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One billion euro program for early childcare services in Italy*

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Abstract

In 2007 the Italian central government started a program by transferring funds to regional governments to develop both private and public early childcare services. Exploiting the different timing of program implementation across regions, we evaluate its effectiveness in boosting the public supply of early childhood educational services. We find that the ratio between the available slots in public early childhood education and the population of those aged 0-2 increased by 17.2% three years after the start of the program, with respect to the pre-program level. The program impact was however limited in the South and mostly driven by the Center-North.

Keywords: Early childcare services, public early childhood education, government transfers, difference-in-differences

JEL classification codes: C23, H52, H70, I28, J13, R10

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1 Introduction

Over the last decades, European policy-makers' agenda has supported the increase in female labour force participation (FLFP) as one of the most crucial goals to reach. From the Lisbon Strategy (CEU, 2000) to the Europe 2020 Strategy of Smart, Sustainable and Inclusive Growth (European Commission, 2010), the targets of female employment rate were set respectively to 60% and to 75% in the European Union. To favor this strategy, in particular to boost maternal employment, Barcelona European Council (CEU, 2002) established that early childcare provision should reach at least 33% of children under three years of age, especially in Southern countries where early childcare facilities have been scarce.

Early studies showed that female labour supply is elastic to childcare access and its cost,¹ so that childcare subsidies were important in encouraging FLFP (Blau and Robins, 1988; Ribar, 1995; Blau, 2003). The meta-analysis in Akgunduz and Plantenga (2018) however revealed that labour supply elasticities became somewhat smaller over time and that they were insignificant in some countries. They claimed that this heterogeneity across countries might be due to different institutions. In countries with high FLFP, high part-time rates, and/or already highly subsidized childcare systems like Norway, France, the Netherlands, and Sweden, policies expanding subsidized child care had a weak effect on maternal employment (Lundin et al., 2008; Havnes and Mogstad, 2011; Givord and Marbot, 2015; Bettendorf et al., 2015), but rather crowded out informal child care arrangements. In countries like Germany, Italy, and Belgium, where childcare is “rationed”,² maternal employment is instead mainly affected by an increase in the supplied slots of early childhood education, with price reductions playing a secondary role (Wrohlich, 2004; Del Boca and Vuri, 2007; Valdelanoote et al., 2015). The impact of childcare access and prices on FLFP was also found to be heterogeneous across subpopulations: the labour supply of low-income, single, and low-educated mother was more responsive to childcare access and prices (Del Boca et al., 2009; Akgunduz and Plantenga, 2018).

Empirical studies for Italy pointed out that making it easier to access early childcare services would be very effective in allowing households to reconcile family and work (Del Boca,

¹See Blau and Currie (2006) and Akgunduz and Plantenga (2018) for recent reviews.

²In these countries, the demand of slots in public early childcare education exceeds their supply. Local authorities set therefore eligibility criteria and this selection process is known as “rationing”.

2002; Bratti et al., 2005; Del Boca et al., 2005; Del Boca and Vuri, 2007; Del Boca and Sauer, 2009). Brilli et al. (2016) found indeed that an increase by one percent in public childcare coverage raised maternal employment by 1.3 percentage points, with this impact being larger in provinces with lower childcare availability. Figari and Narazani (2017) estimated a joint structural model of Italian female labour supply and childcare behaviour including choices in formal or informal childcare services. They found that increasing childcare coverage rate of formal care is more effective than decreasing the costs in encouraging FLFP. Finally, Carta and Rizzica (2018) evaluated the impact of the Moratti Reform (Law 53/2003), which allowed children to start kindergarten at an earlier age: it increased the maternal labour force participation rate and the probability of holding the job by about 6 and 5 percentage points, respectively.

The Italian government, in order to catch up with the European target (CEU, 2002) about the local coverage of early childcare services and to increase the FLFP,³ started with the 2007 Budget Law (Law 296/2006) a three-year special public plan, called “Piano Straordinario per lo Sviluppo dei Servizi per la Prima Infanzia” (PSSSPI). The program was further extended in 2010, 2012, and 2014, for a total public expenditure of about €1 billion. The funds were allocated to regional governments in order to subsidize the development of both public and private early childcare services. The regional governments were asked to co-finance the transfer from the national government. Public and private childcare providers, among which also municipalities, had to apply to obtain the subsidy from their own regions.

The €1 billion program was expected to be effective in increasing maternal employment to the extent to which the transfers were actually and efficiently used in expanding the supply of childcare services. Furthermore, in order to boost the employment rate of mothers belonging to disadvantaged groups, the transfers should have been able to expand the supply of inexpensive childcare services, typically public early childhood educational services. Our study aims at evaluating the impact of the PSSSPI on the availability of slots in public early childhood educational services. This is of utmost importance. If the impact is weak or nil, we cannot expect effects on maternal employment. Moreover, in general, it cannot be given for granted that large transfers from the central governments to local authorities are able to generate the expected impact. There might be several reasons to doubt about the efficient use

³The Italian FLFP and the female employment rates (15-64 years) are still away from the achievement of the targets set by European Commission (2010). In 2015 they were 55.9% and by 47.2% , respectively (Eurostat, Labour Force Survey).

of government funds when transferred to local authorities. The effectiveness of transfers from the central government to local administrations could be limited, for example, by the poor functioning of local institutions in the administrations of the resources or by distorting mechanisms in political economy, such that additional resources increase political corruption and politicians grabbing rents from the transfers (Brollo et al., 2013). About the former, Bandiera et al. (2009) found that in Italy more than 80% of the public waste is related to an inefficient administration of the transfers from the central government. About the latter, there is evidence for Italy of biases in the allocation and use of central transfers: i) Barone and Narciso (2013) detected connections between the local presence of organized crime and the amount of public funding transferred from the central government; ii) Carozzi and Repetto (2016) showed that transfers to municipalities depend on the birth town of the members of Parliament, rather than exclusively on local development needs; iii) De Angelis et al. (2018) found that white collar crimes increased in the South in the presence of EU disbursements.

The main difficulty in identifying the impact of a nationwide policy intervention consists in disentangling its true effect from the spurious one related to the time trend. However, the transfers to the regions did not take place at the same moment. Regions had indeed to pass a set of acts to receive the transfers from the central government. They needed to update their legislation about the different types of early childcare services and to design the executive authorizing procedures for transferring grants to the final childcare service providers (Istituto degli Innocenti, 2009). The different timing with which the funds were transferred from the central government to the regions were plausibly exogenous with respect to the level of supply of slots in public early childhood education at the local level. The implementation timing is indeed likely to be determined by the level of administrative capacity of the regional bureaucracy, as reported by Soncin (2013, p. 73). Consistently, while studying the determinants of the performance of Italian regions in spending resources from European structural funds, Milio (2007) showed that the delays in the programmatic acts to spend their allocated resources were due to their own administrative capacity. Exploiting the different timing of transfers across the Italian regions, we estimate, in a Difference-in-Differences (DiD) model, the causal impact of the PSSSPI on the coverage rate of public early childcare services, defined as the ratio between the available number of slots in public early childhood education and the population aged 0-2 (up to 36 months of age). To understand if the program modified the local diffusion of these

services, we also study the impact on the provincial fraction of municipalities with public early childcare services.

The empirical analysis is based on a dataset at municipal level collected by the Italian Department of Territorial and Internal Affairs over the years 2004-2013 and containing, among other variables, also information on local public formal childcare supply. We collapsed this dataset at the level of provinces for two main reasons. First, most of the municipalities in Italy are small in terms of population and have therefore no public childcare service. For example, in 2007 more than 70% of the municipalities had less than 5,000 inhabitants and 94% of them reported a coverage rate equal to 0. Nationwide, the mass of municipalities with no public childcare services amounted to 81%. If we have worked at the level of municipalities, we would have had to face this corner solution problem or stick to an evaluation of the effect at the extensive margin. Second, given that there are many small municipalities with no public childcare services, it is likely that the demand for public childcare services of parents living in small municipalities is served by the closest large municipality. It might then be that the program will generate an effect only on larger municipalities, so as to exploit economies of scale and allow all the families of the surrounding towns to benefit from the enlarged supply of public slots. In other words, the PSSSPI effect might be highly heterogeneous, with many small municipalities with nil effect, not having the critical size to react, and a small number of large municipalities potentially responsive to the policy.⁴ In a robustness analysis, we check the sensitivity of our results to the grouping of the unit of observation, both by leaving the data at the level of municipality and at regional level.

The set-up of our paper is as follows. Section 2 describes the policy intervention and the program implementation. Section 3 presents the dataset used for the econometric analysis. Section 4 explains the econometric model and the identification strategy of the causal effect of the program. Section 5 reports and comments on the estimation results and on falsification checks. Section 6 concludes. An appendix reports further descriptive statistics, the full set of estimation results of the baseline models, and the estimated effects from robustness checks.

⁴For example, in 2007, the median population was 2,424 inhabitants, the 99th percentile was 68,739, and 22.7% of the Italian population was concentrated in the top 0.5% municipalities.

2 The coverage of early childcare services in Italy and the PSSSPI program

In Italy, the authorities in charge of making the policies for early childcare services are mostly the municipalities, which are the lowest level of local government and are often also providers of childcare services. The regional governments, which are the highest level of local government, are in charge of defining the general management criteria. Finally, the national government allocates funds among the regions. This institutional set-up might explain why an important heterogeneity across regions is observed in terms of supply and use of early childcare services. While the coverage rate of early childcare services, defined as the ratio between the supply of slots of early childcare services and the population aged 0-2, was in 2013 22.5% at national level, it amounted to 28.2% in the Center-North and to 11.5% in the South.⁵ Although the fraction of users of early childcare services increased over time, moving from 11.2% in 2004 to 12.9% in 2013, it was however still quite far from reaching the European target of 33% (Istat, 2016).

The 2007 Budget Law (Law 296/2006) stated the financial coverage of the three-years special public budget for the PSSSPI to: i) subsidize the development of both public and private early childcare services; ii) to reduce differences between the South and the Center-North in terms of availability of early childcare services. After the initial three years, the program was further extended in 2010, 2012, and 2014, with the labels “Intesa 2010”, “Intesa 2012”, and “Intesa 2014”. From 2007 to 2014 the central government invested about €621 million in the program. Panel a) of Table 1 reports by region and year the transfers from the central government. The distribution of the national transfers across the regions was decided by the central government on the basis of regional indicators correlated to the demand of childcare services, (e.g. the size of the population under three years of age, female employment, and unemployment) and the gap between regional and national childcare service indexes.

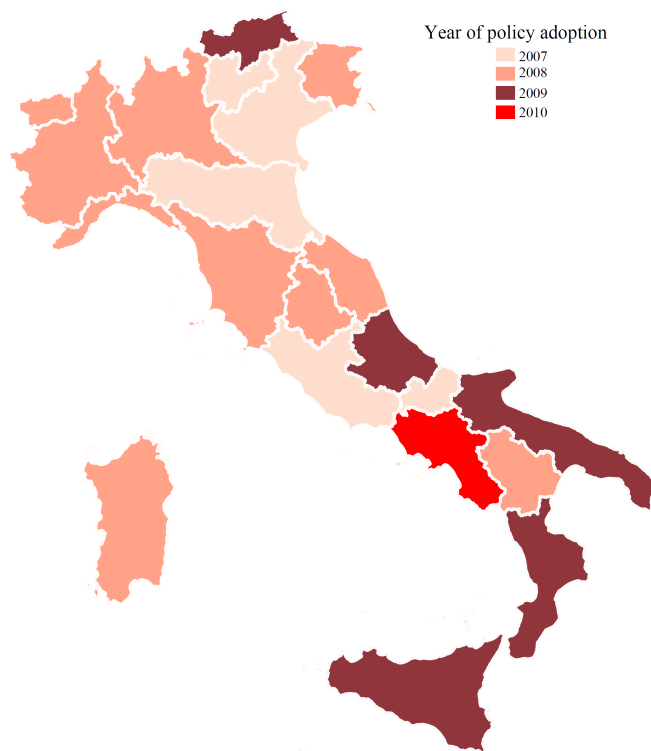
During the first three years of the program, the regional governments were asked to co-finance the intervention, with a total contribution of almost €300 million. Central and Northern regions had to co-sponsor 30% of the national transfer. Southern regions, in which the supply of early childcare services was especially low, had instead to give a larger contribution,

⁵The Southern regions are: Abruzzo, Molise, Puglia, Campania, Basilicata, Calabria, Sicilia, and Sardegna.

which went from 35.4% for Sardegna to 116.4% for Campania. Panel b) of Table 1 reports the national and regional funds in the first three years of the program, as well as the regional co-sponsoring rate.

The funds reported in Table 1 were provisions of transfers from the national government. The actual transfers took place with different timing across regions. Regions had indeed to pass a set of acts to receive the transfers from the central government. They needed to update their legislation about the different types of early childcare services and to design the executive authorizing procedures for transferring grants to the final childcare service providers. Figure 1 clarifies the heterogeneity across regions in the actual implementation of the PSSSPI. Trentino, Veneto, Emilia-Romagna, Lazio, and Molise were the first ones in obtaining the transfers in 2007. In the next year, ten further regions started the program (Istituto degli Innocenti, 2009, pp. 183–252). The last region was Campania in 2010 (Istituto degli Innocenti, 2010, p. 271).

Figure 1: Timing of PSSSPI implementation across Italian regions



Source: Own elaboration based on Istituto degli Innocenti (2009, pp. 183–252) and Istituto degli Innocenti (2010, p. 271).

Table 1: Special public budget plan for the development of early childcare services from 2007 until 2014
(thousand of €)

	a) National funds, 2007-2014										b) National and regional funds, 2007-2009		
	2007	2008	2009	2010	2012	2014	2007-14	National funds	Regional funds co-financing (%)	Regional funds	Total funds		
Piemonte	7,211	10,634	5,151	7,181	5,026	359	35,562	22,996	6,899	30.0	29,895		
Valle d'Aosta	335	494	239	288	203	15	1,575	1,069	321	30.0	1,390		
Lombardia	17,515	25,830	12,511	14,150	9,905	708	80,618	55,855	16,757	30.0	72,612		
Alto Adige	926	1,366	661	824	574	41	4,392	2,995	898	30.0	3,893		
Trentino	939	1,385	671	844	588	42	4,469	2,953	886	30.0	3,839		
Veneto	9,239	13,626	6,599	7,277	5,096	364	42,201	29,464	8,839	30.0	38,303		
Friuli-Venezia Giulia	2,322	3,424	1,658	2,193	1,533	110	11,241	7,405	2,221	30.0	9,626		
Liguria	2,461	3,629	1,758	3,019	2,114	151	13,131	7,847	2,354	30.0	10,201		
Emilia-Romagna	8,401	12,390	6,001	7,084	4,956	354	39,186	26,792	8,038	30.0	34,830		
Toscana	6,885	10,153	4,918	6,555	4,592	328	33,431	21,956	6,587	30.0	28,543		
Umbria	1,504	2,218	1,074	1,642	1,148	82	7,669	4,797	1,439	30.0	6,236		
Marche	2,892	4,265	2,066	2,645	1,855	133	13,857	9,224	2,767	30.0	1,1991		
Lazio	12,127	17,883	8,662	8,600	6,020	430	53,722	38,672	11,602	30.0	50,274		
Abruzzo	3,158	4,657	2,256	2,451	1,715	123	14,361	10,073	7,800	77.4	17,873		
Molise	946	1,395	676	798	560	40	4,415	3,016	3,029	100.4	6,045		
Campania	23,941	35,306	17,100	9,983	6,986	499	93,815	76,347	88,848	116.4	165,195		
Puglia	12,516	18,457	8,940	6,977	4,886	349	52,125	39,913	37,678	94.4	77,591		
Basilicata	1,681	2,478	1,200	1,230	861	62	7,512	5,359	4,916	91.7	10,275		
Calabria	6,966	10,273	4,976	4,112	2,877	206	29,409	22,214	24,813	111.7	47,027		
Sicilia	14,857	21,910	10,612	9,185	6,433	460	63,457	47,379	40,877	86.3	88,256		
Sardegna	3,178	4,687	2,270	2,960	2,072	148	15,316	10,136	3,590	35.4	13,726		
Total	140,000	206,462	100,000	100,000	70,000	5,000	621,462	446,462	281,158	63.0	727,620		

Source: Istituto degli Innocenti (2014).

