvg = high fertility; TFRDev = rising fertility; GDP = high economic development; HighEdu = high share of university graduates; PrivSec = large private sector; Spend = high spending; PolOr = left-leaning political orientation

Appendix 8: Dichotomized Data Table, France

Department (REGION)	Outcome		Demand-Side Conditions			Contextual Conditions			Supply-Side Conditions	
	Chil Cov (%)	High Cov	Fem Emp	TFR Avg	TFR Dev	GDP	High Edu	Low Pov	Chil Min	Pol Or
Haute-Loire (ARA)	**87.8**	**1**	1	1	0	0	0	1	1	0
Vendée (PDL)	**85.8**	**1**	1	1	0	0	0	1	1	0
Mayenne (PDL)	**84.1**	**1**	1	1	0	0	0	1	1	0
Morbihan (BRE)	**83.7**	**1**	1	1	0	0	1	1	1	0
Sarthe (PDL)	**81.9**	**1**	1	1	0	0	0	1	1	0
Finistère (BRE)	**81.6**	**1**	1	1	0	0	1	1	1	1
Manche (NOR)	**81.2**	**1**	1	1	0	0	0	1	1	0
Loire-Atlantique (PDL)	**78.2**	**1**	1	1	0	1	1	1	1	1
Indre-et-Loire (CVL)	**76.5**	**1**	1	0	0	1	1	1	1	0
Maine-et-Loire (PDL)	**76.4**	**1**	1	1	0	0	1	1	1	0
Ille-et-Vilaine (BRE)	**75.6**	**1**	1	1	0	1	1	1	1	1
Calvados (NOR)	**74.9**	**1**	1	0	0	0	1	1	1	0
Saône-et-Loire (BFC)	**74.6**	**1**	1	1	0	0	0	1	1	1
Gers (OCC)	**74.6**	**1**	1	0	0	0	1	0	1	1
Côtes-d'Armor (BRE)	**74.5**	**1**	1	1	0	0	1	1	1	1
Deux-Sèvres (NAQ)	**74.2**	**1**	1	1	0	1	0	1	1	0
Charente-Maritime (NAQ)	**73.9**	**1**	0	0	0	0	0	1	1	0
Lozère (OCC)	**73.9**	**1**	1	0	0	0	1	0	0	0
Indre (CVL)	**72.7**	**1**	1	1	0	0	0	0	1	0
Paris (IDF)	**71.3**	**1**	1	0	0	1	1	0	0	1
Landes (NAQ)	**71.3**	**1**	1	0	0	0	0	1	1	1
Haute-Marne (GES)	**71.2**	**1**	0	1	0	0	0	0	1	0
Côte-d'Or (BFC)	**71.1**	**1**	1	0	0	1	1	1	0	0
Jura (BFC)	**70.3**	**1**	1	0	1	0	0	1	1	0
Cantal (ARA)	**70.3**	**1**	1	1	0	0	0	1	1	0
Vienne (NAQ)	**69.7**	**1**	1	0	1	0	1	0	1	0
Rhône (ARA)	**69.5**	**1**	1	1	1	1	1	0	1	0
Isère (ARA)	**68.5**	**1**	1	1	0	1	1	1	1	1
Charente (NAQ)	**68.3**	**1**	1	0	0	0	0	0	1	1
Gironde (NAQ)	**68.2**	**1**	1	0	0	1	1	1	0	1
Vosges (GES)	**68.0**	**1**	0	1	0	0	0	0	1	0
Hauts-de-Seine (IDF)	**67.7**	**1**	1	1	0	1	1	1	0	0
Aveyron (OCC)	**67.1**	**1**	1	0	1	0	0	0	1	0

Department (REGION)	Outcome		Demand-Side Conditions			Contextual Conditions			Supply-Side Conditions	
	Chil Cov (%)	High Cov	Fem Emp	TFR Avg	TFR Dev	GDP	High Edu	Low Pov	Chil Min	Pol Or
Orne (NOR)	**66.9**	**1**	1	1	0	0	0	0	1	0
Meuse (GES)	**66.1**	**1**	0	1	0	0	0	0	1	0
Cher (CVL)	**65.6**	**1**	0	1	1	0	0	0	1	1
Doubs (BFC)	**65.1**	**1**	1	1	0	0	1	1	1	1
Somme (HDF)	**64.9**	**1**	0	1	0	0	1	1	1	0
Savoie (ARA)	**64.9**	**1**	1	1	0	1	0	0	1	0
Pyrénées-Atlantiques (NAQ)	**64.7**	**1**	1	1	0	1	0	0	0	0
Yonne (BFC)	**64.7**	**1**	1	0	0	0	1	1	1	0
Ain (ARA)	**64.6**	**1**	1	1	0	0	1	1	1	0
Seine-Maritime (NOR)	**64.3**	**1**	0	1	0	1	0	0	1	1
Puy-de-Dôme (ARA)	**64.0**	**1**	1	1	0	1	0	1	1	1
Loir-et-Cher (CVL)	**64.0**	**1**	1	0	1	0	1	1	1	0
Bas-Rhin (GES)	**63.9**	**1**	1	0	0	1	1	0	0	0
Ardennes (GES)	**63.4**	**1**	0	1	0	0	0	1	1	0
Haute-Saône (BFC)	**63.4**	**1**	1	1	0	0	0	0	1	1
Corrèze (NAQ)	**62.9**	**1**	1	0	1	0	0	1	0	0
Lot (OCC)	**62.8**	**1**	1	0	0	0	1	0	1	1
Loiret (CVL)	**62.5**	**1**	1	1	1	0	0	1	1	0
Eure-et-Loir (CVL)	**62.5**	**1**	1	1	1	0	1	1	1	0
Loire (ARA)	**62.2**	**1**	0	1	1	0	0	0	0	0
Ardèche (ARA)	**62.1**	**1**	0	1	0	0	0	0	0	1
Allier (ARA)	**61.8**	**1**	0	1	1	0	0	0	1	0
Haute-Vienne (NAQ)	**61.5**	**1**	1	0	1	0	1	0	1	1
Marne (GES)	**61.3**	**1**	0	0	0	1	1	0	0	0
Nièvre (BFC)	**60.9**	**1**	0	1	1	0	0	0	1	1
Eure (NOR)	**60.3**	**1**	1	1	0	0	0	1	1	1
Yvelines (IDF)	**59.7**	**1**	1	1	0	1	1	0	0	1
Drôme (ARA)	**59.7**	**1**	0	1	1	1	1	1	1	0
Dordogne (NAQ)	**59.7**	**1**	0	0	0	0	0	0	1	1
Creuse (NAQ)	**59.1**	**1**	1	0	1	0	0	0	1	1
Meurthe-et-Moselle (GES)	**58.4**	**1**	0	0	0	0	1	0	0	1
Nord (HDF)	**57.8**	**1**	0	1	0	1	1	0	0	1
Oise (HDF)	**57.7**	**1**	1	1	0	0	1	1	1	1
Hautes-Alpes (PAC)	**57.4**	**1**	1	1	0	0	1	0	0	0

