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Consequences of Mixed Provision of Child Care – An Overview on the German Market

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Non-technical summary

Universal child care that is available, affordable and of good quality is regarded as one political instrument in increasing a country's fertility and maternal labor market participation as well as to equalizing educational opportunities of children. While numerous cost-benefit studies make a strong case for public investments in early education, the ideal way of operating child care facilities is still debated. Whereas public providers can be expected to provide high-quality care but possibly with an inefficient utilization of resources, delegating managerial responsibility to non-public providers might increase flexibility, enlarges parental choice and lowers cost. But at the same time this might reduce quality and contribute to social segregation.

Evidence in the field is largely based on programs for disadvantaged children in the U.S. such as Head Start or state programs with few centers under public operation. However, many European countries, among them Germany, rely on a universal system of child care where public providers as well as different types of non-public providers operate in the same market. The aim of this paper is thus to analyze the consequences of universal, mixed-market provision of child care for availability and quality of the service.

The market allows for direct comparison between public and non-public provision of child care and also for an assessment of various sub-types (non-profit, for-profit) of providers which are the main variables of interest. The results show that non-public providers are at least as capable as public providers to ensure availability and quality in child care. Furthermore, non-religious centers and commercial centers are shown to serve a larger age range, if necessary for longer hours, and with a larger share of personnel with a university education. The differences persist when regional and socio-demographic characteristics are controlled for.

In line with recent studies from the U.S. and in contrast to the theoretical predictions, the results suggest that commercial providers can – at least when covering rather low market shares – increase parental choice and contribute to the provision of high-quality child care. However, they might also contribute to social segregation as they need to charge higher fees when not eligible for public funding.

Das Wichtigste in Kürze

Institutionelle Kinderbetreuung in Form von verfügbaren, bezahlbaren und qualitativ hochwertigen Betreuungsplätzen wird als familienpolitisches Instrument betrachtet, das sowohl die Erwerbstätigkeit von Frauen und die Geburtenrate als auch die Chancengerechtigkeit von Kindern erhöhen soll. Während eine Vielzahl von Kosten-Nutzen-Analysen die Argumente für ein starkes öffentliches Engagement bei der Finanzierung vorschulischer Betreuungsangebote liefert, ist der tatsächliche Betrieb einer Einrichtung auch durch nicht-öffentliche Anbieter denkbar. Auf der einen Seite ist zu erwarten, dass öffentliche Anbieter eher auf Qualität achten, was möglicherweise zu Lasten effizienter Ressourcennutzung geht. Auf der anderen Seite tragen private Anbieter zur Erhöhung von Flexibilität und elterlichen Wahlmöglichkeiten sowie Kostensenkung bei, jedoch haben sie auch den Anreiz, die Qualität abzusenken oder selektive Nutzergruppen auszuwählen.

Im Gegensatz zur bisher verfügbaren Evidenz zur vorschulischen Kinderbetreuung aus den Vereinigten Staaten, die sich häufig speziell auf benachteiligte Kinder bezieht und kaum öffentliche Einrichtungen betrachten kann, verfügen die europäischen Länder und insbesondere Deutschland über eine universell zugängliche Kinderbetreuungsinfrastruktur, die alle Formen öffentlicher und nicht-öffentlicher Bereitstellung einschließt. Ziel dieses Papiers ist es daher, die Konsequenzen der Anbietervielfalt im Markt für Kinderbetreuung in Bezug auf die Verfügbarkeit und die Qualität der angebotenen Leistungen zu ermitteln.

Die Ergebnisse zeigen, dass die vier verschiedenen Anbietertypen, die im deutschen Markt tätig sind – öffentliche, kirchliche, nicht-kirchliche und gewinnorientierte Anbieter – deutliche Unterschiede in der Einrichtungsstruktur sowie in der Zusammensetzung der betreuten Kinder und des beschäftigten Personals zeigen. Nicht-kirchliche und gewinnorientierte Anbieter betreuen eine größere Altersspanne von Kindern und bieten längere Betreuungszeiten sowie vergleichsweise kleine Gruppen an. Zudem beschäftigen diese Anbieter tendenziell mehr Personal mit akademischer Ausbildung als öffentliche und kirchliche Träger. Die Unterschiede bestehen auch, wenn für weitere Einflussfaktoren, wie regionale Variablen und sozio-demographische Charakteristika der Kinder kontrolliert wird.

Übereinstimmend mit weiteren aktuellen Untersuchungen weisen die Ergebnisse darauf hin, dass gewinnorientierte Anbieter – zumindest bei geringem Marktanteil – zur Verfügbarkeit qualitativ hochwertiger Kinderbetreuung beitragen können. Allerdings können diese Anbieter zu sozialer Seggregation beitragen, wenn sie, beispielsweise aufgrund nicht vorhandener öffentlicher Förderung, sehr hohe Elternbeiträge verlangen.

Consequences of Mixed Provision of Child Care – An Overview on the German Market*

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Abstract

Universal child care that is available, affordable and of good quality is regarded as a key instrument of a country's social and labor market policy. As full public involvement in the provision of child care is costly, licensing non-public providers can enlarges parental choice and relieve public funds. This paper analyzes the consequences of universal, mixed-market provision of child care for availability and quality by directly comparing public providers to various non-public providers such as welfare organizations, churches and commercial providers. Controlling for regional and socio-demographic differences in participation, results show that non-religious and in particular commercial providers serve the under three-year-olds and respond to the demand for full-day care. Furthermore, they employ more personnel with a tertiary education. Hence, commercial providers can – at least when covering rather low market shares – increase parental choice and contribute to the provision of high-quality child care.

Keywords: universal child care, mixed industry, public and private sector
JEL-classification: J13, H44, L33

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1 Introduction

Universal child care that is available, affordable and of good quality is regarded as one key instrument in increasing a country's fertility and maternal labor market participation as well as to equalizing educational opportunities of children (OECD 2007). On the one hand, an adequate provision of child care facilities makes it easier for couples to have children, to return to work after birth, and to balance family and career aspirations. On the other hand, early skill formation can be shown to multiply human capital investment in school and thus raises later returns to education (Cunha et al. 2006). While numerous cost-benefit studies make a strong case for public investments in early education (see OECD 2006*b*, Annexe D for a review), the ideal way of operating child care facilities is still debated. Whereas public providers can be expected to provide high-quality care but possibly with an inefficient utilization of resources, delegating managerial responsibility to non-public providers[1] might increase flexibility, enlarges parental choice and lowers cost. But at the same time this might reduce quality and contribute to social segregation. The aim of this paper is to analyze the consequences of universal, mixed-market provision of child care for availability and quality of the service. In particular, I address the question how public providers compare to non-public providers regarding served children and employed personnel.