The final beneficiaries of the program are providers of early childcare services. They could be both private and public. Typical beneficiaries of the program were municipalities and private entities supplying daycare centers and supplementary services for 0-2 years old children.

3 Data and sample

For the empirical analysis, the main data source is the dataset on local public finance collected by Italian Department of Territorial and Internal Affairs over the years 2004-2013.⁶ This dataset contains information on demographics, public finance (revenues and expenditures), and public individual-demand services (like public and financed by public funds daycare centers and school canteens) for all the 8,092 municipalities. In particular, we have information on the number of slots in public and public financed early childhood education. A second data source, still at municipality level, concerns information on the population size by age categories, including the group 0-2, obtained by the National Institute of Statistics (Istat).⁷ Finally, we use time-varying control variables at the provincial level: the time series of the female employment rate obtained by Istat and the real GDP and its growth rate gathered by Eurostat.

After deleting from the sample 7 municipalities on the regional borders which switched regions in 2009,⁸ we aggregated the dataset so as to have variables at provincial level. There are 110 provinces in Italy and they are the intermediate level of local government between the municipalities and regions. Regions are composed of a certain number of provinces which, in turn, are made up of a certain number of municipalities. This implies that each province belongs to one and only one region. After grouping the data at the level of provinces, we have a balanced panel of 1,100 observations, over 10 years and across 110 provinces.

The outcome variable of primary interest is the *coverage rate*, defined as the ratio between the available slots of public (or financed by public grants) early childhood educational services in a province and the population aged 0-2 in the same province.⁹

⁶See Finanza Locale website on <http://finanzalocale.interno.gov.it/apps/floc.php/in/cod/4>.

⁷Information on population from 2004 until 2012 comes from the “Atlante Statistico dei Comuni”. For 2013, data on population was downloaded from the online archive “Popolazione e Famiglie”.

⁸In 2009, Casteldelci, Maiolo, Novafeltria, Pennabilli, San Leo, Sant’Agata Feltria, and Talamello passed from Marche to Emilia-Romagna, as a consequence of a referendum result in 2006.

⁹In Italy children start the maternal school (“Scuola dell’Infanzia”) in September of the year in which they turn 3. This is the reason why we normalize the slots of public early childhood educational services by the

A second outcome variable of interest is the fraction of municipalities supplying public (or financed by public grants) early childhood educational services in a province. While we will use the coverage rate to evaluate the overall effect of the policy, this fraction will let us understand whether the program was able to improve the local pervasiveness of public early childcare services and provide us with an extensive margin evaluation.

Table 2 reports descriptive statistics on the coverage rate and on the fraction of municipalities supplying early childcare services, disaggregated by implementation time, geographical area, and type of municipality. Over the ten year time window under analysis, on average in the Italian provinces there were 8.8 available slots in public early childhood education per 100 children younger than 36 months and 25% of the municipalities supplied public early childcare services. These figures increased over time: by splitting observations according to the timing of PSSSPI implementation, the coverage rate increased by 1.6 points (+20%) and the fraction of municipalities providing early childcare services grew by 3.9 percentage points (+17%). Figure A.1 in Appendix A visually inspects the change in the supply of public childcare services: it shows that the mode shifted to the right, with the right tail becoming fatter.

As we explained in Section 2 and showed in Table 1, the funds were assigned across regions taking into account their heterogeneity and needs. More than one half of the national and regional transfers were indeed used for the 8 regions of the South. In the econometric analysis we will devote special attention to study this dimension of heterogeneity of the program effect. Panels b) and d) of Table 2 report summary statistics of the two outcome variables in the 8 regions of the South and in the rest of Italy, before and after the program implementation. In the South, the coverage rate was 0.041 and 15.3% of the municipalities were offering public childcare services, against 0.118 and 31.2%, respectively, in the Center-North.

Figures 2 and 3 show the trends of, respectively, the coverage rate and the fraction of municipalities supplying public early childcare services, after grouping regions by geographical area. Before the start of the PSSSPI, the trends across geographical areas were very similar. From 2007 they took however different routes, with a steeper increase in the Center-North, whilst the South stagnated at the pre-program values.

Finally, Table 3 displays summary statistics of the covariates used in the regression model. Apart from the regional indicators, we also exploit the female employment, the real GDP, and population aged 0-2. We conducted a sensitivity analysis, available from the authors upon request, to assess the robustness of our benchmark findings when using the population aged 0-3. We obtained similar results.

Table 2: Descriptive statistics of the outcome variable and the timing of the program implementation

	Mean	Std. Dev.	Minimum	Maximum	Observations
<i>a) Coverage rate, Italy</i>					
All years	0.088	0.060	0.000	0.305	1,100
Before PSSSPI	0.079	0.055	0.001	0.276	451
After PSSSPI	0.095	0.062	0.000	0.305	649
<i>b) Coverage rate, South vs Center-North</i>					
Center-North	0.118	0.057	0.023	0.305	690
South	0.041	0.026	0.000	0.110	410
Center-North before PSSSPI	0.111	0.052	0.023	0.276	255
South before PSSSPI	0.038	0.024	0.001	0.106	196
Center-North after PSSSPI	0.121	0.059	0.026	0.305	435
South after PSSSPI	0.044	0.027	0.000	0.110	214
<i>c) Fraction of municipalities supplying early childcare services (%), Italy</i>					
All years	25.266	19.576	0.000	94.444	1,100
Before PSSSPI	22.959	18.957	0.962	88.889	451
After PSSSPI	26.870	19.851	0.000	94.444	649
<i>d) Fraction of municipalities supplying early childcare services (%), South vs Center-North</i>					
Center-North	31.202	20.416	3.600	94.444	690
South	15.277	12.966	0.000	66.667	410
Center-North before PSSSPI	28.677	20.460	3.600	88.889	255
South before PSSSPI	15.519	13.625	0.962	66.667	196
Center-North after PSSSPI	32.681	20.267	4.000	94.444	435
South after PSSSPI	15.056	12.360	0.000	66.667	214

Figure 2: Trend of coverage rate by geographical area (base year 2004)

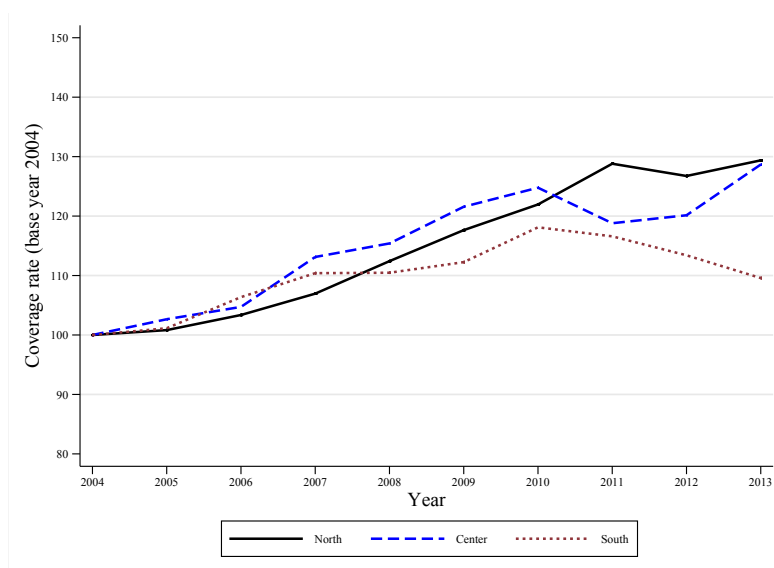
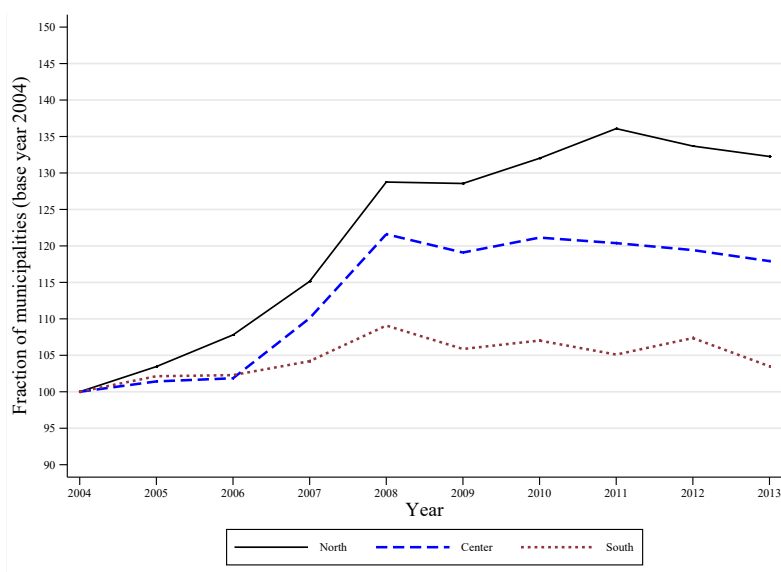


Figure 3: Trend of fraction of municipalities with public early childcare services by geographical area (base year 2004)



the real GDP growth to control for time-varying provincial heterogeneity.

4 Method

Identification of the effect of PSSSPI implementation on the public supply of early childcare services is attained by exploiting the fact that the program started with different timing across regions from 2007 until 2010. Simply comparing provinces before and after the program implementation is problematic since there may have been many economic and political influences other than the PSSSPI which affected the supply of early childcare services over time. Similarly, by focusing on a particular year in a cross-section framework, a simple difference in the average outcome variable between regions which already implemented the program and those which have not done it yet also poses a problem because there might be fundamental differences in the political attention towards childcare services between the two groups of regions. As a result, we employ a DiD estimator and estimate changes in the differences of the public supply of early childcare services between early and late implementing regions before and after the reform. The identification of the causal effect requires some assumptions. In what follows, we conduct statistical tests for each of these assumptions to check whether they

Table 3: Summary statistics of covariates

	Mean	Std. Dev.	Minimum	Maximum
Female employment rate	0.468	0.118	0.203	0.681
Real GDP (million of €)	12,883	18,714	783	142,351
Real GDP growth rate	0.001	0.002	-0.009	0.070
<i>Regions</i>				
Piemonte	0.073	0.266	0.000	1.000
Valle d' Aosta	0.009	0.095	0.000	1.000
Lombardia	0.109	0.312	0.000	1.000
Province of Trento	0.009	0.095	0.000	1.000
Province of Bolzano	0.009	0.095	0.000	1.000
Veneto	0.063	0.244	0.000	1.000
Friuli-Venezia Giulia	0.036	0.187	0.000	1.000
Liguria	0.036	0.187	0.000	1.000
Emilia-Romagna	0.082	0.274	0.000	1.000
Toscana	0.091	0.288	0.000	1.000
Umbria	0.018	0.134	0.000	1.000
Marche	0.045	0.208	0.000	1.000
Lazio	0.045	0.208	0.000	1.000
Abruzzo	0.036	0.187	0.000	1.000
Molise	0.018	0.134	0.000	1.000
Campania	0.045	0.208	0.000	1.000
Puglia	0.055	0.227	0.000	1.000
Basilicata	0.018	0.134	0.000	1.000
Calabria	0.045	0.208	0.000	1.000
Sicilia	0.082	0.274	0.000	1.000
Sardegna	0.073	0.260	0.000	1.000
Provinces (Total observations)	110 (1,100)			

are supported by the data.

Our empirical evaluation will be in a panel data framework. We specify the following model for the outcome variable y of province i of region r in year t :

$$y_{irt} = \mathbf{x}'_{irt}\boldsymbol{\beta} + \gamma_r + \phi_t + \delta_0 I_{rt} + \delta_1 I_{rt+1} + \delta_2 I_{rt+2} + \delta_3 I_{rt+3} + u_{irt}, \quad (1)$$

where

- \mathbf{x}_{irt} is the vector containing the time-varying variables at provincial level (employment rate, real GDP, and real GDP growth rate) and $\boldsymbol{\beta}$ is the conformable vector of coefficients.
- γ_r is a set of regional fixed effects. Since there are 21 regions, they amount to 20 dummies.
- ϕ_t is a set of year fixed effects.
- $(I_{rt}, I_{rt+1}, I_{rt+2}, I_{rt+3})$ are the regressors of interest. They are indicator variables. $I_{rt+\tau}$, with $\tau = 0, 1, 2$, is equal to 1 if the program was implemented in region r 0, 1, and 2 years earlier. I_{rt+3} is equal to 1 if the program was implemented 3 or more years ago. The parameter δ_0 is the effect of the program in the year of implementation; δ_1 is the effect one year after the year of implementation; δ_2 and δ_3 are the program impact two and three or more years after the program implementation, respectively.¹⁰
- u_{irt} is the error term at the provincial level.

The parameters of Equation (1) are estimated using Ordinary Least Squares (OLS).

Inference deserves a special discussion. In our DiD application the identification of the PSSSPI effect is based on variations across regions and years. The regressors of primary interest $(I_{rt}, I_{rt+1}, I_{rt+2}, I_{rt+3})$ are therefore correlated within regions. Proper inference should take this into account. The cluster-robust variance estimator (CRVE) is a simple way to deal with correlation within-groups (Liang and Zeger, 1986). However, this approach is unbiased

¹⁰We allow therefore the effect to be heterogeneous over time. It might take indeed some time to see a change in the supply and organization of the early childcare services from the moment in which the funds are transferred to the local governments. If it is implausible that the effect is constant over time, de Chaisemartin and D'Haultfœuille (2019) showed that the usual two-way fixed effects estimator with constant effect could give severely biased results. It does not indeed satisfy the no sign-reversal property, i.e. it may be negative even if the treatment effect is positive for each year after the start of the programme (de Chaisemartin and D'Haultfœuille, 2018). When reporting the benchmark estimation results in Table 7, we will however also present the effect under the constraint of being time-constant.

only when the number of clusters is large enough and the asymptotic results can be safely invoked. In our study, the number of regions is just 21. The CRVE is therefore likely to suffer from a small sample bias, resulting in a type I error.¹¹ Cameron et al. (2008) proposed a wild cluster bootstrap- t procedure to get critical values when the number of clusters is small. When reporting the estimation results, the presentation of the point estimates of the coefficients of $(I_{rt}, I_{rt+1}, I_{rt+2}, I_{rt+3})$ will be accompanied by p -values based on the wild cluster bootstrap (WCB) procedure by Cameron et al. (2008) with restricted residuals.¹²

Some assumptions are required for the OLS estimation of the DiD model in Equation (1) to return unbiased estimates of the causal effect of the program implementation.