Department (REGION)	Outcome		Demand-Side Conditions			Contextual Conditions			Supply-Side Conditions	
	Chil Cov (%)	High Cov	Fem Emp	TFR Avg	TFR Dev	GDP	High Edu	Low Pov	Chil Min	Pol Or
Lot-et-Garonne (NAQ)	**56.9**	**0**	0	1	0	0	0	0	0	1
Territoire de Belfort (BFC)	**56.9**	**0**	0	1	0	0	1	0	0	1
Haute-Garonne (OCC)	**56.8**	**0**	1	0	0	1	1	1	0	1
Hautes-Pyrénées (OCC)	**56.6**	**0**	1	0	0	0	0	0	0	1
Tarn (OCC)	**56.4**	**0**	0	0	0	0	1	0	0	1
Tarn-et-Garonne (OCC)	**56.0**	**0**	0	1	1	0	0	0	0	1
Pas-de-Calais (HDF)	**55.8**	**0**	0	1	0	0	0	0	0	1
Aube (GES)	**55.8**	**0**	0	1	0	0	0	0	1	0
Aisne (HDF)	**55.4**	**0**	0	1	0	0	0	0	1	1
Haute-Savoie (ARA)	**54.0**	**0**	1	1	0	1	1	1	0	0
Moselle (GES)	**53.5**	**0**	0	0	0	0	1	0	1	0
Ariège (OCC)	**53.4**	**0**	0	0	0	0	0	0	0	1
Seine-et-Marne (IDF)	**53.0**	**0**	1	1	0	0	1	1	1	1
Alpes-de-Haute-Provence (PAC)	**52.0**	**0**	0	1	0	0	1	0	0	1
Var (PAC)	**51.0**	**0**	0	1	0	0	1	0	0	0
Essonne (IDF)	**50.5**	**0**	1	1	1	1	1	1	0	1
Hérault (OCC)	**50.4**	**0**	0	0	1	0	1	0	0	1
Val-de-Marne (IDF)	**50.3**	**0**	1	1	0	1	1	0	0	1
Haut-Rhin (GES)	**50.1**	**0**	1	1	0	0	1	1	0	0
Alpes-Maritimes (PAC)	**49.7**	**0**	1	1	1	1	1	0	0	0
Gard (OCC)	**49.3**	**0**	0	1	1	0	1	0	0	1
Pyrénées-Orientales (OCC)	**48.9**	**0**	0	0	1	0	0	0	0	1
Aude (OCC)	**48.9**	**0**	0	1	1	0	0	0	0	1
Bouches-du-Rhône (PAC)	**47.1**	**0**	0	1	1	1	1	0	0	1
Vaucluse (PAC)	**46.0**	**0**	0	1	1	1	1	0	0	1
Val-d'Oise (IDF)	**41.8**	**0**	1	1	1	1	1	0	0	0
Seine-Saint-Denis (IDF)	**30.8**	**0**	0	1	1	1	1	0	0	1

Source: own illustration; for childcare coverage for the school year 2018/2019 by ONAPE, 2021

Note: 1 = presence of condition/outcome; 2 = absence of condition/outcome; ChilCov = childcare coverage; HighCov = high childcare coverage; FemEmp = high female employment; TFRAvg = high fertility; TFRDev = rising fertility; GDP = high economic development; High Edu = high share of university graduates; LowPov = low poverty rate; ChilMin = large childminding sector; PolOr = left-leaning political orientation

Appendix 9: List of Italian and French Regions Included in the Study

ITALY		FRANCE	
ABR	Abruzzo	ARA	Auvergne-Rhône-Alps
BAS	Basilicata	BFC	Burgundy-Free County
CAL	Calabria	BRE	Britany
CAM	Campania	CVL	Centre-Loire Valley
EMI	Emilia-Romagna	GES	Great East
FRI	Friuli-Venezia Giulia	HDF	Upper France
LAZ	Lazio	IDF	Island of France
LIG	Liguria	NOR	Normandy
LOM	Lombardy	NAQ	New Aquitaine
MAR	Marche	OCC	Occitania
MOL	Molise	PDL	Loire Counties
PIE	Piedmont	PAC	Provence-Alps-Azure Coast
PUG	Apulia		
SIC	Sicily		
TOS	Tuscany		
UMB	Umbria		
VEN	Veneto		