Most empirical evidence on differences in the provision of child care stems from the U.S. and concentrates on differences in child care quality (see Cleveland & Krashinsky 2009, Morris & Helburn 2000, for reviews). Resulting from the market structure in these countries, the studies compare quality between for-profit and non-profit providers and show non-profit centers to have the same or higher quality of care than for-profit providers. More recently, literature has started to include different forms of non-profit sub-types like welfare organizations, religious providers or parent cooperatives (Morris & Helburn 2000) and to account for systematic differences in regional availability and socio-demographic characteristics of the parents (Sosinsky et al. 2007). Their results show that the correlation between quality and type of provider is highest in non-profit, non-religious centers. However, the evidence in the field is largely based on programs for disadvantaged children in the U.S. such as e.g. Head Start or state programs with few centers under public operation (Barnett et al. 2008, Henry et al. 2006, Gormley Jr. et al. 2005). Hence, they appeal to a specific target group with probably very different needs.

In contrast to that, European countries often rely on universal child care which is provided by both the public and the non-profit sector. One example for such a universal system is Germany where different public providers as well as different types of non-public providers

[1] In the following I will refer to non-public providers for all child care centers that are not owned by public authorities. In the literature this group is often referred to as "private providers" although this term is sometimes also applied uniquely to commercial providers and thus confusing.

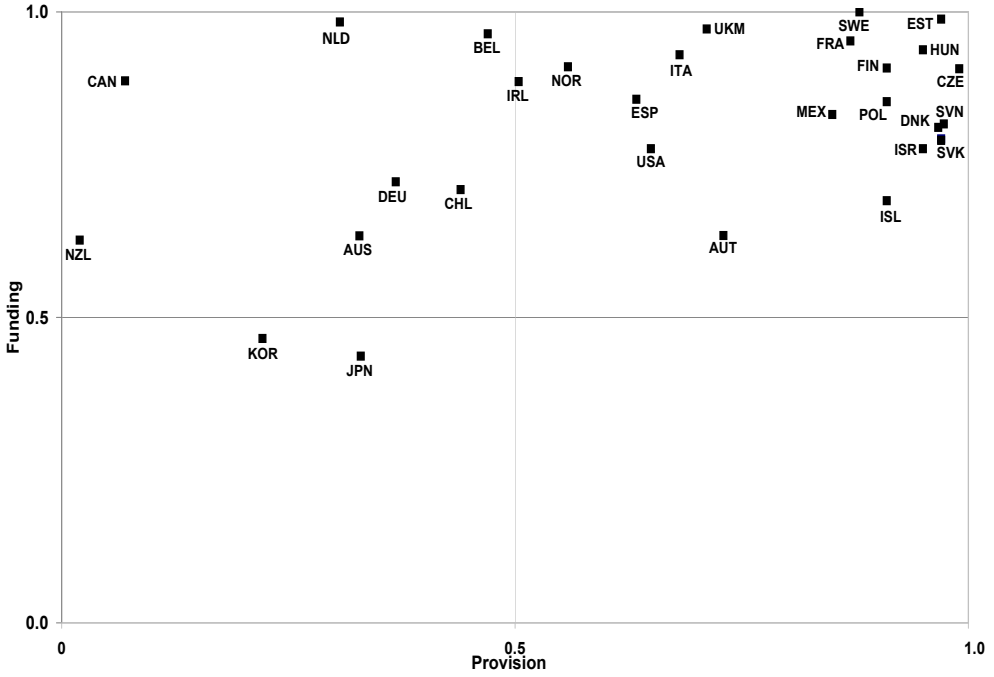
operate in the same market. In 2009, one third of the 50,299 German child care spaces is publicly operated and about another third is operated by non-public bodies such as religious organizations and other non-religious welfare institutions, respectively. Only 2% of the market are covered by commercial centers which are mainly independent and not part of a corporate chain. Despite the dominance of non-profit facilities, the average quality of German child care is evaluated medium to low in international comparison (Tietze 1998, Meyers & Gornick 2003, German Youth Institute 2004). However, as only minimum quality standards are imposed, within-country differentiation between providers likely leads to heterogeneity in supply with regard to quality and availability.

This paper provides an overview on the German market for child care using newly available administrative data on all German child care facilities. The analysis contributes to the literature by comparing child care provision in the public sector to various sub-types (religious, non-religious, for-profit) of non-public providers. Further, the study analyzes various outcomes such as teacher education, as a measure for structural quality, as well as market shares of children under age three and in full day care. Multivariate analyses are used to account for systematic differences in regional availability and basic socio-demographic characteristics of the participating children.

The results show that, although licensing regulation is largely similar throughout the country, public and non-public providers differ substantially with regard to availability and quality. Public and religious providers on the one hand and non-religious and for-profit providers on the other hand tend to be similar in center, child and staff characteristics. Non-religious and primarily commercial providers serve the market for under three-year-olds, particularly in full day care. Furthermore, they tend to have lower child-staff-ratios and employ a larger share of personnel with a tertiary degree. Thus, especially for-profit providers and company-run centers, seem to fill part of the gap in availability for children under three and to meet parental needs with regard to full-day care and quality expectations.

The paper is structured as follows. The next section explains the reasons for public involvement in the provision and funding of child care and gives an overview on various countries. Section 3 introduces the German data used for the analysis, characterizes the providers of child care in the market and explains the outcome measures which are available in the data. Section 4 describes the empirical analysis, Section 5 presents the results, and Section 6 concludes.

Figure 1: Public involvement in child care funding and operation in different countries



Data on funding (vertical axis) refer to the financial year 2006 (OECD 2009, p. 232) and on pre-primary eduction for children 3 years and older. Shares of public and private expenditure on educational institutions are the percentages of total spending originating in or coming from the public and private sectors. Data on provision (horizontal axis) refer to the school year 2005/2006 (UNESCO 2010, p. 324). The public or private proportions refer to the percentage share of children from age 3 to school entry enrolled in a pre-primary institution that is operated by a public authority. School entry age varies by country. The same country codes as in the OECD reports are used. See Table A.1 in the Appendix for the full names and further details.