Assumption 1 (Parallel trend assumption): Conditional on the control variables, provinces in regions which have already implemented the program would have experienced similar trends in the supply of public early childcare services as provinces in regions which have not implemented yet the program, in the absence of the program.

Since we cannot observe the counterfactual evolution of the outcome variables in the absence of the program implementation, this assumption is not testable. However, we can check if it is supported by the data before the policy implementation, by testing whether the provinces were following parallel trends before regions started the program. In the same spirit of Autor (2003), we checked this by including into Equation (1) leads of the indicator for the program implementation, up to 5 years. If the trend between treated and not treated yet is parallel before the policy implementation, the coefficients of these leads are to be nil. When this is the case, the provinces were following parallel trends in the dependent variable while approaching the implementation moment. We report the results of this check in Subsection 5.2.

Assumption 2 (Exogeneity of the timing of program implementation): Conditional on observables, the timing of the implementation is exogenous with respect to the supply and the demand of public early childhood educational services. Rather, the timing is determined by the efficiency of regional or local governments.

¹¹See Cameron and Miller (2015) for an overview of the problems in doing inference when the number of clusters is small.

¹²In the WCB procedure with restricted residuals, the bootstrap algorithm the model is re-estimated under the null hypothesis of no treatment effect. We bootstrapped the residuals 5,000 times using the Webb six-point distribution as weights (Webb, 2014).

The timing of program implementation differed across regions because the transfers from the central government took place in different moments. In order to be financed, regions had to pass a set of acts to update their legislation about the different types of early childcare services and to design the executive authorizing procedures for transferring grants to the final childcare service providers (Istituto degli Innocenti, 2009). The different timing with which the funds were transferred from the central government was therefore likely determined by the level of administrative capacity of the regional bureaucracy (Soncin, 2013, p. 73). There is evidence that this also explains the heterogeneity across regions in spending resources from European structural funds (Milio, 2007). Furthermore, the 2010 European Quality of government Index (EQI) confirms for Italy this wide regional variability in the quality of governance and also highlights that all the Southern regions of Italy stay in the bottom 20% of the ranking with Romanian, Bulgarian, and Greek regions (Charron et al., 2014).

To assess whether the efficiency of regional governments could explain the heterogeneity across regions in the timing of the program implementation, we collected 2010 data at regional level on the European Quality of government Index, and we regressed the timing of PSSSPI implementation on the EQI and on its three components: quality pillar, impartiality pillar, and corruption pillar. The EQI and its components were built on the basis of how interviewed citizens rated three public services (education, healthcare, and law enforcement) with respect to their quality, impartiality, and level of corruption (Charron et al., 2014). They potentially range from 0 to 100. The dependent variable goes from 0 to 3: it is 0 if the implementation was in 2007 and 3 if in 2010. If it is true that the quality of regional governments mattered in determining the timing, we should find that the higher these indicators, the sooner the program started. Table 4 shows indeed that the relation between the measures of the quality of government and the timing of implementation is significantly different from zero, sizeable, and with the expected sign.¹³ It is also noteworthy their ability to explain a large share of the variability of the implementation timing,¹⁴ further suggesting that the different timing with which the funds were transferred from the central government was indeed largely determined by the level of regional administrative capacity.

¹³An increase in the EQI index by 10 points anticipates the implementation of the policy by 2.5 months. An increase by 46 points, which is the difference in the EQI between the values at the 90th and 10th percentiles of the EQI distribution, anticipates the policy implementation by 1 year. From the Poisson regression, we find that a unitary increase in the EQI anticipates the implementation time by 2%.

¹⁴When the regressor is the natural logarithm of EQI, the R^2 is 0.309.

Table 4: Linear and Poisson regression of the timing of the implementation of PSSSPI on 2010 indexes of government quality at regional level

Government quality index: ^(a)	EQI		Quality pillar		Impartiality pillar		Corruption pillar					
	(1)		(2)		(3)		(4)					
	Coeff.	<i>p</i> -value ^(b)	Coeff.	<i>p</i> -value ^(b)	Coeff.	<i>p</i> -value ^(b)	Coeff.	<i>p</i> -value ^(b)				
<i>a) Linear regression on quality index</i>												
Quality index	-0.021	**	0.048	-0.019	*	0.051	-0.021	0.145	-0.025	**	0.022	
Constant	2.002	**	0.023	2.049	**	0.023	1.975	*	0.071	2.200	**	0.014
<i>b) Linear regression on the natural logarithm of the quality index</i>												
Natural log quality index	-0.950	**	0.010	-1.041	**	0.017	-1.049	*	0.065	-0.980	***	0.003
Constant	4.589	***	0.007	5.104	**	0.011	4.974	**	0.030	4.695	***	0.002
<i>c) Poisson regression on quality index</i>												
Quality index	-0.019	*	0.052	-0.017	**	0.050	-0.019	0.141	-0.022	**	0.036	
Constant	0.864	**	0.044	0.926	**	0.039	0.879	0.122	0.977	**	0.032	
<i>c) Poisson regression on the natural logarithm of the quality index</i>												
Natural log quality index	-0.736	**	0.041	-0.860	**	0.038	-0.912	*	0.085	-0.687	**	0.044
Constant	2.729	**	0.038	3.338	**	0.035	3.420	*	0.081	2.542	**	0.043
Observations	21		21		21		21					
Means of quality indexes	43.570		50.741		42.387		43.625					
<i>R</i> ² from a)	0.185		0.178		0.104		0.254					
<i>R</i> ² from b)	0.309		0.274		0.170		0.382					

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.

^(a) The EQI and its three pillars potentially range from 0 to 100.

^(b) Given the small sample size, we report two-sided permutation-based *p*-values to avoid finite-sample bias in making inference. Permutation (or randomization) tests were introduced by Fisher (1935). See e.g. Box and Andersen (1955) and Welch (1990) for further details.

Further, Assumption 2 might fail if the timing of the program implementation is related to characteristics of the politicians that could also explain differential evolution across regions of the supply of public early childcare services. For example, in those regions with more female or graduated politicians the attention towards early childcare services might be higher, both in the presence and in the absence of the PSSSPI. However, a larger share of female or graduated politicians might also be determinants of the fastness with which the region was able to start the PSSSPI. Hence, we built a dataset of all Italian politicians in charge in municipal and regional governments using the Historical Archive of the Elections collected by Italian Department of Territorial and Internal Affairs.¹⁵ For each region, we computed the fraction of female and graduated politicians in the regional government and the fraction of female mayors, female politicians, and graduated politicians in the municipal governments in 2006 and 2007. We then regressed the timing of PSSSPI implementation on these 5 politicians' characteristics at regional level. The results are reported in Table 5. It shows that none of these politicians' characteristics are significant in explaining the timing of the program implementation and, especially when measured in 2007, they return a very low R^2 .

Finally, the fact that the Southern regions, which were the most in need of early childcare services, delayed the program implementation also corroborates Assumption 2: if the timing had been endogenous, one would have expected the opposite. To quantitatively assess if regional differences in the program implementation are influenced by regional heterogeneity in the demand or supply of early childhood educational services, we regressed at regional level the timing of implementation on:

- The pre-program total fertility rates and on their variation. Table 6 shows the coefficient estimates. We do not detect any explanatory power of the total fertility rates or of their variation on the timing of the program implementation.
- A dummy equal to 1 for those regions that before the PSSSPI had no planning and support activities for early childcare services (Basilicata, Calabria, Campania, Molise, and Sicilia) (Istituto degli Innocenti, 2009, p. 28). The absence of systematic policy intervention for early childcare services does not significantly explain the timing of the implementation (p -value=0.138) and, actually, delayed it by 0.663 years on average.¹⁶

¹⁵See <https://elezionistorico.interno.gov.it>.

¹⁶Results available from the authors upon request.

Table 5: Linear and Poisson regression of the timing of the implementation of PSSSPI on politicians' characteristics at regional level^(a)

	2007 (1)		2006 (2)	
	Coeff.	<i>p</i> -value ^(b)	Coeff.	<i>p</i> -value ^(b)
<i>a) Linear regression on politicians' characteristics</i>				
Female politicians rate (regional government)	-4.944	0.509	-3.205	0.468
Graduated politicians rate (regional government)	-58.381	0.694	-43.072	0.739
Female mayors rate	16.139	0.293	13.961	0.293
Female politicians rate (local government)	69.005	0.149	1.607	0.149
Graduated politicians rate (local government)	-26.874	0.100	0.166	0.238
Constant	2.371	*	0.087	1.697
<i>b) Poisson regression on politicians' characteristics</i>				
Female politicians rate (regional government)	-4.853	0.509	-2.944	0.468
Graduated politicians rate (regional government)	-53.892	0.694	-42.912	0.739
Female mayors rate	9.845	0.293	9.996	0.293
Female politicians rate (local government)	69.711	0.149	8.496	0.149
Graduated politicians rate (local government)	-23.173	0.100	0.241	0.238
Constant	1.303	0.332	0.677	0.534
Observations	21		21	
<i>R</i> ² from a)	0.003		0.064	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.

^(a) At the level of regional government, we use the fraction of female politicians and graduated politicians over the total politicians in a given region. At the level of local government, we use the fraction of female mayors, female politicians, and graduated politicians.

^(b) See footnote (b) of Table 4.

Table 6: Linear and Poisson regression of the timing of the implementation of PSSSPI on total fertility rates and their variation

Fertility index: ^(a)	Total fertility rate in 2007 (1)		Total fertility rate in 2006 (2)		Variation in fertility rates 2007/2006 (3)		Variation in fertility rates 2006/2005 (4)	
	Coeff.	<i>p</i> -value ^(b)	Coeff.	<i>p</i> -value ^(b)	Coeff.	<i>p</i> -value ^(b)	Coeff.	<i>p</i> -value ^(b)
<i>a) Linear regression on fertility index</i>								
Fertility index	0.387	0.812	0.703	0.650	-14.167	0.167	-8.637	0.172
Constant	0.566	0.820	0.152	0.955	1.500	*	0.089	1.379
<i>b) Poisson regression on fertility index</i>								
Fertility index	0.355	0.804	0.647	0.650	-8.361	0.143	-12.326	0.182
Constant	-0.397	0.847	-0.779	0.674	0.337	0.100	0.417	0.144
Observations	21		21		21		21	
Means of fertility indexes	1.370		1.341		0.029		0.033	
<i>R</i> ² from a)	0.003		0.011		0.100		0.097	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.

^(a) The fertility indexes are based on the total fertility rate: the average number of live children that a cohort of women would bear if they experienced the age-specific fertility rates of the calendar year in question throughout their childbearing lifespan.

^(b) See footnote (b) of Table 4.

Assumption 3 (No anticipation): The local authorities were not able to anticipate the PSSSPI implementation.

This assumption would fail if the municipalities or the region itself anticipated the start of the program and decided either to invest more in childcare services before the actual arrival of the transfers or to postpone some planned investment in childcare services, so as to sponsor them with the PSSSPI. The direction of the eventual bias could go in either way. To assess whether anticipation might be an issue, in Subsection 5.2 we provide a robustness check by removing all the provinces in the year before the program implementation.

5 Estimation results

5.1 Baseline results and regional differences

Table 7 displays the DiD estimation results of Equation (1) when the outcome variable is the coverage rate, (panel a)) or the fraction of municipalities in a province with public early childcare services (panel b)). In model (i), the whole sample is used. In the year of implementation the effect on the coverage rate was not significantly different from zero, although the magnitude was already important: an increase in the coverage rate by 0.0042 is an increase by 5.3% relatively to the sample mean before the policy implementation. One and two years after the program implementation the magnitude doubled, plus 9% and 11.4% respectively, but not yet significantly different from zero at the usual 5% level. Finally, 3 or more years after the program implementation the coverage rate significantly increased by 1.4 slots per 100 children aged 0-2, which is an increase by 17.2% relatively to the before-program sample mean. The PSSSPI effect at the extensive margin, i.e. in terms of fraction of municipalities supplying public early childcare services, was not significantly different from zero. In the year of the program implementation, the fraction of municipalities with public early childcare services increased by 0.47 percentage points, which was an increase of 2% with respect to the before-program sample mean. The effect 3 or more years after the start of PSSSPI is of about 2.6 percentage points, i.e. 11% relatively to the before-program sample mean.

Models (ii) and (iii) of Table 7 report the results when we split the sample in provinces in the South and in the Center-North. There are several reasons why one might expect het-

Table 7: Estimated effect of PSSSPI in the year of adoption (δ_0), 1 year after the adoption (δ_1), 2 years after the adoption (δ_2), and 3 or more years after the adoption (δ_3)

	(i) Italy		(ii) Center-North		(iii) South		(iv) Significance test of difference (ii)-(iii)		
	Coeff.	WCB ^(a)		Coeff.	WCB ^(a)		Coeff.	WCB ^(a)	
		<i>p</i> -value			<i>p</i> -value			<i>p</i> -value	
<i>a) Dependent variable: coverage rate</i>									
I_{rt} (δ_0)	0.0042	0.1686	0.0141	**	0.0106	0.0016	0.5892	0.0062	
I_{rt+1} (δ_1)	0.0071	*	0.0828	0.0232	**	0.0184	0.0030	0.5724	0.0144
I_{rt+2} (δ_2)	0.0090		0.1078	0.0307	**	0.0186	0.0008	0.7690	0.0078
I_{rt+3} (δ_3)	0.0136	**	0.0402	0.0365	**	0.0314	0.0013	0.7684	0.0126
Joint significance test		*	0.0888		**	0.0230		0.3466	0.0050
Time-constant effect ($\delta_0=\delta_1=\delta_2=\delta_3$) ^(b)	0.0034		0.2424	0.0117	**	0.0100	0.0020	0.6602	0.0130
Adjusted R^2		0.7387		0.5895		0.6158			
LOOCV ^(c) criterion		0.000983		0.002067		0.124384			
<i>b) Dependent variable: fraction of municipalities with public early childcare services</i>									
I_{rt} (δ_0)	0.4709	0.2614	1.5257	***	0.0032	-0.8537	0.4276	0.0052	
I_{rt+1} (δ_1)	0.9376	0.2618	2.9067	*	0.0518	-2.1272	0.1682	0.0082	
I_{rt+2} (δ_2)	1.5138	0.2726	4.7168	*	0.0502	-3.5341	**	0.0466	0.0048
I_{rt+3} (δ_3)	2.5969	0.1720	5.7887		0.1846	-4.1795	**	0.0404	0.0262
Joint significance test		0.3732		***	0.0032		0.3656	0.0654	
Time-constant effect ($\delta_0=\delta_1=\delta_2=\delta_3$) ^(b)	0.2355	0.6030	1.0602	***	0.0016	-0.6205	0.6058	0.0542	
Adjusted R^2		0.6703		0.6062		0.6362			
LOOCV ^(c) criterion		129.4958		1,000.3350		108,593.9000			
# of observations		1,100		690		410			
# of provinces		110		69		41			
# of regions		21		13		8			

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The estimated coefficients of all the other regressors are reported in Appendix C, Tables C.1 and C.2. The estimated equations contain a full set of regional indicators, year indicators, the female employment rate, the real GDP, the real GDP growth rate, and the constant.