2 Child care funding and provision

Countries differ in the funding and provision of child care services. Figure 1 indicates the extent of public involvement in funding and provision observed in different countries (see also Table A.1 in the Appendix). As it can be seen from the figure, the 13 OECD-countries in the upper right corner, among them the nordic countries Finland, Sweden and Denmark, have complete governmental responsibility for funding and provision. Along with this involvement comes available, affordable and high-quality child care which these countries are widely known for (Datta Gupta et al. 2008, Meyers & Gornick 2003). However, the large public provision yields high rates of family spending that are reflected in high rates of public expenditure of GDP and financed by high tax rates, which e.g. in Sweden contribute to a tax-to-GDP ratio of over 50%, one of the highest in the OECD countries (OECD 2007, p. 71).[2]

Early childhood education has aspects of a public good (or a "merit good", Bergemann 1996) with positive externalities which justify public funding (Cleveland & Krashinsky

[2]Expressed as share of gross domestic product (GDP), public spending on early childhood education and care services reaches 1.7% in Sweden compared to 0.45% in Germany (OECD 2006*b*, p. 105). Whereas in Sweden all of the investments are public, in Germany 0.14% of GDP are privately invested, either by parents or by the non-public child care providers themselves.

1998). As societal benefits largely exceed the benefits to the child and the parents, and thus the parent's willingness to pay, pure private funding would lead to underinvestment (Poterba 1996). Moreover, the monetary benefits associated with e.g. lower dependence on social assistance and better health status are shown to outweigh the costs of child care by far (Belfield et al. 2006, Masse & Barnett 2002, Karoly et al. 1998). In Germany, child care centers are funded to around 70% by public sources (see also Table A.1 in the Appendix). In the case where a center is operated by non-public providers, the governing organization covers roughly 10% of the operating costs by own resources (German Youth Institute 2004, p. 88).

Despite the very high level of public funding in nearly all countries, child care centers must not necessarily be operated by public providers (James 1993). According to Hart et al. (1997) and Shleifer (1998), two main incentives influence the decision to deliver a product or service by non-public providers: First, cost reduction and second, quality improvement and innovation.

Regarding the first incentive, non-public providers of child care could operate at lower cost compared to public centers as they are autonomous in budget and personnel decisions. By this they can overcome the inflexible salary scales of public bodies and probably circumvent the bargaining power of teacher unions. Empirical evidence for the U.S. suggests that the costs for providing high-quality education are lower in the private compared to the public sector (Blau & Currie 2008).[3] However, non-public centers seem not to realize efficiency gains, once differences in wages are considered (Mocan 1995). Regarding the second incentive, non-public centers might provide higher quality as they could be more able to quickly react to changes in customer demand (Shleifer 1998, James 1993, Weisbrod 1975) or as they have access to other sorts of employees bringing in professional skills and new ideas from the private sector (Gill et al. 2007, for privately operated schools). Empirical results confirm higher quality in non-public centers, in particular for non-profit, non-religious centers (Sosinsky et al. 2007, Morris & Helburn 2000).

The main reason for this is, that non-public provision is mostly carried out through socially motivated, non-profit providers. They have no incentive to lower quality as – by purpose – they do not benefit from a surplus in gains (Shleifer 1998, Weisbrod 1988, Hansmann 1987). On the one hand, non-profit providers are seen as a probable way to assure high-quality care as parents might consider them more trustworthy. Competition as a quality enforcing mechanism fails because center quality is difficult to observe (and thus to regulate) and parents can be shown to misjudge the quality of a facility (Mocan 2007, Arrow 1996, Walker 1991). On the other hand, non-profit providers may also promote inefficiencies in production due to a limited incentive to minimize costs and to innovate. Consequently, both arguments have to be considered when delegating manage-

[3] See Wößmann (2009), Patrinos et al. (2009) for similar evidence on secondary schooling.

rial responsibility to non-profit providers. In sum, the available U.S. evidence suggests that non-public provision of child care can be less costly and of at least same quality than public provision (Levin & Schwartz 2007). Nevertheless, it is not clear whether these results hold true in markets with universal child care provision.

Two more aspects might be of interest, when looking at a market of universal rather than program-driven child care provision. First, if public authorities refrain from provision, social segregation and inequality in the access to child care might occur as the market allows for product differentiation and by this creates incentives to appeal to a distinct and narrow clientele (Kushman 1979, Levin 1987). Recent empirical work shows, that markets tend to separate providers in a way that for-profit providers with a strategy of quality differentiation settle in rather urban areas, i.e. thick markets (Cleveland & Krashinsky 2009, Noailly & Visser 2009). Accounting for regional and socio-demographic differences in utilization as well as considering the various subtypes – instead of a dichotomous non-profit/for-profit categorization – seems thus indispensable for the empirical analysis.

Second, benefits could emerge from the complementarity of the two sectors. Not only the different attributes of care may be supplied most effectively by different types of providers (Walker 1991), but also different providers might have heterogenous effects on child outcomes. If e.g. served by a catholic center, catholic parents might engage more as the center is in line with their educational preferences which might positively effect child outcomes. Moreover, the overall outcome of a mixed system might be larger than the single outcomes of its parts (Epple & Romano 1996). Regarding availability of child care, Viitanen (2007) can show, that in the areas of excess demand not only the use of non-public but also the use of public child care increased during the Finnish voucher experiment.[4] Hence, analyzing the German mixed market for child care seems especially promising as it allows some insights to both utilization and quality of a universal system of child care as well as to compare public and non-public providers directly.

3 Data and variables

The data used for the analysis is the 2009 survey on "Children and Personnel in Child Care Centers" which is a part of the Child and Youth Welfare Survey collected by the German Federal Statistical Office.[5] The data are collected yearly as a full survey where

[4]For schools, Hoxby (2000) shows that competition is likely to increase the quality of both, public and non-public sector.

[5]The data are German administrative child care data ("Statistik der Kinder- und Jugendhilfe, Teil III.1: Kinder und tätige Personen in Tageseinrichtungen"). Researchers may request access to the data by applying at the Research Data Centres of the Federal Statistical Office and the statistical offices of the Länder (http://www.forschungsdatenzentrum.de/en/). The Federal Statistical Office which is responsible for user support concerning the statistics used for this article is the State Offices of Statistics in Thuringia,

all institutions and centers providing child care in Germany are obliged to report.[6] In addition to the information on the center level, the data cover information on all children and employees in the center. The information is obtained through a questionnaire to be answered by the center management. Thus, the Child and Youth Welfare Survey covers all German centers, with all children and everybody who works there (see Kolvenbach & Taubmann (2006) for more information).