^(a) WCB indicates that the *p*-values come from the wild cluster bootstrap-*t* statistics based on restricted residuals and 5,000 replications using the Webb six-point distribution as weights.

^(b) The full set of estimation results of the model with time-constant effects are available from the authors upon request.

^(c) LOOCV stands for leave-one-out cross validation.

erogeneous effects across Italian regions. First, as shown in Table 1, the national funds and the requested regional co-financing rates were set at a much higher level in the regions of the South. Hence, one would expect a stronger effect in the South than in the rest of Italy. Second, Italian regions are quite different in socio-economic measures, social norms, and the ability to cooperate (Banfield, 1958; Guiso et al., 2004; Bigoni et al., 2016, 2018). Starting from a situation of worst economic conditions with the Great Recession hitting asymmetrically the country and of less articulated social services (Fargion, 1996), it could be more difficult to create in the South the premises for a large and immediate impact of the PSSSPI. Third, as pointed out by Fargion (1996, p. 149), “the political process in southern Italy displays remarkably different features to the centre-north: pre-political particularism; an instrumental approach to politics; an absence of collective action”. This is reflected in all the Southern regions being in the bottom 20% of the 2010 European Quality of government Index. This regional disparity might affect the effectiveness of the invested resources in attaining the objectives of PSSSPI.

When splitting the provinces in those in Southern regions and in the Center-North, we realize that the positive effect of PSSSPI on the coverage rate at national level is due to the Center-North. The program implementation was indeed ineffective in the South, where the impact on the coverage rate is small in size and never significant. In the Center-North, the impact was instead immediate: already in the year of the implementation, the transfers generated a significant increase in the coverage rate by 1.4 slots in public early childhood education per 100 children aged 0-2. Relatively to the average coverage rate before PSSSPI in the Center-North, the rise amounts to 12.7%. The impact becomes much stronger when moving ahead: 3 or more years after the start of PSSSPI, the coverage rate increases by 32.9% with respect to the pre-intervention average.

About the impact on the fraction of municipalities with public early childcare services, we find that the nil effect at national level is due to a significant and positive impact in the Center-North and a negative one in the South. In the South, the impact two (three or more) years after the program implementation implies a significant reduction in the fraction of municipalities with public early childcare services of 3.5 (4.2) percentage points, which is a decrease of 22.8% (26.9%) with respect to the pre-program sample mean.

Finally, the *p*-values of the test of the significance of the differences of the estimated effects between geographical areas, reported in column (iv) of Table 7, suggest that formally the

program impact was significantly different between the Center-North and the South.¹⁷

5.2 Validity tests

In Section 4 we outlined the assumptions under which we can credibly identify the causal impact of the program implementation on the supply of public early childcare services. Assumption 1 states that provinces in regions which have already implemented the program would have experienced similar trends in the supply of public early childcare services as provinces in regions which have not implemented yet the program, in the absence of the program. Although we cannot test this assumption, we can check whether it is supported by the data before the policy implementation, by verifying whether the provinces were following parallel trends before the program implementation. As in Autor (2003), we include in Equation (1) further indicator variables equal to 1 if the program is implemented from 1 to 6 years in the future ($I_{rt-1}, \dots, I_{rt-6}$).¹⁸ If the trend between treated and not treated yet is parallel before the policy implementation, the coefficients of these further indicator variables should be zero. Table 8 reports the estimated coefficients of the time indicators for the pre-treatment and post-treatment period: all the coefficients of the leads are not significantly different from zero.¹⁹

A further assumption is no anticipation (Assumption 3). It would fail if the local authority anticipated the start of the program and decided either to invest more in childcare services before the actual arrival of the transfers or to postpone some planned investment in childcare services, so as to sponsor them with the PSSSPI. To check whether anticipation might be an issue, we removed for all the provinces the observation one year before the program implementation and re-estimated the model. Table 9 shows the estimated effects. The point estimates are very much in line with those reported in Table 7. In the Center-North, the magnitude of the effect is even larger. However, we lose in precision because of the sample size reduction.

¹⁷Although grouping Central regions with Northern regions could seem arbitrary, it should be considered that: i) if we split them, we would find that both the Northern regions and Central regions displayed program effects of similar magnitude (estimation results available from the authors upon request); ii) the division of the country in South and Center-North has deep roots which are reflected in different social, economic, and political problems (Putnam et al., 1993), with the regions in the Center-North sharing similar systems (Fargion, 1996).

¹⁸The coefficient of I_{rt-1} is innocuously normalized to zero.

¹⁹The facts that all the coefficients of the leads are not significantly different from zero and that the adjusted R^2 and the LOOCV criterion point to a better goodness of fit with the more parsimonious model of Equation (1) justify why we chose as benchmark results those reported in Table 7.

Table 8: Placebo test for the parallel trend assumption

	(i) Total		(ii) Center-North		(iii) South	
	Coeff.	WCB ^(a) pvalue	Coeff.	WCB ^(a) pvalue	Coeff.	WCB ^(a) pvalue
<i>a) Dependent variable: coverage rate</i>						
I_{rt-6}	-0.0084	0.7458	-	-	0.0048	0.5586
I_{rt-5}	-0.0004	0.9112	-0.0372	0.4268	0.0057	0.5022
I_{rt-4}	-0.0023	0.8270	-0.0228	0.2866	0.0016	0.7700
I_{rt-3}	-0.0034	0.8460	-0.0163	0.2638	0.0006	0.8488
I_{rt-2}	-0.0023	0.9538	-0.0095	0.1968	0.0018	0.5112
I_{rt-1}	0.0000	-	0.0000	-	0.0000	-
I_{rt}	0.0048	0.3126	0.0180	** 0.0260	0.0010	0.7430
I_{rt+1}	0.0084	0.2660	0.0311	** 0.0334	0.0016	0.7110
I_{rt+2}	0.0109	0.3018	0.0426	** 0.0382	-0.0014	0.7524
I_{rt+3}	0.0163	0.2228	0.0524	** 0.0410	-0.0019	0.6236
Joint significance test of coefficients of pre-treatment dummies		0.4360		0.5830		0.7650
Adjusted R^2	0.7375		0.5878		0.6116	
LOOCV ^(c) criterion	0.000988		0.003058		0.124384	
<i>b) Dependent variable: fraction of municipalities with public early childcare services</i>						
I_{rt-6}	0.5115	0.9438	-	-	4.3903	0.3836
I_{rt-5}	1.2687	0.8368	-14.2505	0.4692	3.6115	0.4100
I_{rt-4}	0.8244	0.8494	-5.9649	0.3856	2.7158	0.4160
I_{rt-3}	0.6137	0.8338	-4.1457	0.3630	2.0140	0.4226
I_{rt-2}	0.3707	0.7986	-2.2923	0.3500	1.0630	0.3982
I_{rt-1}	0.0000	-	0.0000	-	0.0000	-
I_{rt}	0.3568	0.7566	2.6019	* 0.0926	-1.3697	0.3446
I_{rt+1}	0.6535	0.7942	5.0847	0.1196	-3.2780	0.2846
I_{rt+2}	1.0717	0.7932	7.9942	0.1146	-5.2774	0.2026
I_{rt+3}	1.9492	0.7808	10.1870	0.1536	-6.6708	0.1892
Joint significance test of coefficients of pre-treatment dummies		0.9974		0.6786		0.9680
Adjusted R^2	0.6703		0.6062		0.6362	
LOOCV ^(c) criterion	130.4958		2,365.6940		21,025.9000	
# of observations	1,100		690		410	
# of provinces	110		69		41	
# of regions	21		13		8	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The coefficient of I_{rt-1} is normalized to 0. The estimated equations contain also a full set of regional indicators, year indicators, the female employment rate, the real GDP, the real GDP growth rate, and the constant.

(a) See footnote ^(a) of Table 7.

(b) Since the regions of the Center-North implemented the program by the end of 2009 and the first observed year is 2004, we cannot identify the coefficient of I_{rt-6} .

(c) LOOCV stands for leave-one-out cross validation.

Table 9: Estimated effect of PSSSPI after removing the year before the program implementation

	Total		Center-North ^(b)		South	
	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value
<i>a) Dependent variable: coverage rate</i>						
I_{rt} (δ_0)	0.0054	0.1156	0.0245	0.2812	0.0021	0.7600
I_{rt+1} (δ_1)	0.0092 *	0.0904	0.0349	0.1318	0.0035	0.6468
I_{rt+2} (δ_2)	0.0111	0.1230	0.0435 *	0.0940	0.0011	0.8638
I_{rt+3} (δ_3)	0.0158 *	0.0650	0.0504 *	0.0676	0.0015	0.8190
Joint significance test		0.1286		0.1386		0.3282
<i>b) Dependent variable: fraction of municipalities with public early childcare services</i>						
I_{rt} (δ_0)	0.0069	0.9938	3.0289	0.4168	-1.2809	0.6642
I_{rt+1} (δ_1)	0.5023	0.7298	4.6118	0.3922	-2.7152	0.4114
I_{rt+2} (δ_2)	1.0744	0.5562	6.6282	0.3332	-4.1468	0.1750
I_{rt+3} (δ_3)	2.1277	0.3620	7.8947	0.3076	-4.8715	0.1052
Joint significance test		0.8214		0.1818		0.4274
# of observations	990		621		396	
# of provinces	110		69		41	
# of regions	21		13		8	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.
^(a) See footnote ^(a) of Table 7.

5.3 Explaining regional differences

A clear North-South cleavage emerged from Table 7 about the PSSSPI impact. In this section, we speculate about the reasons for these different regional effects on the basis of further data-driven findings.

Different local re-organization of the public early childcare services?

Panel a) of Table 7 reported no negative program effect on the coverage rate in the South. However, panel b) showed that the PSSSPI negatively impacted on the fraction of municipalities supplying public early childcare services. This might suggest that in the South the PSSSPI induced a re-organization of the public early childcare services, with the centralization of the supply in key areas, for example to exploit economies of scale. If in the South the program funds were mainly used for this, one would expect a limited or nil effect on the coverage rate. To shed more light into this issue, we split municipalities and computed the coverage rate in provincial capitals and in the rest of the provincial territory. The provincial capitals are generally the most populated municipalities and the economic hubs in the provincial territory. Therefore, they could be the focal points where concentrating the public supply, if the aim is

to exploit economies of scale and increase the capability of the families in the surrounding areas to benefit from the converged supply of public slots. If so, we should observe that in the South the PSSSPI increased the coverage rate in provincial capitals but negatively affected the supply elsewhere.

Panel a) of Table 10 reports the estimated program effect on the coverage rate for the 110 provincial capitals, whilst panels b) and c) focus on the rest of provincial territory in terms of both the effect on the coverage rate and the effect on the fraction of municipalities with public early childcare services.²⁰ In the Center-North the impact on the coverage rate is significant both in capitals and in the rest of the provincial territory. This provides evidence that in the Center-North the PSSSPI was effective in increasing the supply of public childcare services also in smaller towns and less populated areas, where traditionally the availability of public childcare services has been scarce. On the contrary, in the South, while provincial capitals experienced an increase in the coverage rate, although significant only in the short-term, in the rest of territory the policy effect had a negative impact. When we use as outcome variable the fraction of municipalities (excluding capitals) with public early childcare services, in Southern provinces we detect significant negative effects, in magnitude somewhat larger than the ones reported in Table 7. Hence, while in the Center-North the policy generated a positive impact on the supply of public early childcare services both at the intensive and the extensive margins, in the South the supply was reallocated to the advantage of provincial capitals. These findings therefore support our speculation that in the South the PSSSPI induced a re-organization of the public early childcare services, with the centralization of the supply in key areas and the penalization of smaller urban areas.

To check the robustness of these pieces of evidence, we adopted two alternative definitions of small urban areas. First, we considered municipalities smaller than 10,000 inhabitants in 2004. They included 86% of the total municipalities and 32.4% of the 2004 population. Second, we focused on municipalities with a density of the population lower than 500 inhabitants per square kilometre in 2004. They also encompassed 86% of the municipalities, but covering 50.6% of the 2004 population. Table D.1 in Appendix D reports the program effects on the coverage rate and on the fraction of municipalities with public early childcare services for

²⁰For provincial capitals we do not estimate the model for the presence of public early childcare services, where the outcome variable is 1 if the capital has public early childcare services and 0 otherwise. There is indeed almost no variation across capitals and over time in this dummy variable.

Table 10: Estimated effect of PSSSPI in provincial capitals and in the rest of the territory

	(i) Italy		(ii) Center-North		(iii) South		(iv) Significance test of difference (ii)-(iii)			
	Coeff.	WCB ^(a)	Coeff.	WCB ^(a)	Coeff.	WCB ^(a)	WCB ^(a)	WCB ^(a)		
		p-value		p-value		p-value				
<i>a) Provincial capitals. Dependent variable: coverage rate</i>										
I_{rt} (δ_0)	0.0063	0.2620	0.0205	**	0.0324	0.0038	**	0.0412	0.0276	
I_{rt+1} (δ_1)	0.0144	**	0.0472	0.0346	**	0.0288	0.0180	*	0.0510	0.1260
I_{rt+2} (δ_2)	0.0144		0.1114	0.0423	**	0.0212	0.0124		0.2792	0.0818
I_{rt+3} (δ_3)	0.0196		0.1574	0.0564	***	0.0076	0.0091		0.5910	0.0480
Joint significance test		0.3572		**	0.0278			0.3298	0.1122	
<i>b) Provinces excluding capitals. Dependent variable: coverage rate</i>										
I_{rt} (δ_0)	0.0042	**	0.0294	0.0110	**	0.0130	0.0015		0.6852	0.0576
I_{rt+1} (δ_1)	0.0064	**	0.0484	0.0174	**	0.0340	-0.0006		0.8578	0.0278
I_{rt+2} (δ_2)	0.0083	*	0.0602	0.0227	*	0.0578	-0.0038		0.5350	0.0196
I_{rt+3} (δ_3)	0.0123	**	0.0158	0.0237		0.1206	-0.0032		0.5278	0.0634
Joint significance test		*	0.0524		**	0.0308		0.2306	0.0592	
<i>c) Provinces excluding capitals. Dependent variable: fraction of municipalities with public early childcare services</i>										
I_{rt} (δ_0)	0.5692		0.1780	1.5551	***	0.0018	-0.9758		0.3398	0.0034
I_{rt+1} (δ_1)	1.1583		0.1904	3.0041	*	0.0544	-2.4007	*	0.0692	0.0058
I_{rt+2} (δ_2)	1.6973		0.2704	4.9134	*	0.0598	-4.3618	**	0.0284	0.0030
I_{rt+3} (δ_3)	2.8339		0.1854	6.1139		0.1976	-5.2281	**	0.0326	0.0176
Joint significance test			0.2724		***	0.0018		0.2376	0.0230	
# of observations	1,100			690			410			
# of provinces	110			69			41			
# of regions	21			13			8			

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The estimated parameters of the coefficient all the other regressors are reported in Appendix C, Tables C.3, C.4, and C.5. The estimated equations contain a full set of regional indicators, year indicators, the female employment rate, the real GDP, the real GDP growth rate, and the constant.

^(a) See footnote ^(a) of Table 7.

small urban areas. The North-South differences spotted when excluding the provincial capitals are confirmed when using these two alternative definitions of small urban areas.