Although information is limited compared to special surveys on child care, such as e.g. Child Care Cost Quality and Outcome Study in the U.S. (Helburn 1995), the data is very useful for the purpose of this study. Regarding child characteristics, a small set of background variables such as age, gender and non-German origin are available. Moreover, I observe if the children have special needs due to physical or intellectual disabilities or learning difficulties. Regarding personnel, the data include maintenance staff (63,226) as well as pedagogical and managerial personnel (402,121). As the information on the maintenance personnel, i.e. domestic and technical positions, includes only information on gender and weekly working hours and as the employees working with children are of interest here, I exclude maintenance staff from the analysis. Thus, the data on pedagogical and managerial personnel contain variables such as gender and age as well as education, weekly working hours, field of work (working with children, administrative tasks, managerial tasks) and occupational status. The data for 2009 consists of 50,299 centers, 402,121 employed personnel and 3,050,916 children.

3.1 Types of providers

The main variable of interest is the type of provider, which I refer to as "auspice", i.e. ownership of a child care center. German child care centers fall under the auspices of public as well as non-public providers. In addition to auspice, the data allow to distinguish between ownership and management, i.e. the responsibility for carrying out the in day-to-day activities. In most cases managerial responsibility is identical with ownership.

Four main types of providers are active in the German market for institutional child care:

- **Public:** These centers are owned and operated by municipalities or other local authorities. They are not-for-profit by purpose and amount to 17,256 centers, or 34% of the market in 2009.
- **Non-religious:** These are not for-profit centers which are owned by non-public institutions, mainly welfare organizations. They are eligible for public funding and

Europaplatz 3, D-99091 Erfurt. The author is willing to advise others about access to the data and the application process.

[6] Record date was March, 1st 2009.

amount to 14,299 or 28% of the market. The majority of non-religions centers is operated by the proprietor institution. However, nearly all centers operated by parent cooperatives fall also under the auspices of welfare organizations.

- **Religious:** These are centers which are owned and operated by churches or religious institutions belonging to churches. They are eligible for public funding. Their number amounts to 17,924 centers covering 36% of the market.

- **Commercial:** These are privately managed and privately financed for-profit centers. Owners can be single entrepreneurs, child care businesses or companies providing child care for the children of their employees. Their proportion in the market is rather low with 820 centers or a 1.6% market share in 2009. Commercial centers are eligible for public funding in nine of the sixteen federal states (Rauschenbach & Schilling 2008).[7]

In most cases, the provider has also managerial responsibility but this is not necessarily the case. Some of the German centers are run by parents (9%) or companies (0.8%). Nearly all (96%) of the parent-run centers and 60% of the company-run centers are associated to a larger non-profit organization as this is beneficial in terms of public funding. Parent-run centers are operated by a parent board and often parents additionally support the day-to-day business e.g. by cooking, cleaning or accomplishing administrative tasks. Company-run centers are comparable to parent-run centers in the sense that they are also mostly organized as a registered membership association. Employer sponsored child care centers offer all or the majority of their places to children of the companies' employees. Regarding their regional distribution, non-profit providers account for the largest part of the market in the West German federal states, whereas in the East municipal providers have a larger market share (see Figure A.1 in the Appendix). The market share of for-profit providers seems to be higher in federal states which allocate public funding, such as Brandenburg, and in areas with high population density such as Hamburg and Berlin.

3.2 Outcome measures

Outcome measures are selected to cover two dimensions of child care, namely availability and quality. However, as the data is gathered from the child care centers, differences between the types of providers are assessed conditional on the participating children and the employed personnel.

[7]Funding requirements can include acceptance to the overall planning of child care provision, which is difficult to obtain for new market entrants as the plan is fixed by the local youth welfare office several years in advance.

Overall, the **availability** of German child care, i.e. the number of children in child care in relation to the total number of children in the respective age group, still differs considerably between East and West Germany in particular for children under age three. Whereas in the five federal states of former East Germany on average 41% of the under three-year-olds attend a child care center or public day care setting, this share is considerably lower in West Germany with around 12%.[8] The market is characterized by excess demand (Wrohlich 2008) and German family policy aims at increasing child care availability until 2013 so that the estimated (overall) demand of 35% (Rauschenbach et al. 2007) will be met. In the age group of three years to school entry, coverage rates are much higher as children are legally entitled to child care from age three on. Around 91% of the German children in this age group attend a child care center or public day care (Statistisches Bundesamt 2010).

The availability of full-day slots or for places for under-three year old depends on differences in regional allocation of providers (as shown in Figure A.1 in the Appendix), but also from socio-demographic differences in parental demand. Cultural heterogeneity caused by religion, language or nationality of the parents might prompt providers to differentiate with regard to the envisaged target groups. For the subsequent multivariate analysis, I thus use the children under age three and children in full-day care as outcome variables to measure the market shares of served children for the four different types of providers. Further, I control for differences in regional coverage and basic characteristics of socio-economic background (see Section 4 for details.

The **Quality** of child care can be described using three different types of measures: Either the structural characteristics of the center such as child safety, teacher education or group size, the process quality of the interactions between children or child and teacher or the developmental outcomes.[9] Research shows that child outcomes are predicted most accurately by process quality (Lamb 1998, Hayes et al. 1990, Blau & Mocan 2002), however a strong strong relationship between structural quality and process quality is also found (Cryer et al. 1999, Sylva et al. 2006). In particular higher levels of teacher education have been associated with higher process quality (Sosinsky et al. 2007, NICHD Early Child Care Research Network 2002).

Regarding the data, teacher education and group sizes can serve as quality measures. Differentiation between providers is possible as child care quality, and in particular the

[8]The number of children under three in public day care other than institutional child care is a very small. In East Germany on average 2.4% of the children are in public day care, in West Germany it is 4.6% (Statistisches Bundesamt 2010). The statistical figures do not cover informal care arrangements.

[9]Developmental psychologists describe child care quality using two main concepts: structural quality and process quality (Lamb 1998, Love et al. 1996, Hayes et al. 1990). Structural quality covers all prerequisites which are indispensable to provide high quality child care. Process quality describes all interactions between children and also with teachers. The accurate measurement of both dimensions is done by trained observers using a quality-rating instrument such as e.g. the Early Childhood Environment Rating Scale (ECERS, ECERS-R as described in Sylva et al. (2006) or Harms et al. (1998).

required level of teacher education, is regulated on the federal level by a uniform licensing standard which applies to all child care centers. These regulations are minimum standards on structural features and impose only basic quality standards which cannot be undercut by providers, regardless if they receive public funding or not, but of course they might be topped.

4 Empirical analysis

The empirical analysis aims at detecting differences between the four different types of providers with regard to availability and quality. These differences might stem from differences in financial regulation or managing structures. However, as discussed above, child care supply in Germany is not random. One should expect systematic differences in availability and quality by region (as shown in Figure A.1) or by socio-demographic characteristics of the parents preferring one or the other type of provider. The following multivariate analysis assesses whether the observable mean differences between providers translate into differences in availability and quality once regional and socio-demographic characteristics are controlled for.