Different starting points in the supply of early childcare services?

As mentioned in Section 4, before the PSSSPI not all the regions were equally committed to the development of planning and support activities for early childcare services. In particular, there were five regions – Basilicata, Calabria, Campania, Molise, and Sicilia – which did not have any (Istituto degli Innocenti, 2009, p. 28). Although the PSSSPI assigned to these regions more funds and set their regional co-financing rate at a larger value, starting from scratch may require more years for the program effects to pop up into our outcome variables.

Hence, we split the provinces of the South in those five regions without any planning or support activities for early childcare services and in the remaining three – Abruzzo, Puglia, and Sardegna. Table 11 shows the estimated effects and reports, in the last two columns, the tests for the significance of the differences between the effects in the two groups of the South with respect to those in the Center-North, used as baseline. Whereas the estimates from the five regions in the South without any previous planning or support activities are significantly different from those in the Center-North, this is not true for the effects of the remaining three Southern regions. Apart from the results of the significance tests, also by looking at the point estimates we can see that the North-South cleavage is mainly driven by the Southern regions that did not have systematic action for early childcare services before the PSSSPI. This contributes in explaining the different regional effectiveness of the program, at least to the extent that it is measured by the coverage rate and the fraction of municipalities with public early childcare services.

Different quality of regional government?

Further, we examined if the different regional effects are mirrored by different level of quality of regional government. We interacted the indicators for the policy implementation with the 2010 regional values of EQI and with its three components: the quality pillar, the impartiality pillar, and the corruption pillar. The coefficients of the interactions with the EQI are jointly significant at 10% in affecting the coverage rate: the higher the EQI, the more positive the PSSSPI effect on both the coverage rate and the fraction of municipalities with public early

Table 11: Estimated effect of PSSSPI by splitting South in regions with and without previous planning and support activities for early childcare services

	(i) Center-North		(ii) South without childcare activities ^(b)		(iii) South with childcare activities ^(c)		Significance test of difference		
	Coeff.	WCB ^(a)	Coeff.	WCB ^(a)	Coeff.	WCB ^(a)	WCB ^(a)	WCB ^(a)	
		p-value		p-value		p-value	p-value	p-value	p-value
<i>a) Dependent variable: coverage rate</i>									
$I_{rt} (\delta_0)$	0.0141	**	0.0106	-0.0010	0.0106	0.0086	0.1802	0.0086	0.1236
$I_{rt+1} (\delta_1)$	0.0232	**	0.0184	-0.0018	0.0184	0.0170	0.1324	0.0128	0.2786
$I_{rt+2} (\delta_2)$	0.0307	**	0.0186	-0.0038	0.0186	0.0150	0.1024	0.0096	0.1188
$I_{rt+3} (\delta_3)$	0.0365	**	0.0186	-0.0034	0.0314	0.0143	0.1120	0.0130	0.1216
Joint signific. test	**	0.0230			0.8642		0.3642	0.0098	0.0578
<i>b) Dependent variable: fraction of municipalities with public early childcare services</i>									
$I_{rt} (\delta_0)$	1.5257	***	0.0032	-1.6596	0.1166	-0.0048	0.9712	0.0024	0.3752
$I_{rt+1} (\delta_1)$	2.9067	*	0.0518	-3.6231	0.1294	-0.7362	0.6312	0.0106	0.3030
$I_{rt+2} (\delta_2)$	4.7168	*	0.0502	-5.3558	0.1208	-2.2853	0.6038	0.0136	0.1992
$I_{rt+3} (\delta_3)$	5.7887		0.1846	-6.1171	0.1440	-3.3805	0.5794	0.0412	0.1754
Joint signific. test	***	0.0032		***	0.0038		0.7822	0.0985	0.3026
# of observations	690			230		180			
# of provinces	69			23		18			
# of regions	13			5		3			

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The estimated equations contain a full set of regional indicators, year indicators, the female employment rate, the real GDP, the real GDP growth rate, and the constant.

(a) See footnote ^(a) of Table 7.

(b) It includes Basilicata, Calabria, Campania, Molise, and Sicilia.

(c) it includes Abruzzo, Puglia, and Sardegna.

childcare services. When looking at the interactions with the three components, we realize that this is due to the quality and the impartiality pillars. The interactions with the corruption pillar plays a more marginal role. Given that in the last 8 positions of the ranking according to both the quality and the impartiality pillars there are 7 out of the 8 Southern regions, the general low level of the regional governments in terms of ability of providing impartial and quality public services could in part explain the regional differences in the PSSSPI effects.

Table 12: Effect of PSSSPI interacted with EQI and its 3 components

Dependent variable:	(i) Coverage rate		(ii) Fraction of municipalities with public early childcare services	
	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value
<i>a) Interactions with 2010 EQI</i>				
$I_{rt} \times EQI$	0.0001	0.5350	0.0353	0.5216
$I_{rt+1} \times EQI$	0.0001	0.5642	0.0833	0.3252
$I_{rt+2} \times EQI$	0.0002	0.1330	0.1492	*
$I_{rt+3} \times EQI$	0.0003	*	0.0552	0.1084
Joint significance test		0.1380		0.1130
				0.3574
<i>b) Interactions with 2010 quality pillar of EQI</i>				
$I_{rt} \times \text{quality pillar}$	0.0000	0.8038	0.0234	0.4562
$I_{rt+1} \times \text{quality pillar}$	0.0000	0.7348	0.0436	0.2814
$I_{rt+2} \times \text{quality pillar}$	0.0002	0.1584	0.1023	**
$I_{rt+3} \times \text{quality pillar}$	0.0003	**	0.0368	**
Joint significance test	*	0.0920		0.1798
<i>c) Interactions with 2010 impartiality pillar of EQI</i>				
$I_{rt} \times \text{impartiality pillar}$	0.0001	0.2338	0.0327	0.4908
$I_{rt+1} \times \text{impartiality pillar}$	0.0001	0.3186	0.0599	0.2960
$I_{rt+2} \times \text{impartiality pillar}$	0.0003	*	0.0620	*
$I_{rt+3} \times \text{impartiality pillar}$	0.0004	*	0.0568	0.1103
Joint significance test		0.2418		0.2010
				0.4720
<i>d) Interactions with 2010 corruption pillar of EQI</i>				
$I_{rt} \times \text{corruption pillar}$	0.0001	0.4668	0.0204	0.5946
$I_{rt+1} \times \text{corruption pillar}$	0.0001	0.5942	0.0385	0.4406
$I_{rt+2} \times \text{corruption pillar}$	0.0002	0.1874	0.0944	0.1326
$I_{rt+3} \times \text{corruption pillar}$	0.0003	*	0.0974	0.0976
Joint significance test		0.2462		0.1868
				0.4828
# of observations	1,100		1,100	
# of provinces	110		110	
# of regions	21		21	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The estimated equations contain a full set of regional indicators, year indicators, the female employment rate, the real GDP, the real GDP growth rate, and the constant.

^(a) See footnote ^(a) of Table 7.

Different female employment conditions, social capital, or economic growth?

Finally, we checked whether different program effects corresponded to different employment, social capital, or economic situations. First, we took the regional female employment rate in 2006, we interacted it with the dummy indicators for the policy implementation $(I_{rt}, \dots, I_{rt+3})$, and we included the interactions into the baseline models. Second, we did the same but by replacing the regional female employment rate with the regional levels of social capital. We use the measures of social capital for Italian regions built by [Sabatini \(2005\)](#) and based on “five main social capital dimensions: strong family ties, weak informal ties, voluntary organizations, civic awareness, and political participation” ([Sabatini, 2005](#)). Third, we rerun it with the interactions with the 2006 regional GDP growth rate. [Table 13](#) shows that the coefficients of the interactions are not jointly significant from zeros. We do not therefore detect evidence of heterogeneity of the effect across different female employment conditions, social capital, or economic growth.

5.4 Robustness checks

In this section we briefly mention a battery of robustness analyses to check the sensitivity of our results. Detailed comments and estimation results are reported in [Appendix B](#).

First, we checked the sensitivity of our results to the aggregation level of the original dataset of Italian municipalities. In [Table B.1](#) we show the estimation results if we kept the unit of observation at the municipality level or if we grouped the data at regional level instead of at the level of provinces. In both cases, the point estimates are very much in line with the ones reported in [Table 7](#).

Second, we examined the robustness of our findings to the presence of provincial fixed-effects (FE), instead of regional FE. Results are robust to the inclusion of provincial FE (see [Table B.2](#)).

Third, in addition to the provincial FE, we also included as further regressors the interactions between the provincial dummy indicators and the calendar year, so as to control not only for the provincial FE, but also for provincial specific linear trends. [Table B.3](#) shows that the effects are in line with those from the baseline specification.

Fourth, we removed observations in 2011-2013, so as to exclude the 2010 and 2012 exten-

Table 13: Effect of PSSSPI interacted with regional female employment rate, social capital, and GDP growth rate

Dependent variable:	(i) Coverage rate		(ii) Fraction of municipalities with public early childcare services	
	Coeff.	WCB ^(a)	Coeff.	WCB ^(a)
		<i>p</i> -value		<i>p</i> -value
<i>a) Interactions with 2006 regional female employment rate</i>				
$I_{rt} \times$ Female employment rate	0.0000	0.9288	0.0353	0.5354
$I_{rt+1} \times$ Female employment rate	0.0001	0.5794	0.0833	0.2802
$I_{rt+2} \times$ Female employment rate	0.0003	** 0.0472	0.1492	* 0.0820
$I_{rt+3} \times$ Female employment rate	0.0002	0.3990	0.1084	0.2914
Joint significance test		0.1596		0.1836
<i>b) Interactions with 2004 regional social capital</i>				
$I_{rt} \times$ Social capital	0.0002	0.7606	0.1031	0.4602
$I_{rt+1} \times$ Social capital	0.0003	0.4258	0.1901	0.2420
$I_{rt+2} \times$ Social capital	0.0007	* 0.0642	0.3517	* 0.0718
$I_{rt+3} \times$ Social capital	0.0006	0.2922	0.2236	0.3232
Joint significance test		0.2546		0.2060
<i>c) Interactions with 2006 regional GDP growth rate</i>				
$I_{rt} \times$ GDP growth rate	-0.1100	0.4176	-60.2930	0.2870
$I_{rt+1} \times$ GDP growth rate	-0.0500	0.7056	-51.3778	0.3502
$I_{rt+2} \times$ GDP growth rate	-0.0344	0.7930	-44.6752	0.4264
$I_{rt+3} \times$ GDP growth rate	0.0056	0.9666	-53.9925	0.3320
Joint significance test		0.3656		0.7488
# of observations	1,100		1,100	
# of provinces	110		110	
# of regions	21		21	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The estimated equations contain a full set of regional indicators, year indicators, the female employment rate, the real GDP, the real GDP growth rate, and the constant.

^(a) See footnote ^(a) of Table 7.

sions of the PSSSPI.²¹ Since the new point estimates very much in line with the benchmark results (see Table B.4), we infer that it is the first intervention (2007-2009) that drives our findings. As a matter of fact, the 2007-2009 funds are the largest part of the full program, as shown in Table 1.

Fifth, we checked whether the identified impact on the coverage rate could be spurious and affected by differential trends across regions in fertility, given that the population aged 0-2 is at the denominator of this outcome variable. We used two different dependent variables: (a) the ratio between the availability of public slots at time t and the population aged 0-2 in 2004 (first year of observation); (b) the number of available slots at time t . The results confirm that our baseline conclusions are not affected by eventual spurious components due to differential trends across regions in fertility (see Table B.5).

Sixth, we added as further controls the lags up to order three of the provincial real GDP growth rate. Since the period under analysis covers the years of the Great Recession and Italy was asymmetrically hit by the downturn from the geographical viewpoint, one might wonder whether this could imply time-varying heterogeneity confounding our findings. Although in the baseline model we control for the real GDP growth rate, it might be not enough if economic shocks have persistent effects on both the dependent variable and the implementation timing. Hence, by adding the lags of the real GDP growth rate, we control for different evolution over time of the economy across provinces. Table B.6 shows that the results are unchanged.

Seventh, we checked whether the results are sensitive to the inclusion of the five regressors describing the characteristics of politicians at municipal and regional level used in Section 4 to support Assumption 2). These variables could indeed determine both the implementation timing of the PSSSPI and the level of attention towards the supply of public early childcare services. The point estimates are very much in line with those from the baseline specification (see Table B.7).

Finally, we replaced the female employment rate, which was included in the model as a time-varying covariate, with its 2006 value. Indeed, one might wonder whether the female employment rate could be an outcome of the treatment itself and, therefore, be a “bad control”. The estimation results are clearly unaffected, as shown by Table B.8.

²¹As mentioned in the Introduction, the PSSSPI was extended in 2010, 2012, and 2014.

6 Conclusions

We evaluated the effectiveness of PSSSPI, a national program co-financed by regions and started in 2007, in increasing the available slots in public early childhood education. The transfers towards public and private early childcare providers amounted to almost €1 billion. The central government designed this intervention in order to enlarge the supply of early childcare services and to reduce the imbalances between the South and the Center-North in the supply and use of early childcare services.

Since PSSSPI was a nationwide program, disentangling the impact of the time trend from the true effect of the program is not trivial. However, the transfers from the central government to the regional authority did not take place at the same moment in each region. Regions had indeed to pass a set of acts to receive the transfers from the central government to update their legislation about the different types of early childcare services and to design the executive authorizing procedures for transferring grants to the final childcare service providers. We took advantage of the different timing of transfers across regions and estimated the causal impact of PSSSPI on the available slots in public early childhood education by the DiD estimator. The empirical analysis is based on a dataset at the municipal level collected by the Italian Department of Territorial and Internal Affairs over the years 2004-2013. We aggregated the data at the level of the 110 Italian provinces which are observed for 10 years.

We found that PSSSPI was only partially successful. Whilst on average in Italy three (or more) years after the program intervention the available slots in public early childhood education increased by 17.2% with respect to the pre-intervention average, the program impact was not homogeneous across regions. We showed indeed that the program effectiveness was almost nil in the Southern regions and quite strong in the Center-North where, three or more years after the policy implementation, the increase in the coverage rate amounted to more than 30% and the fraction of municipalities with public early childcare services grew by 20%. Hence, the program failed in reducing regional differences in the supply of early childcare services, at least the public ones.

We tried to unveil the reasons for this failure. We found evidence that, whilst in the Center-North the increase in the public supplied concerned both provincial capitals and the rest of the territory, in the South the coverage rate improved somewhat in provincial capitals, but in the rest of the territory the fraction of municipalities with public early childcare services signif-

icantly decreased. We speculated that in the South the PSSSPI induced a re-organization of the public early childcare services, with the centralization of the supply in key areas to benefit from economies of scale. Because of this, public funding could have been not sufficient in the South to cover additional expenses in building new places. We also found that the negative performance in the Southern regions is driven by those 5 regions without systematic actions for early childcare services before the PSSSPI. Since these regions were lagging behind, it might simply be that they need more time to transform the public investment into an increase in the coverage rate. We suggest therefore that any further policy intervention to reduce regional disparities in the availability of public early childcare services should be designed after having understood the critical factors of these regions which prevented the growth of public supply of early childhood educational services. These critical factors are not in question in this paper, but left for future research.