The multivariate estimations to determine the differences in the probability for serving children under age three and children in full-day care are run on the sample of children. The outcome variable A_i^* is latent and the indicator variable A_i can become zero and one. The estimations for both variables are run separately and the term A_i^* is used as a wildcard for both in the following equation. The first measure describes the probability that a child is under age three. The variable becomes 1 if the age of the child is less than 36 months and 0 if the child is older. The second measure is the probability that a child is in full-day care. The variable turns to 1 if the daily care intensity longer than seven hours a day and 0 if it is equal or less than seven hours. The estimation equation can be written as

$$A_i^* = \alpha + \beta_1 P + \beta_2 C + \beta_3 X_i + \beta_4 S + u_i \tag{1}$$

The main variables of interest are dummies on the type of provider (P) where public provision serves as the reference category. Thus, the partial effect for P describes providers differences in the share of children under age three (the differences in the share of children in full-day, respectively). As the data covers only children that are cared for in child care centers and micro-level data on all children in the respective age groups are not available, the figures cannot be interpreted as availability. However, as there is excess demand for places for children aged three years and younger (Wrohlich 2008), the number of slots that are available is likely to equal the number of slots that are taken. The estimated figures for the coefficient on P thus reflect differences in the market shares for under three-year-olds

(and full-day care, respectively) to public providers conditional on being in center-based child care.

State specific unobservable characteristics such as variations in the child care regulations are controlled with dummies for federal state (S), using North Rhine-Westphalia – the largest federal state in Germany – as reference category. Controls at the center level (C) include center size as well as dummies for inclusive, parent-run and company run centers. The equation contains socio-demographic controls at the child level (X) wich include age as well as dummies for gender, immigration background and special needs for each child i who is taken care of in the center. Standard errors for this regression are clustered at the center level.

The estimations for the educational levels of the personnel are run on the sample of personnel working with children, i.e. 384,002 individuals in 2009. The outcome of interest Q_i^* is latent and describes the level of education. The first measure turns to 1 if a teacher possesses a completed vocational degree or higher degree a the relevant field and zero if the degree is lower or not from pedagogy or educational sciences.[10] The second measure restricts that variable to becoming one only for those observations with a tertiary degree in the relevant field and 0 otherwise.[11] The estimation equation for the measures of quality can similarly be written as

$$Q_i^* = \alpha + \beta_1 P + \beta_2 C + \beta_3 X_i + \beta_4 S + u_i \tag{2}$$

Thus, the partial effect for P describes the differences between providers in the share of personnel with at least vocational, pedagogical education (with at least tertiary education, respectively), again compared to public providers. Besides the already explained variables on center C and state S, socio-demographic controls at the individual level of the staff (X_i) are age and weekly working time as well as dummies for gender and second occupation. Standard errors for these regressions are also clustered at the center level.

5 Results

Both descriptive statistics and multivariate analyses show substantial heterogeneity between the providers in the German market. Table 1 gives a comprehensive overview on

[10]The "relevant" fields of education are pedagogy and educational sciences, psychology or teaching, as the sample is restricted to persons working with children on a day-to-day basis and does not include full-time managerial or administrative staff. Teachers in their third or fourth year, i.e. practical year, of their vocational education ("Anerkennungsjahr") are considered as having completed the vocational degree as they are employed like regular teachers.

[11]Tertiary degree here is defined as having at least a degree of a university of applied sciences or a full university (this corresponds to ISCED 5A or higher).

the mean values of the center, child and staff characteristics for the different types of providers. Regarding center characteristics, the number of children shows that public centers are on average more than twice as large as commercial centers. In terms of operation, parent-run centers are often under the auspices of non-religious welfare organizations and centers offering places to companies are mainly for-profit.

The main indicators at the child level are age and daily care intensity. All together, 3,050,916 children were served in child care centers in Germany in 2009. Child ages vary from zero up to 13 years as some centers do not only offer pre-school but also after-school care in the afternoon for children who are already in primary or secondary school. Due to the German legislation, which guarantees a place in a child care facility for children from age three upwards, the largest age group served by all providers are children from 3 to 6 years of age. Figure 2 summarizes the distribution of age and daily care intensity by provider. Religious centers only serve a very narrow range of age groups and provide only very few places for e.g. under three-year-olds whereas in for-profit centers more than 40% of the places are occupied by children from that age group.

The distribution of the daily care intensity reveals that in particular non-religious and for-profit providers take care of children for longer hours. In public and religious centers, less than one third of the children are served full-day, i.e. for more than 7 hours, whereas in non-religious and for-profit centers this share is at 42% (see Figure 2 and Table 1). Consequently, these providers have a higher share of children having lunch in the center. Children below age three are much more often cared for throughout the full-day compared to children aged three and above. Nearly 60% of the children who are a few months old or one year of age and still 45% of these of age two are served for more than seven hours a day.

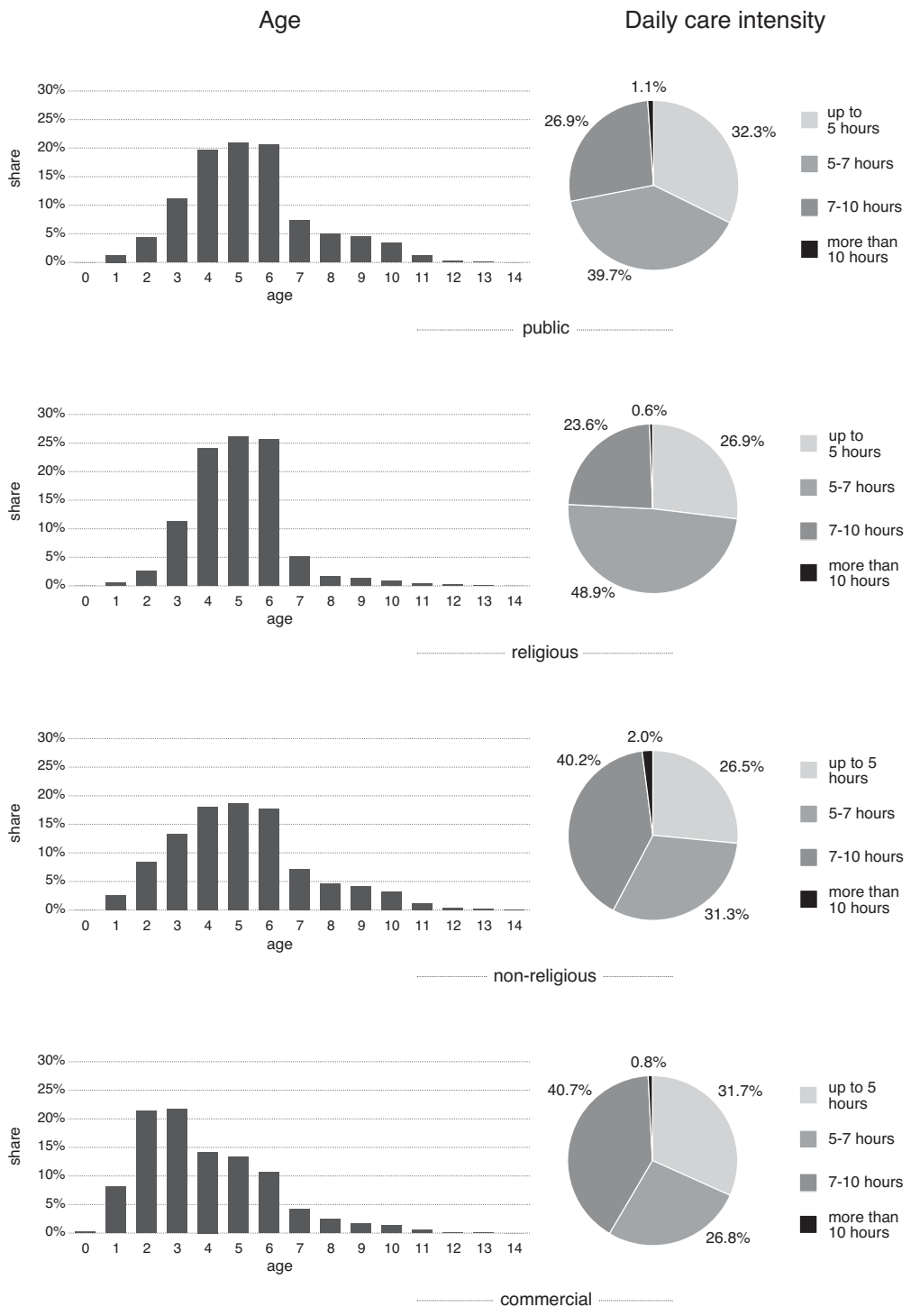
Table 1: Center, child and staff characteristics by type of provider

	public	non-religious	religious	commercial
center characteristics				
number of children	65.2	54.9	62.3	30.0
occupancy	0.90	0.95	0.94	0.97
share of				
play groups	0.08	0.16	0.08	0.21
inclusive	0.25	0.30	0.33	0.08
parent-run	0.00	0.30	0.01	0.06
company-run	0.003	0.02	0.003	0.09
N	*17,256*	*14,299*	*17,924*	*820*
market share	*34.31%*	*28.43%*	*35.63%*	*1.63%*
child characteristics				
av. age	5.3	5.1	4.9	3.8
share of children under 3	0.10	0.17	0.07	0.42
share of immigration background	0.26	0.21	0.27	0.20
share of special needs	0.02	0.05	0.03	0.02
share of full-day care (>7 hours)	0.28	0.42	0.24	0.42
lunch in center	0.63	0.81	0.50	0.79
N	*1,125,177*	*784,802*	*1,116,330*	*24,607*
market share	*36.88%*	*25.72%*	*36.59%*	*0.81%*
staff characteristics				
share of women	0.97	0.95	0.97	0.95
av. age	41.2	40.1	40.0	36.7
av. weekly working hours	31.6	31.3	30.9	30.2
child-staff-ratio	8.4	7.3	8.1	5.8
share of personnel working with children	0.96	0.94	0.96	0.95
thereof share with				
no pedagogical degree	0.09	0.13	0.10	0.21
vocational pedagogical degree	0.89	0.82	0.88	0.70
tertiary pedagogical degree	0.02	0.05	0.02	0.09
N	*138,929*	*115,174*	*143,501*	*4,517*
market share	*34.5%*	*28.6%*	*35.7%*	*1.1%*

Data Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Laender, Child and Youth Welfare Survey, 2009, own calculations.

The multivariate estimates presented in Table 2 confirm the results of the mean comparisons. Non-religious an in particular commercial providers have substantially higher market shares at the under three year old children and children in full-day care, even when regional and socio-demographic differences are accounted for. Compared to public

Figure 2: Distribution of child age and daily care intensity by type of provider



Data Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Laender, Child and Youth Welfare Survey, 2009, own calculations and graphical illustration.

providers, the market share for under-three year olds is 4.5 percentage points higher for non-religious providers and 27 percentage points higher for commercial providers. Furthermore, centers which are company-run are also considerably more likely (13.7 percentage points) to care for children under age three. Regarding full-day care, children served at non-religious providers (7.4 percentage points) and commercial providers (3.3 percentage points) are significantly more likely to be cared for full-day compared to children at public providers. Also, company-run centers stand out as the children they serve are 17.7 percentage points more likely to be cared for full-day. Thus, commercial providers and company-run centers as well as – to a lesser extent – non-religious providers seem to respond to the excess demand for places for children under age three. Further, children in this age group are significantly more often in full-day care compared to children above that age group. This supports the observation that the use of center-based child care for children under age three is motivated by maternal labor market participation rather than by educational considerations.

Table 2: Probit regressions (reporting partial effects) of the probit child variables on type of provider

	Child under age 3		Child in full-day care	
	marg. effect	(std. err)	marg. effect	(std. err)
Type of provider				
religious	-0.017***	(0.001)	-0.011***	(0.003)
non-religious	0.045***	(0.002)	0.074***	(0.004)
commercial	0.273***	(0.015)	0.033**	(0.015)
Center controls				
number of children	0.000***	(0.000)	0.000	(0.000)
play group	-0.006***	(0.001)	0.002	(0.003)
inclusive	0.010***	(0.002)	-0.003	(0.004)
company-run	0.137***	(0.012)	0.177***	(0.021)
parent-run	0.014***	(0.003)	0.009	(0.006)
Child controls				
child age			-0.068***	(0.001)
female	0.000	(0.000)	-0.005***	(0.001)
special needs	-0.030***	(0.001)	0.055***	(0.002)
immigration background	-0.068***	(0.001)	0.122***	(0.005)
full-day care	0.074***	(0.001)		
Federal state	yes		yes	
N	*3,050,916*		*3,050,916*	
Pseudo-R^2	*0.0956*		*0.1494*	

Data Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Laender, Child and Youth Welfare Survey, 2009, own calculations. Partial effects are calculated at the mean.