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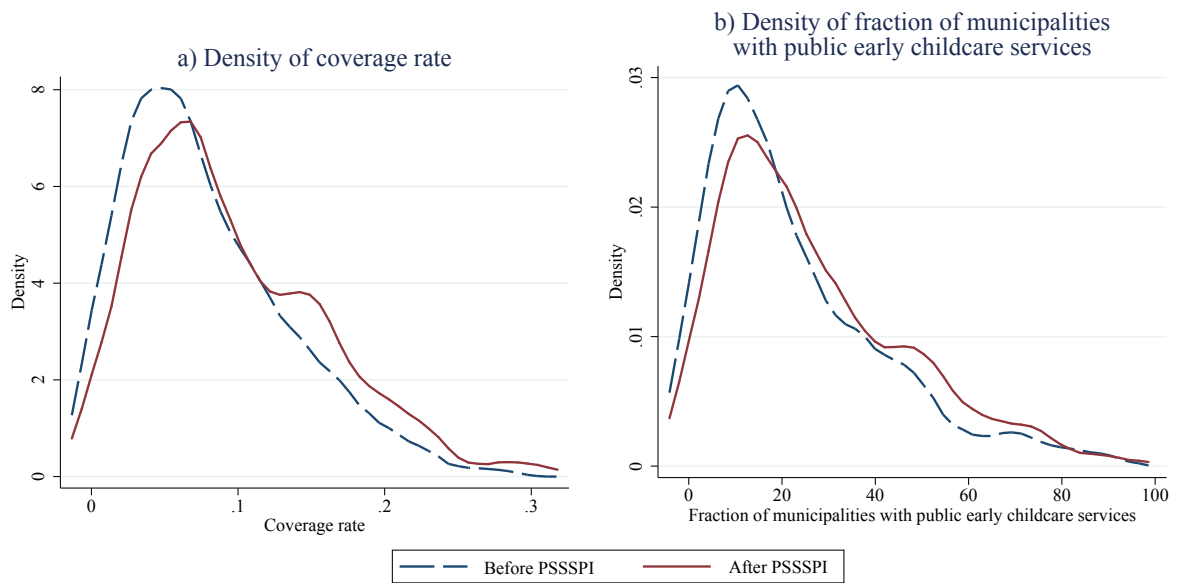
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Appendix

A Further descriptive statistics

Figure A.1: Density distribution^(a) of the coverage rate and fraction of municipalities with public childcare services, before and after PSSSPI implementation



^(a) Epanechnikov kernel function.

B Robustness analysis

First, we checked the sensitivity of our results to the aggregation level of the original dataset of Italian municipalities. In panel a) of Table B.1 we show the estimation results if we kept the unit of observation at the municipality level. Panel b) reports instead the results if we grouped the data at regional level instead of at the level of provinces. The point estimates are very much in line with the ones reported in Table 7. We lose the significance of the parameters when we aggregate the information at regional level, but this is likely related to the loss of precision due to the reduced number of observations.

Table B.1: PSSSPI effects on the coverage rate with data at municipality or regional level

	(i) Italy		(ii) Center-North		(iii) South			
	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value		
<i>a) Data at municipality level</i>								
$I_{rt} (\delta_0)$	0.0043	***	0.0028	0.0091	0.1564	-0.0009	0.6210	
$I_{rt+1} (\delta_1)$	0.0063	***	0.0012	0.0162	0.1286	-0.0031	0.4254	
$I_{rt+2} (\delta_2)$	0.0091	**	0.0250	0.0242	*	0.0568	0.2878	
$I_{rt+3} (\delta_3)$	0.0125	**	0.0172	0.0273	**	0.0322	0.3558	
Joint significance test		***	0.0074			0.1362	0.5080	
Time-constant effect ($\delta_0=\delta_1=\delta_2=\delta_3$)	0.0034	**	0.0208	0.0074		0.2256	-0.0008	0.6028
# of observations		80,849		55,279		25,570		
# of regions		21		13		8		
R^2		0.0510		0.0429		0.0630		
<i>b) Data aggregated at regional level</i>								
$I_{rt} (\delta_0)$	0.0024		0.5670	0.0120	*	0.0644	-0.0008	0.7224
$I_{rt+1} (\delta_1)$	0.0050		0.5400	0.0204	*	0.0910	0.0002	0.9540
$I_{rt+2} (\delta_2)$	0.0070		0.6132	0.0280		0.1754	-0.0013	0.8876
$I_{rt+3} (\delta_3)$	0.0120		0.4956	0.0337		0.2528	-0.0005	0.9452
Joint significance test			0.6168			0.1472		0.2938
Time-constant effect ($\delta_0=\delta_1=\delta_2=\delta_3$)	0.0013		0.6584	0.0099	*	0.0550	-0.0005	0.5896
# of observations		210		130		80		
# of regions		21		13		8		
R^2		0.9727		0.9514		0.9765		

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The placebo tests for the parallel trend assumption do not show evidence for its failure with data both at municipality level and aggregated at regional level. The joint tests of equality to 0 of the leads of the indicator of the program implementation deliver *p*-values equal to 0.6614 and 0.1538 respectively.

^(a) See footnote ^(a) of Table 7.

Second, we check the robustness of our findings to the presence of provincial fixed-effects (FE). When we include in Equation (1) provincial FE instead of regional FE, we get point estimates of the effects of interest that are very close to those from the benchmark model (see Table B.2). The Hausman tests at the bottom of Table B.2 formally show that the estimations from the pooled OLS and FE specifications are statistically equivalent to each other.

Table B.2: Estimated effect of PSSSPI with provincial fixed effects

	(i) Italy		(ii) Center-North		(iii) South			
	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value		
<i>a) Dependent variable: coverage rate</i>								
$I_{rt} (\delta_0)$	0.0043	0.1178	0.0124	**	0.0278	0.0021	0.5844	
$I_{rt+1} (\delta_1)$	0.0081	**	0.0428	0.0210	**	0.0396	0.0041	0.4734
$I_{rt+2} (\delta_2)$	0.0108	**	0.0352	0.0268	*	0.0542	0.0028	0.5760
$I_{rt+3} (\delta_3)$	0.0149	***	0.0060	0.0305	*	0.0894	0.0039	0.5000
Joint significance test		**	0.0198			0.1907		0.3602
Time-constant effect ($\delta_0=\delta_1=\delta_2=\delta_3$)	0.0035		0.2390	0.0105	**	0.0228	0.0023	0.5798
Hausman test OLS vs FE: ^(b) <i>p</i> -value		0.4486		0.1914			0.8489	
<i>b) Dependent variable: fraction of municipalities with public early childcare services</i>								
$I_{rt} (\delta_0)$	0.7357	0.1608	1.2448	0.1300	-0.6537	0.4620		
$I_{rt+1} (\delta_1)$	1.5623	0.1268	2.5662	0.1742	-1.6205	0.2662		
$I_{rt+2} (\delta_2)$	2.5469	*	0.0920	3.9632	0.1986	-2.2641	0.1766	
$I_{rt+3} (\delta_3)$	3.7398	**	0.0452	4.3467	0.3454	-2.4431	0.1768	
Joint significance test		0.3658		0.5474		0.6454		
Time-constant effect ($\delta_0=\delta_1=\delta_2=\delta_3$)	0.4478	0.3708	0.9110	0.1004	-0.5838	0.5126		
Hausman test OLS vs FE: ^(b) <i>p</i> -value		0.8305		0.7458		0.1982		

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.

^(a) See footnote ^(a) of Table 7.

^(b) The Hausman test is based on the difference between the estimated effects from the baseline model and the ones from the model with provincial FE. The Hausman test is computed bootstrapping 1,000 times the sample clustered at regional level to take into account within cluster correlation.

Third, in addition to the provincial FE, we also included as further regressors the interactions between the provincial dummy indicators and the calendar year, so as to control not only for the provincial FE, but also for provincial specific linear trends. Table B.3 shows that the effects are in line with those from the baseline specification.

As mentioned in the Introduction the PSSSPI was extended in 2010, 2012 and 2014. Since our findings are drawn from a dataset ranging from 2004 until 2013, one might wonder whether they are due to the 2010 and 2012 extensions. For this reason, in a fourth sensitivity analysis, we replicated our estimates by removing observations in 2011-2013, implying a 30% reduction in the sample size. We report the estimated policy effects in Table B.4.²² What we find is very much in line with the estimation results in Table 7. Hence, the point estimates from the benchmark model are not influenced much by the second (2010) and the third (2012) interventions. This is not surprising since the 2007-2009 funds are the largest part of the full program, as shown in Table 1.

In the benchmark analysis one of the two dependent variables is the coverage rate, i.e. the ratio between the available slots in the public early childhood education and the population aged 0-2. We

²²Since the 2010 extension was formally approved in October 2010, we kept the 2010 observations in this sensitivity analysis.

Table B.3: Estimated effect of PSSSPI with provincial fixed effects and provincial linear trends

	(i) Italy		(ii) Center-North		(iii) South	
	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value
<i>a) Dependent variable: coverage rate</i>						
I_{rt} (δ_0)	0.0047 *	0.0504	0.0113 ***	0.0082	0.0023	0.5340
I_{rt+1} (δ_1)	0.0086 **	0.0402	0.0199 **	0.0110	0.0041	0.4252
I_{rt+2} (δ_2)	0.0113 **	0.0488	0.0267 **	0.0126	0.0028	0.5952
I_{rt+3} (δ_3)	0.0153 **	0.0238	0.0322 **	0.0162	0.0030	0.5410
Joint significance test	*	0.0910	**	0.0156		0.6460
Time-constant effect ($\delta_0=\delta_1=\delta_2=\delta_3$)	0.0040 *	0.0954	0.0091 ***	0.0070	0.0025	0.4948
Adjusted R^2	0.9777		0.9675		0.9440	
<i>b) Dependent variable: fraction of municipalities with public early childcare services</i>						
I_{rt} (δ_0)	0.7397 *	0.0796	0.8898	0.1940	-0.6839	0.4312
I_{rt+1} (δ_1)	1.4414	0.1428	2.2563	0.1910	-1.9199	0.1754
I_{rt+2} (δ_2)	2.2217	0.1852	4.0179	0.1734	-3.1247 *	0.0700
I_{rt+3} (δ_3)	2.9812	0.2340	5.0993	0.2618	-4.0188 *	0.0690
Joint significance test		0.6054		0.6556		0.4832
Time-constant effect ($\delta_0=\delta_1=\delta_2=\delta_3$)	0.5788	0.1358	0.4483	0.3360	-0.4475	0.5998
Adjusted R^2	0.6703		0.6062		0.6362	
# of observations	1,100		690		410	
# of provinces	110		69		41	
# of regions	21		13		8	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The estimated coefficients of all the other regressors are available from the authors upon request. The estimated equations contain a full set of provincial indicators, the interactions between the provincial indicators and calendar year, year indicators, the female employment rate, the real GDP, the real GDP growth rate, and the constant.

^(a) See footnote ^(a) of Table 7.

Table B.4: Estimated effect of PSSSPI on the coverage rate, 2004-2010

	(i) Italy		(ii) Center-North		(iii) South	
	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value
<i>a) Dependent variable: coverage rate</i>						
$I_{rt} (\delta_0)$	0.0037 *	0.0670	0.0103 **	0.0454	0.0024	0.5666
$I_{rt+1} (\delta_1)$	0.0061 *	0.0534	0.0157 *	0.0684	0.0039	0.5724
$I_{rt+2} (\delta_2)$	0.0088 *	0.0922	0.0194 *	0.0914	0.0035	0.5616
$I_{rt+3} (\delta_3)$	0.0113 *	0.0848	0.0229	0.1032	0.0055	0.4960
Joint significance test		0.4874		** 0.0218		0.9542
<i>b) Dependent variable: fraction of municipalities with public early childcare services</i>						
$I_{rt} (\delta_0)$	0.5489	0.3684	0.6350	0.4830	-0.2740	0.7416
$I_{rt+1} (\delta_1)$	0.9417	0.3752	1.0919	0.5782	-1.4557	0.2074
$I_{rt+2} (\delta_2)$	1.9367	0.3082	2.0252	0.5152	-2.0036	0.1996
$I_{rt+3} (\delta_3)$	3.1123	0.1654	3.0192	0.5206	-1.3411	0.6342
Joint significance test		0.6386		0.9204		0.3408
# of observations	770		483		287	
# of provinces	110		69		41	
# of regions	21		13		8	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.

(a) See footnote ^(a) of Table 7.

focused on this outcome because this coverage rate definition has been officially used to define common targets across European countries, for example in the Barcelona European Council (CEU, 2002). However, since the population aged 0-2 is at the denominator of the dependent variable, one could wonder whether our findings are driven and biased by differential trends across regions in terms of fertility, especially after the onset of the Great Recession, which asymmetrically hit the Italian regions. There is indeed empirical evidence that the economic cycle affects fertility (Sobotka et al., 2011; Matysiak et al., 2018), and that the direction of the impact could also depend on the economic situation before downturns Davalos and Morales (2017). In order to isolate the program effect on the availability of public slots from the eventual spurious one induced by heterogeneous changes across regions in the fertility rate, especially after the onset of the Great Recession, in a fifth sensitivity analysis we use two different dependent variables: (a) the ratio between the availability of public slots at time t and the population aged 0-2 in 2004 (first year of observation); (b) the number of available slots at time t . Table B.5 reports the estimation results of the policy effect on these two new outcome measures. The estimated effects in panel (a) of Table B.5 are qualitatively identical to those obtained using the benchmark definition of the dependent variable. For Italy and for the Center-North, the impacts are even larger and more significant than those reported in Table 7. If we use the number of available slots as dependent variable, we find that the effect of the policy is very large and significantly different from zero in the Center-North. Considering that in the Center-North before the program, the average number of slots per province was

1,635, the policy effect after 3 or more years since the program start of about 1,440 slots implies an increase of about 88% relatively to the pre-program level. In the South there is no effect in the number of slots, in line with the nil impact found when using the benchmark outcome variable. These findings are supporting evidence that our baseline conclusions are not affected by spurious components due to differential trends across regions in fertility.

Table B.5: Estimated effect of PSSSPI on the coverage rate defined using the population aged 0-2 in 2004 and on the total number of available slots in the public early childhood education

	(i) Italy		(ii) Center-North		(iii) South			
	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value		
<i>a) Dependent variable: Ratio between the available slots and population aged 0-2 in 2004</i>								
$I_{rt} (\delta_0)$	0.0065	**	0.0208	0.0144	**	0.0196	0.0016	0.5944
$I_{rt+1} (\delta_1)$	0.0124	**	0.0108	0.0247	**	0.0278	0.0030	0.5932
$I_{rt+2} (\delta_2)$	0.0172	**	0.0144	0.0344	**	0.0280	0.0006	0.8342
$I_{rt+3} (\delta_3)$	0.0247	***	0.0096	0.0431	**	0.0328	0.0006	0.9130
Joint significance test		*	0.0846		**	0.0492		0.5722
<i>b) Dependent variable: Number of available slots</i>								
$I_{rt} (\delta_0)$	79.689		0.3000	312.548	**	0.0328	-10.041	0.7268
$I_{rt+1} (\delta_1)$	232.845	*	0.0732	660.028	**	0.0350	2.927	0.9418
$I_{rt+2} (\delta_2)$	367.009		0.1844	1,029.318	**	0.0184	-47.124	0.6960
$I_{rt+3} (\delta_3)$	528.348		0.1768	1,440.341	**	0.0208	-68.089	0.8016
Joint significance test			0.4600			0.3006		0.6178
# of observations	770			483			287	
# of provinces	110			69			41	
# of regions	21			13			8	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.