Regarding the personnel, the share of staff which is administrative or managerial is around 5% for all four types of providers (see Table 1).[12] The share of women is above 95% at all facilities, the average staff-age is around 40 years and the average weekly working hours amount to around 30. In non-religious and for-profit centers, 5.3%, respectively 8.9%, of the staff working with children has a tertiary degree.[13] Overall, the number of tertiary educated staff is higher, as the center manager is often educated at a university level but probably not directly working with children. The share of personnel with tertiary degree rises by 1% for all types of providers (6.8% for non-religious, 10.1% for commercial providers and 3.4% for public and religious providers). At the level of the center, this figure means that each for-profit centers has one person with academic qualification (either in a managerial position or working with children) whereas only every third public or religious center employs such a person educated at the academic level.

The child-staff-ratio, which is the number of children per staff person working with children, is considerably higher for centers under public and non-religious auspice. This is partly due to the age structure of the children. For children of the age group 3-6 years, the child-staff-ratio required by law is higher compared to younger children. Since e.g. religious centers serve mainly children in that age group (see Figure 2) one teacher is responsible for a larger number of children. As the regulation vary additionally between federal states, a multivariate analysis is needed to assess whether the differences in means between providers persist once regional and socio-demographic factors are controlled.

The multivariate results presented in Table 3 show the probit estimates of having at least a completed a pedagogical vocational degree (first column) or at least a higher degree (second column) on the four types of providers and the other center and staff characteristics. Again, the results confirm the incidence of the mean comparisons. Teachers who spend their workday in contact with children and have a completed pedagogical education of at least secondary level (ISCED 4B) are most likely to work for a public provider. All other providers have a significantly lower probability ranging up to 6.1 percentage points for commercial centers. However, this result is completely reversed, once pedagogical education is restricted to the tertiary level (at least ISCED 5A). As the results in the third column of Table 3 reveal, all three other types of providers are more likely to have people with college or university degree working with children. This is in particular the case for commercial centers, as already shown in Table 1. For-profit providers seem to

[12]When including the domestic and technical personnel in the calculation, the overall repartition of staff in German centers it the following: 83% pedagogical staff, 15% domestic and technical staff and 2% administrative and managerial staff.

[13]Tertiary degree here is defined as having at least a degree of a university of applied sciences or a full university in a subject such as educational science, psychology or teaching. Teachers in their third or fourth year, i.e. practical year, of their vocational education ("Anerkennungsjahr") are considered as having completed the vocational degree as the training period at education school is finished and they are employed as regular teachers.

employ substantially more often people with other than a pedagogical degree but when employing pedagogues they are involved in the day-to-day routines with children although with the tertiary degree they would also qualify for management positions according to the licensing standards in most federal states. These results confirm the U.S. evidence where (apart from for-profit chains which do hardly exist in Germany) non-profit centers operated by community agencies and churches show lower quality compared to other non-profit sub-sectors (Sosinsky et al. 2007, Morris & Helburn 2000).

Table 3: Probit regressions (reporting partial effects) of education of personnel working with children on type of provider

	staff working with children			
	≥ pedagogical voc. degree		≥ ped. tertiary degree	
	marg. eff.	(std. err.)	marg. eff.	(std. err.)
Type of provider				
religious	-0.003**	(0.001)	0.001	(0.001)
non-religious	-0.026***	(0.002)	0.023***	(0.001)
commercial	-0.061***	(0.007)	0.070***	(0.008)
Center controls				
number of children	0.000***	(0.000)	0.000***	(0.000)
inclusive	-0.008***	(0.001)	0.006***	(0.001)
play group	-0.021***	(0.002)	0.002	(0.001)
company-run	0.000	(0.005)	0.002	(0.004)
parent-run	-0.004**	(0.002)	0.007***	(0.002)
Individual controls				
age	0.003***	(0.000)	0.001***	(0.000)
female	0.131***	(0.004)	-0.046***	(0.002)
second occupation	-0.027***	(0.001)	0.011***	(0.001)
weekly working hours	0.002***	(0.000)	0.000***	(0.000)
Federal state	yes		yes	
N	*384,002*		*384,002*	
Pseudo-R^2	*0.1155*		*0.0637*	

Data Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Laender, Child and Youth Welfare Survey, 2009, own calculations. Partial effects are calculated at the mean.

6 Conclusion

The German child care market allows a direct comparison of different types of providers as the market is largely non-public, with religious and non-religious providers covering nearly two thirds of the German child care centers. This paper analyzes the consequences of diversity in the provision of child care in terms of availability and quality and compares public and non-public providers in the German market.

The main result of this study is, that some non-public providers are at least as capable as public providers to ensure availability and quality in child care. However, the results show considerable heterogeneity between providers with regard to center, child and staff characteristics regardless of the fact that there are minimum quality regulations which are binding for all. In comparison to public providers, especially non-religious centers, commercial centers and company-run centers serve a larger age range, if necessary for longer hours, in smaller groups and with a larger share of personnel with a university education.

Differences between the providers occur as they operate in different regions, employ different people and care for different children. Access to full-day and provision for under-three year olds is in particular difficult for families living in regions with high shares of public and religious provision, e.g. in southwest Germany. Controlling for these factors shows that the differences with regard to type of provider persist. In line with recent studies from the U.S. and in contrast to the theoretical predictions, my results suggest that commercial providers can – at least when covering rather low market shares – increase parental choice and contribute to the provision of high-quality child care.

However, commercial providers might also contribute to social segregation as they need to charge higher fees when not eligible for public funding. Therefore, they might appeal to a narrow, high-income clientele. Children with a rather "above average" family background could therefore probably benefit from high-quality care in addition to a also "high-quality" home environment. Hence, if the observed differences in structural features would translate into differences in educational achievement of the children, fostering diversity in child care provision in combination with the rather lax regulation on quality as it is now, might be one of the factors which increase educational inequalities before the start of primary schooling.

The available evidence relying on the more accurate measures of process quality and child outcomes indicates that a rather strict quality regulation in line with public funding might be the ideal way to assure quality in provision (Blau & Currie 2008). Unfortunately, the administrative data does not hold information on parental fees nor on process quality or differences in child outcomes according to center type. As the two latter need to be measured by trained observers they can – for reasons of practicability and cost – unlikely be included in the available statistical data on all centers. However, a focussed survey on a subsample of centers covering all types of providers (see e.g. the American Cost, Quality and Outcomes Study) could shed more light on the outcome consequences of the mixed market provision of child care in Germany.

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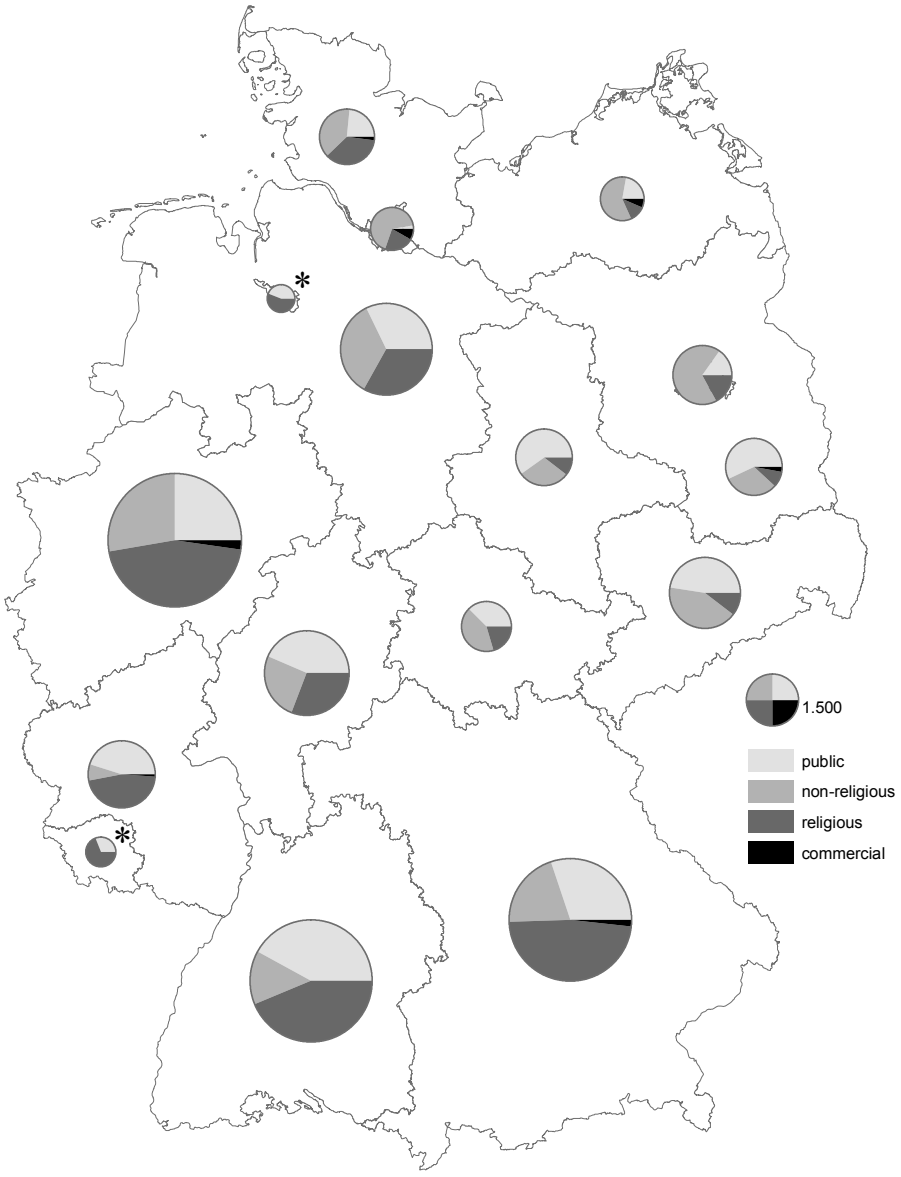
A Appendix

A.1 Figures

Figure A.1: Regional coverage of the four different types of providers across the German federal states in 2009



Data Source: Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Laender, Child and Youth Welfare Survey, 2009, own calculations and graphical illustration. The two federal states marked with [*], Bremen and the Saarland, the shares of non-religious and commercial providers cannot be published due to reasons of statistical secrecy.

A.2 Tables

Table A.1: Public involvement in child care funding and provision in different countries

country	country code	share of public funding	share of public provision	comments and figures from alternative sources
Australia	AUS	0.631	0.330	based on Rush (2006) the share of public centers is 0.31 in 2004
Austria	AUT	0.634	0.730	according to Statistik Austria (2008*a*) the share is 0.62 when calculated on center level and 0.67 when calculated based on the number of children enrolled; funding based on Statistik Austria (2008*b*) is 0.83
Belgium	BEL	0.964	0.470	
Canada	CAN	0.887	0.070	funding overall, not exclusively pre-primary, share of public provision is based on OECD (2004*a*)
Chile	CHL	0.709	0.440	funding for 2007 instead of 2006
Czech Republic	CZE	0.907	0.990	
Denmark	DNK	0.814	0.973	operation refers to the school year 2001/2002 (UNESCO 2004, p. 362); share of public funding based on OECD (2001) is 0.80 in kindergartens
Estonia	EST	0.988	0.970	
Finland	FIN	0.908	0.910	share of public provision based on OECD (2004*b*) is also 0.93
France	FRA	0.955	0.870	share of public provision based on OECD (2004*c*) is about 0.80
Germany	GER	0.722	0.370	
Hungary	HUN	0.938	0.950	share of public provision based on Eurybase Hungary (2006) is 0.95
Iceland	ISL	0.696	0.910	funding refers to the year 2003 (OECD 2006*a*, p. 219), operation refers to the school year 2001/2002 (UNESCO 2004, p. 362)
Ireland	IRL	0.886	0.504	
Israel	ISR	0.776	0.950	
Italy	ITA	0.935	0.680	
Japan	JPN	0.434	0.330	share of public provision based on JETRO - Japan External Trade Organization (2005) is 0.54 (counted on center level)
Korea	KOR	0.463	0.220	share of public provision based on OECD (2004*e*) is 0.22
Mexico	MEX	0.832	0.850	same figure of provision in OECD (2004*d*)
Netherlands	NLD	0.986	0.307	operation refers to the school year 2001/2002 (UNESCO 2004, p. 362)
New Zealand	NZL	0.624	0.020	
Norway	NOR	0.905	0.560	
Poland	POL	0.853	0.910	
Slovakia	SVK	0.792	0.970	share of public provision based on Eurybase Slovakia (2006) is 0.97
Slovenia	SLO	0.817	0.980	
Spain	ESP	0.857	0.640	
Sweden	SWE	1.000	0.880	share of public provision based on Swedish National Agency for Education (2006) is 0.84 (pre-school activities of children over 3); share of public funding in pre-schools is 0.92
United Kingdom	UKM	0.972	0.710	
USA	USA	0.776	0.650	

Sources: Data on Funding OECD (2009), financial year 2006; Data on provision: UNESCO (2010) children enrolled in school year 2006/2007. If a countries was not covered in these overviews, older figures or alternative sources where used as cited in the table.