^(a) See footnote ^(a) of Table 7.

Sixth, we added as further controls the lags up to order three of the provincial real GDP growth rate. Since the period under analysis covers the years of the Great Recession and Italy was asymmetrically hit by the downturn from the geographical viewpoint, one might wonder whether this could imply time-varying heterogeneity confounding our findings. Although in the baseline model we control for the real GDP growth rate, it might be not enough if economic shocks have persistent effects on both the dependent variable and the implementation timing. Hence, by adding the lags of the real GDP growth rate, we control for different evolution over time of the economy across provinces. Table B.6 shows that the results are unchanged.

Seventh, we checked whether the results are sensitive to the inclusion of the five regressors describing the characteristics of politicians at municipal and regional level used in Section 4 to support Assumption 2). These variables could indeed determine both the implementation timing of the PSSSPI

Table B.6: Estimated effects of PSSSPI adding lags of the GDP growth rate to control for different evolution over time of the economy across provinces

	(i) Italy		(ii) Center-North		(iii) South			
	Coeff.	WCB ^(a) <i>p</i> value	Coeff.	WCB ^(a) <i>p</i> value	Coeff.	WCB ^(a) <i>p</i> value		
<i>a) Dependent variable: coverage rate</i>								
I_{rt} (δ_0)	0.0037	0.2472	0.0140	**	0.0148	0.0014	0.5622	
I_{rt+1} (δ_1)	0.0063	0.1092	0.0230	**	0.0350	0.0027	0.5508	
I_{rt+2} (δ_2)	0.0078	0.1270	0.0305	**	0.0364	0.0003	0.9450	
I_{rt+3} (δ_3)	0.0119	**	0.0392	0.0362	*	0.0612	0.0006	0.9022
Joint significance test		*	0.0992		**	0.0356		0.3322
<i>b) Dependent variable: fraction of municipalities with public early childcare services</i>								
I_{rt} (δ_0)	0.4049	0.3616	1.5149	**	0.0104	-0.9752	0.2760	
I_{rt+1} (δ_1)	0.8232	0.3422	2.8822	*	0.0746	-2.3478	* 0.0658	
I_{rt+2} (δ_2)	1.3482	0.3432	4.6804	*	0.0992	-3.8590	** 0.0446	
I_{rt+3} (δ_3)	2.3601	0.2344	5.7468		0.2534	-4.6183	** 0.0458	
Joint significance test		0.5360		**	0.0154		0.3972	
# of observations	1,100		690		410			
# of provinces	110		69		41			
# of regions	21		13		8			

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The estimated equations contain a full set of regional indicators, year indicators, the female employment rate, the real GDP, the real GDP growth rate, and the constant. We added lags of real GDP growth rate until the third order to control for different evolution over time of the economy across provinces.

^(a) See footnote ^(a) of Table 7.

and the level of attention towards the supply of public early childcare services. The point estimates in Table B.7 are very much in line with those from the baseline specification. We lose the statistical significance in the effects on the dependent variable of panel b), but it may be a consequence of adding covariates that vary at regional level with almost nil explanatory power.

Table B.7: Estimated effects of PSSSPI controlling for politicians' characteristics

	(i) Italy		(ii) Center-North		(iii) South			
	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value		
<i>a) Dependent variable: coverage rate</i>								
$I_{rt}(\delta_0)$	0.0045	0.1290	0.0138	**	0.0126	0.0021	0.5568	
$I_{rt-1}(\delta_1)$	0.0066	*	0.0882	0.0224	**	0.0172	0.0039	0.4260
$I_{rt-2}(\delta_2)$	0.0077	0.1314	0.0296	**	0.0236	0.0016	0.6172	
$I_{rt-3}(\delta_3)$	0.0112	*	0.0680	0.0353	**	0.0302	0.0014	0.6796
Joint significance test	**	0.0418	**	0.0250	**	0.0250	0.2504	
<i>b) Dependent variable: fraction of municipalities with public early childcare services</i>								
$I_{rt}(\delta_0)$	0.4802	0.3994	1.1494	0.1336	-0.896	0.3840		
$I_{rt-1}(\delta_1)$	0.6388	0.5642	2.3314	0.2056	-2.354	0.2576		
$I_{rt-2}(\delta_2)$	0.7938	0.6218	4.0641	0.1462	-3.983	0.1298		
$I_{rt-3}(\delta_3)$	1.2084	0.5394	5.2558	0.2054	-5.104	0.1310		
Joint significance test		0.6072		0.5304		0.6296		
# of observations	1,100		690		410			
# of provinces	110		69		41			
# of regions	21		13		8			

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The estimated equations contain the constant, a full set of regional indicators, year indicators, the female employment rate, the real GDP, the real GDP growth rate, the fraction of female politicians in the regional government, the fraction of graduated politicians in the regional government, the regional fraction of female mayors, the regional fraction of female politicians in the municipal government, and the regional fraction of graduated politicians in the municipal government.

^(a) See footnote ^(a) of Table 7.

Finally, we replaced the female employment rate, which was included in the model as a time-varying covariate, with its 2006 value. Indeed, one might wonder whether the female employment rate could be an outcome of the treatment itself and, therefore, be a “bad control”. The estimation results are unaffected, as shown by Table B.8.

Table B.8: Estimated effects of PSPPPI replacing the female employment rate with the 2006 female employment rate as control

	(i) Italy		(ii) Center-North		(iii) South	
	Coeff.	WCB ^(a) p-value	Coeff.	WCB ^(a) p-value	Coeff.	WCB ^(a) p-value
<i>a) Dependent variable: coverage rate</i>						
$I_{rt} (\delta_0)$	0.0049 *	0.0804	0.0125 **	0.0198	0.0199	0.6500
$I_{rt+1} (\delta_1)$	0.0090 **	0.0382	0.0211 **	0.0290	0.0041	0.5566
$I_{rt+2} (\delta_2)$	0.0122 **	0.0310	0.0267 **	0.0382	0.0032	0.6282
$I_{rt+3} (\delta_3)$	0.0169 ***	0.0066	0.0295 *	0.0656	0.0046	0.5912
Joint significance test	***	0.0084		0.1956		0.4912
<i>b) Dependent variable: fraction of municipalities with public early childcare services</i>						
$I_{rt} (\delta_0)$	0.7037	0.2072	1.0283	0.2140	-0.6830	0.4630
$I_{rt+1} (\delta_1)$	1.5726	0.1490	2.2650	0.2482	-1.6453	0.2780
$I_{rt+2} (\delta_2)$	2.5667	0.1156	3.5001	0.2788	-2.3913	0.1278
$I_{rt+3} (\delta_3)$	3.6785 *	0.0608	3.3670	0.4556	-2.6370 *	0.0782
Joint significance test		0.4142		0.7408		0.4132
# of observations	1,100		690		410	
# of provinces	110		69		41	
# of regions	21		13		8	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The estimated equations contain a full set of regional indicators, year indicators, the 2006 female employment rate, the real GDP, the real GDP growth rate, and the constant.

^(a) See footnote ^(a) of Table 7.

C Full set of estimation results of the benchmark models

Table C.1: Full set of results of the estimates reported in panel a) of Table 7

	(i) Italy		(ii) Center-North		(iii) South	
	Coeff.	Std. Err. ^(a)	Coeff.	Std. Err. ^(a)	Coeff.	Std. Err. ^(a)
<i>Program implementation impact</i>						
$I_{rt} (\delta_0)$	0.0042 *	0.0021	0.0141 ***	0.0022	0.0016	0.0024
$I_{rt+1} (\delta_1)$	0.0071 **	0.0028	0.0232 ***	0.0044	0.0030	0.0041
$I_{rt+2} (\delta_2)$	0.0090 **	0.0040	0.0307 ***	0.0058	0.0008	0.0044
$I_{rt+3} (\delta_3)$	0.0136 **	0.0050	0.0365 ***	0.0079	0.0013	0.0046
<i>Region - Reference: Piemonte (Campania in model iii)</i>						
Valle d'Aosta	0.0098 ***	0.0026	0.0051	0.0050	–	–
Lombardia	-0.0348 ***	0.0014	-0.0331 ***	0.0021	–	–
Province of Trento	0.0225 ***	0.0008	0.0195 ***	0.0014	–	–
Veneto	-0.0481 ***	0.0012	-0.0482 ***	0.0022	–	–
Fiuli-Venezia Giulia	0.0019	0.0013	0.0025	0.0016	–	–
Liguria	0.0129 ***	0.0031	0.0168 ***	0.0051	–	–
Emilia-Romagna	0.0694 ***	0.0032	0.0625 ***	0.0058	–	–
Toscana	0.0432 ***	0.0022	0.0455 ***	0.0033	–	–
Umbria	0.0008	0.0031	0.0046	0.0049	–	–
Marche	0.0074 ***	0.0025	0.0098 **	0.0036	–	–
Lazio	-0.0229 **	0.0095	-0.0092	0.0177	–	–
Abruzzo	-0.0224 **	0.0096	–	–	0.0395 ***	0.0065
Molise	-0.0464 ***	0.0138	–	–	0.0087 *	0.0042
Campania	-0.0457 **	0.0203	–	–	–	–
Puglia	-0.0271	0.0222	–	–	0.0132 ***	0.0029
Basilicata	-0.0118	0.0179	–	–	0.0355 ***	0.0025
Calabria	-0.0396 *	0.0216	–	–	0.0001	0.0034
Sicilia	0.0042	0.0225	–	–	0.0434 ***	0.0034
Sardegna	-0.0095	0.0144	–	–	0.0437 ***	0.0036
Province of Bolzano	-0.0720 ***	0.0046	-0.0759 ***	0.0075	–	–
<i>Year - Reference: 2004</i>						
2005	0.0019 *	0.0010	0.0020	0.0014	0.0006	0.0012
2006	0.0002	0.0015	-0.0012	0.0026	0.0011	0.0019
2007	0.0010	0.0022	-0.0049	0.0041	0.0029 *	0.0012
2008	-0.0018	0.0033	-0.0176 **	0.0064	0.0021	0.0018
2009	-0.0005	0.0033	-0.0196 **	0.0068	0.0013	0.0027
2010	-0.0020	0.0041	-0.0242 ***	0.0079	0.0014	0.0037
2011	-0.0046	0.0053	-0.0272 **	0.0095	0.0020	0.0045
2012	-0.0082	0.0062	-0.0311 **	0.0110	0.0015	0.0049
2013	-0.0088	0.0060	-0.0321 **	0.0111	0.0004	0.0048
Female employment rate	0.0022	0.0008	0.0033 **	0.0014	0.0007	0.0006
Real GDP	0.0000	0.0000	0.0000 ***	0.0000	0.0000	0.0000
Real GDP growth rate	-0.0045 ***	0.0009	-0.0045 ***	0.0010	-0.0165	0.0112
Constant	0.0967 ***	0.0053	0.0891 ***	0.0089	0.0245 **	0.0099
# of observations	1,100		690		410	
# of provinces	110		69		41	
# of regions	21		13		8	
R^2	0.7472		0.6062		0.6374	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.

^(a) CRVE standard errors.

Table C.2: Full set of results of the estimates reported in panel b) of Table 7

<i>Program implementation impact</i>								
I_{rt} (δ_0)	0.4709		0.3941	1.5257	***	0.3207	-0.8537	0.8849
I_{rt+1} (δ_1)	0.9376		0.7482	2.9067	**	1.1251	-2.1272	1.5314
I_{rt+2} (δ_2)	1.5138		1.2083	4.7168	**	1.8375	-3.5341	1.9283
I_{rt+3} (δ_3)	2.5969		1.5969	5.7887		3.2579	-4.1795	* 1.7994
<i>Region - Reference: Piemonte (Campania in model iii)</i>								
Valle d'Aosta	7.2917	***	1.0857	6.2329	***	1.8608	-	-
Lombardia	10.9096	***	1.0174	11.2804	***	1.0827	-	-
Province of Trento	1.8288	***	0.3590	1.3385	*	0.7144	-	-
Veneto	9.5568	***	0.4680	9.7397	***	0.8100	-	-
Fiuli-Venezia Giulia	27.8989	***	0.8271	28.0720	***	0.9731	-	-
Liguria	11.5574	***	1.4586	12.4832	***	2.2911	-	-
Emilia-Romagna	43.6658	***	1.3414	42.2540	***	2.4831	-	-
Toscana	35.8783	***	1.0995	36.4537	***	1.5919	-	-
Umbria	22.0345	***	1.4531	22.9554	***	2.2565	-	-
Marche	23.5789	***	1.3358	24.1743	***	1.8363	-	-
Lazio	9.9240	**	3.6457	13.3290	*	6.7429	-	-
Abruzzo	9.5930	**	4.2838	-	-	-	3.7809	4.2048
Molise	3.8701		6.1729	-	-	-	-3.3463	3.9446
Campania	9.8450		8.3667	-	-	-	-	-
Puglia	26.7178	**	9.4095	-	-	-	15.3887	*** 1.1349
Basilicata	16.3524	**	7.7959	-	-	-	6.8850	** 2.8440
Calabria	12.2684		9.3321	-	-	-	0.5058	2.1250
Sicilia	40.9236	***	9.5818	-	-	-	29.1887	*** 1.4249
Sardegna	12.5468	*	6.3861	-	-	-	4.5589	3.7753
Province of Bolzano	-0.0347		2.0136	-1.2238		3.1782	-	-
<i>Year - Reference: 2004</i>								
2005	0.6366	***	0.1485	0.5697	***	0.1504	0.4752	* 0.2212
2006	0.0551		0.4520	-0.2861		0.8627	0.3012	0.3216
2007	0.7381		0.8015	-0.2246		1.5958	1.2276	* 0.6425
2008	2.0355	**	0.9173	0.5635		2.2377	1.7996	* 0.9292
2009	1.7834	**	0.7555	-0.3272		2.4887	2.0797	1.1572
2010	0.9460		1.2162	-1.8812		3.4985	3.1972	* 1.6015
2011	-0.5816		1.6437	-3.3286		4.3644	3.4749	* 1.6767
2012	-1.5470		2.2521	-4.4315		5.0596	3.8195	* 1.6224
2013	-1.5183		2.1167	-4.4546		4.9316	3.6686	** 1.4026
Female employment rate	0.7115	**	0.3364	0.9875		0.5826	0.3279	* 0.1727
Real GDP	0.0002		0.0001	0.0002		0.0001	0.0000	0.0002
Real GDP growth rate	0.0185		0.2867	0.1009		0.3311	-8.6603	10.4441
Constant	6.4549	***	2.0633	4.3053		3.4927	9.3406	** 3.4584
# of observations		1,100			690			410
# of provinces		110			69			41
# of regions		21			13			8
R^2		0.6826			0.6240			0.6608

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.

(a) CRVE standard errors.

Table C.3: Full set of estimation results of those reported in panel a) of Table 10 (provincial capitals, impact on coverage rate)

	(i) Italy		(ii) Center-North		(iii) South	
	Coeff.	Std. Err. ^(a)	Coeff.	Std. Err. ^(a)	Coeff.	Std. Err. ^(a)
<i>Program implementation impact</i>						
$I_{rt} (\delta_0)$	0.0063	0.0046	0.0205 ***	0.0058	0.0038 *	0.0018
$I_{rt+1} (\delta_1)$	0.0144 **	0.0060	0.0346 ***	0.0090	0.0180 **	0.0052
$I_{rt} + 2 (\delta_2)$	0.0144 *	0.0080	0.0423 ***	0.0112	0.0124	0.0105
$I_{rt} + 3 (\delta_3)$	0.0196	0.0119	0.0564 ***	0.0127	0.0091	0.0162
<i>Region - Reference: Piemonte (Campania in model iii)</i>						
Valle d'Aosta	-0.0256 ***	0.0060	-0.0357 ***	0.0081	–	–
Lombardia	-0.0123 ***	0.0025	-0.0083 **	0.0033	–	–
Province of Trento	0.0874 ***	0.0017	0.0823 ***	0.0021	–	–
Veneto	-0.0501 ***	0.0031	-0.0490 ***	0.0036	–	–
Fiuli-Venezia Giulia	-0.0399 ***	0.0020	-0.0388 ***	0.0023	–	–
Liguria	-0.0019	0.0063	0.0061	0.0080	–	–
Emilia-Romagna	0.0465 ***	0.0069	0.0331 ***	0.0092	–	–
Toscana	0.0194 ***	0.0041	0.0241 ***	0.0051	–	–
Umbria	-0.0448 ***	0.0062	-0.0369 ***	0.0078	–	–
Marche	-0.0354 ***	0.0046	-0.0306 ***	0.0056	–	–
Lazio	-0.0198	0.0219	0.0108	0.0286	–	–
Abruzzo	-0.0420 **	0.0199	–	–	0.0512	0.0279
Molise	-0.0902 ***	0.0287	–	–	-0.0124	0.0121
Campania	-0.0586	0.0438	–	–	–	–
Puglia	-0.0617	0.0473	–	–	-0.0118	0.0125
Basilicata	-0.0096	0.0376	–	–	0.0542 ***	0.0047
Calabria	-0.0869 *	0.0457	–	–	-0.0367 **	0.0135
Sicilia	-0.0180	0.0478	–	–	0.0302 *	0.0144
Sardegna	0.0120	0.0299	–	–	0.0876 ***	0.0104
Province of Bolzano	-0.2111 ***	0.0097	-0.2206 ***	0.0122	–	–
<i>Year - Reference: 2004</i>						
2005	0.0033	0.0028	0.0058	0.0042	-0.0031	0.0030
2006	0.0001	0.0036	-0.0012	0.0044	-0.0015	0.0082
2007	0.0025	0.0048	-0.0054	0.0064	0.0020	0.0069
2008	-0.0101	0.0080	-0.0341 ***	0.0109	-0.0056	0.0116
2009	-0.0043	0.0080	-0.0302 **	0.0124	-0.0080	0.0116
2010	-0.0077	0.0089	-0.0381 **	0.0141	-0.0153	0.0107
2011	-0.0047	0.0124	-0.0428 **	0.0169	-0.0040	0.0144
2012	-0.0141	0.0139	-0.0533 ***	0.0162	-0.0078	0.0181
2013	-0.0099	0.0140	-0.0498 **	0.0162	-0.0047	0.0199
Female employment rate	0.0031 *	0.0017	0.0055 **	0.0022	0.0003	0.0027
Real GDP	0.0000 **	0.0000	0.0000 *	0.0000	0.0000	0.0000
Real GDP growth rate	-0.0119 ***	0.0014	-0.0115 ***	0.0010	-0.0883	0.0648
Constant	0.1680 ***	0.0118	0.1514 ***	0.0157	0.0608	0.0516
# of observations	1,100		690		410	
# of provinces	110		69		41	
# of regions	21		13		8	
R^2	0.5195		0.3352		0.4075	

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.
^(a) CRVE standard errors.

Table C.4: Full set of estimation results of those reported in panel b) of Table 10 (provinces without their capitals, impact on coverage rate)

	(i) Italy		(ii) Center-North		(iii) South			
	Coeff.	Std. Err. ^(a)	Coeff.	Std. Err. ^(a)	Coeff.	Std. Err. ^(a)		
<i>Program implementation impact</i>								
$I_{rt} (\delta_0)$	0.0042	**	0.0015	0.0110	***	0.0022	0.0015	0.0034
$I_{rt+1} (\delta_1)$	0.0064	**	0.0023	0.0174	***	0.0037	-0.0006	0.0047
$I_{rt+2} (\delta_2)$	0.0083	**	0.0034	0.0227	***	0.0062	-0.0038	0.0051
$I_{rt+3} (\delta_3)$	0.0123	***	0.0041	0.0237	**	0.0092	-0.0032	0.0048
<i>Region - Reference: Piemonte (Campania in model iii)</i>								
Valle d'Aosta	0.0180	***	0.0027	0.0145	**	0.0050	-	-
Lombardia	-0.0202	***	0.0022	-0.0187	***	0.0027	-	-
Province of Trento	0.0128	***	0.0009	0.0112	***	0.0019	-	-
Veneto	-0.0381	***	0.0012	-0.0376	***	0.0019	-	-
Fiuli-Venezia Giulia	0.0209	***	0.0018	0.0212	***	0.0021	-	-
Liguria	0.0052		0.0033	0.0078		0.0054	-	-
Emilia-Romagna	0.0651	***	0.0032	0.0607	***	0.0064	-	-
Toscana	0.0417	***	0.0024	0.0432	***	0.0036	-	-
Umbria	0.0129	***	0.0033	0.0155	**	0.0053	-	-
Marche	0.0211	***	0.0029	0.0226	***	0.0041	-	-
Lazio	-0.0247	**	0.0089	-0.0142		0.0172	-	-
Abruzzo	-0.0129		0.0099	-		-	0.0291	***
Molise	-0.0341	**	0.0141	-		-	0.0064	
Campania	-0.0290		0.0198	-		-	-	-
Puglia	-0.0133		0.0220	-		-	0.0153	***
Basilicata	-0.0149		0.0180	-		-	0.0198	***
Calabria	-0.0219		0.0217	-		-	0.0073	***
Sicilia	0.0169		0.0224	-		-	0.0452	***
Sardegna	-0.0225		0.0147	-		-	0.0159	***
Province of Bolzano	-0.0305	***	0.0046	-0.0337	***	0.0074	-	-
<i>Year - Reference: 2004</i>								
2005	0.0029	***	0.0010	0.0032	**	0.0013	0.0018	0.0011
2006	0.0014		0.0018	0.0005		0.0031	0.0017	0.0010
2007	0.0020		0.0025	-0.0024		0.0052	0.0036	**
2008	0.0022		0.0030	-0.0074		0.0072	0.0030	0.0020
2009	0.0015		0.0029	-0.0102		0.0085	0.0021	0.0031
2010	0.0001		0.0040	-0.0126		0.0110	0.0051	0.0046
2011	-0.0035		0.0050	-0.0132		0.0142	0.0041	0.0052
2012	-0.0060		0.0061	-0.0161		0.0156	0.0048	0.0052
2013	-0.0086		0.0059	-0.0193		0.0158	0.0029	0.0046
Female employment rate	0.0020	**	0.0008	0.0028	*	0.0014	0.0011	**
Real GDP	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000
Real GDP growth rate	-0.0019	*	0.0009	-0.0017		0.0011	-0.0129	0.0141
Constant	0.0679	***	0.0045	0.0615	***	0.0078	0.0238	**
# of observations	1,100		690		410			
# of provinces	110		69		41			
# of regions	21		13		8			
R^2	0.6898		0.5347		0.4811			

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.
^(a) CRVE standard errors.

Table C.5: Full set of estimation results of those reported in panel c) of Table 10 (provinces without their capitals, impact on fractions of municipalities with public early childcare services)

<i>Program implementation impact</i>								
I_{rt} (δ_0)	0.5692		0.3892	1.5551	***	0.2654	-0.9758	0.8549
I_{rt+1} (δ_1)	1.1583		0.7589	3.0041	**	1.1982	-2.4007	1.4312
I_{rt+2} (δ_2)	1.6973		1.2928	4.9134	**	2.0199	-4.3618	** 1.7649
I_{rt+3} (δ_3)	2.8339		1.7679	6.1139		3.5550	-5.2281	** 1.6546
<i>Region - Reference: Piemonte (Campania in model iii)</i>								
Valle d'Aosta	6.6913	***	1.1176	5.7243	**	1.9398	-	-
Lombardia	10.9467	***	1.0296	11.3136	***	1.0997	-	-
Province of Trento	2.0855	***	0.3780	1.6126	*	0.7464	-	-
Veneto	9.3527	***	0.4760	9.4816	***	0.8491	-	-
Fiuli-Venezia Giulia	26.6548	***	0.8409	26.7835	***	0.9881	-	-
Liguria	11.2163	***	1.4996	12.0073	***	2.3645	-	-
Emilia-Romagna	42.8141	***	1.3956	41.5270	***	2.5799	-	-
Toscana	33.8383	***	1.1265	34.3244	***	1.6364	-	-
Umbria	21.4662	***	1.4934	22.2573	***	2.3280	-	-
Marche	22.9234	***	1.3658	23.4189	***	1.8823	-	-
Lazio	10.4748	**	3.7705	13.4819	*	7.0274	-	-
Abruzzo	10.4047	**	4.4206	-	-	-	1.9233	3.9417
Molise	4.8311		6.3523	-	-	-	-4.1060	3.5526
Campania	12.4107		8.6679	-	-	-	-	-
Puglia	26.4643	**	9.7246	-	-	-	13.4897	*** 0.8557
Basilicata	17.4517	**	8.0400	-	-	-	6.4219	** 2.4693
Calabria	14.5717		9.6365	-	-	-	1.4465	1.7036
Sicilia	42.4814	***	9.8997	-	-	-	29.2509	*** 1.0849
Sardegna	11.3298		6.5805	-	-	-	1.5111	3.3921
Province of Bolzano	0.2974		2.0702	-0.6876		3.2897	-	-
<i>Year - Reference: 2004</i>								
2005	0.6869	***	0.1680	0.5874	***	0.1586	0.6228	* 0.2716
2006	0.0110		0.4681	-0.3202		0.8938	0.2542	0.2305
2007	0.4738		0.7608	-0.2815		1.6015	0.6985	** 0.2823
2008	1.8014	**	0.8592	0.6346		2.2341	1.2394	* 0.5717
2009	1.5456	**	0.7209	-0.2754		2.6163	1.7231	** 0.7114
2010	0.7483		1.2178	-1.9481		3.7244	3.3153	** 1.2187
2011	-0.8543		1.7330	-3.5515		4.6355	3.9454	** 1.3074
2012	-1.9365		2.3812	-4.6858		5.3953	4.2085	*** 1.0122
2013	-1.9759		2.2658	-4.6991		5.2579	3.9976	*** 0.8897
Female employment rate	0.8137	**	0.3476	1.0556		0.6042	0.5140	** 0.1714
Real GDP	0.0002	*	0.0001	0.0002		0.0001	0.0001	0.0002
Real GDP growth rate	0.0257		0.2945	0.1370		0.3402	-10.5720	7.2068
Constant	5.0224	**	2.1863	2.9895		3.7194	12.0361	*** 3.3690
# of observations		1,100			690			410
# of provinces		110			69			41
# of regions		21			13			8
R^2		0.6843			0.6114			0.6768
# of observations		1,100			690			410
# of provinces		110			69			41
# of regions		21			13			8
R^2		0.6843			0.6114			0.6768

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%.
(a) CRVE standard errors.

D Other estimation results

Table D.1: Estimated effect of PSSSPI on small urban areas

	(i)		(ii)		(iii)		(iv)		
	Italy		Center-North		South		Significance test of difference (ii)-(iii)		
	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value	Coeff.	WCB ^(a) <i>p</i> -value	WCB ^(a) <i>p</i> -value		
<i>a) Municipalities ≤ 10,000 inhabitants in 2004</i>									
<i>Dependent variable: coverage rate</i>									
$I_{rt} (\delta_0)$	0.0047	**	0.0414	0.0131	**	0.0156	0.0002	0.9488	0.0030
$I_{rt+1} (\delta_1)$	0.0080	*	0.0628	0.0230	**	0.0274	-0.0017	0.7790	0.0032
$I_{rt+2} (\delta_2)$	0.0117	*	0.0512	0.0318	**	0.0352	-0.0047	0.6302	0.0054
$I_{rt+3} (\delta_3)$	0.0182	**	0.0178	0.0353	*	0.0504	-0.0042	0.6600	0.0158
Joint significance test		*	0.0842		**	0.0407		0.2156	0.0394
<i>b) Municipalities ≤ 10,000 inhabitants in 2004</i>									
<i>Dependent variable: fraction of municipalities with public early childcare services</i>									
$I_{rt} (\delta_0)$	1.2452	**	0.0324	1.8511	***	0.0038	-0.4729	0.5522	0.0004
$I_{rt+1} (\delta_1)$	2.3773	*	0.0534	3.7332	*	0.0820	-1.3963	0.3354	0.0282
$I_{rt+2} (\delta_2)$	3.5541	*	0.0720	6.2475		0.1032	-2.4548	* 0.0818	0.0300
$I_{rt+3} (\delta_3)$	5.1180	*	0.0724	8.0510		0.2138	-3.1836	** 0.0322	0.0770
Joint significance test			0.1764			0.1066		0.3652	0.0752
<i>c) Municipalities ≤ 500 inhabitants per square kilometre in 2004</i>									
<i>Dependent variable: coverage rate</i>									
$I_{rt} (\delta_0)$	0.0032		0.1150	0.0118	***	0.0096	-0.0006	0.7336	0.0006
$I_{rt+1} (\delta_1)$	0.0043		0.1404	0.0172	**	0.0120	-0.0019	0.6474	0.0026
$I_{rt+2} (\delta_2)$	0.0055		0.1938	0.0213	**	0.0166	-0.0045	0.4238	0.0028
$I_{rt+3} (\delta_3)$	0.0089	*	0.0760	0.0229	*	0.0592	-0.0035	0.6588	0.0128
Joint significance test		**	0.0496		*	0.0588		0.4712	0.0354
<i>d) Municipalities ≤ 500 inhabitants per square kilometre in 2004</i>									
<i>Dependent variable: fraction of municipalities with public early childcare services</i>									
$I_{rt} (\delta_0)$	0.6270		0.1984	1.7347	***	0.0008	-0.6987	0.4158	0.0012
$I_{rt+1} (\delta_1)$	1.1112		0.1774	3.0770	**	0.0384	-1.9680	0.1716	0.0106
$I_{rt+2} (\delta_2)$	1.8332		0.1712	4.8736	**	0.0466	-2.9943	* 0.0838	0.0074
$I_{rt+3} (\delta_3)$	2.9219		0.1346	5.9551		0.1594	-3.6236	* 0.0588	0.0298
Joint significance test			0.3790		**	0.0176		0.4198	0.1594
# of observations	1,100		690		410				
# of provinces	110		69		41				
# of regions	21		13		8				

Notes: *** Significant at 1%; ** significant at 5%; * significant at 10%. The estimated equations contain a full set of regional indicators, year indicators, the female employment rate, the real GDP, the real GDP growth rate, and the constant.

^(a) See footnote ^(a) of Table 7.