Policy Research Working Paper 10638

Preparatory School Years and Maternal Employment in Romania

Monica Robayo-Abril
Britta Rude

WORLD BANK GROUP
Poverty and Equity Global Practice
December 2023

Policy Research Working Paper 10638

Abstract

This paper uses the introduction of preparatory school classes targeting six-year-old children in Romania to study whether universal, compulsory, public care provision could increase female employment. Results from difference-in-difference estimations show that the reform resulted in rising employment rates for mothers of six-year-old children. The effect is lower for mothers living in households with elderly people, but larger for those facing stronger trade-offs prior to the reform. Overall, investing in universal, compulsory, public childcare is beneficial and could significantly increase female employment and labor force participation rates.

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Preparatory School Years and Maternal Employment in Romania*

Monica Robayo-Abril† and Britta Rude‡

Keywords: Government Policy; Childcare; Economics of Gender; Public Policy; Time Allocation and Labor Supply

JEL Codes: I28, J13, J16, J18, J22

*We thank Reena Badiani-Magnusson, Anna Fruttero and Miriam Muller for valuable comments and suggestions.

†Senior Economist, World Bank Poverty and Equity Global Practice

‡Young Professional, World Bank Poverty and Equity Global Practice

1 Introduction

One of the biggest puzzles still to solve is how to address the persistently low labor force participation among women, especially among women with children. Globally, not even half of the women above 15 years old participate in the labor market (World Bank 2023). Compared to 20 years ago, the average female labor force participation rate has even declined globally and the gap relative to male labor force participation rates remains significant, standing at a female-to-male labor force participation ratio of 65 percent. A large body of literature explains the stagnating progress in female labor force participation via a child penalty (example studies are by Kleven, Landais, and Søgaard (2019); Lundborg, Plug, and Rasmussen (2017); Blundell et al. (2016); Agüero and Marks (2008)).

Several researchers have studied the impact of potential policies to address the gender gap in labor force participation, such as tax credits in the UK (Blundell et al. 2016) or the US (Bastian 2020), changes in parental leave policies (Tamm (2019); Bergemann and Riphahn (2010); Baker and Milligan (2010)), or the introduction of universal childcare (Baker, Gruber, and Milligan (2008); Lefebvre, Merrigan, and Verstraete (2009); Havnes and Mogstad (2011); Havnes and Mogstad (2015); Bauernschuster and Schlotter (2015); Herbst (2017)). However, to date, it is not clear which policy options are most effective in increasing women's participation in the labor market. Furthermore, since results differ across countries and time periods studied, the contextual attributes that feed into policy impacts require further examination.

In this paper, we explore the introduction of pre-primary, compulsory, preparatory classes in Romania for children aged six years old, to study the impact of childcare services provided by the government on maternal labor supply. We argue that the policy, which was introduced in 2012, resulted in a natural subsidy for childcare by the government, potentially liberating the time constraints of primary caregivers. Based on this rationale, the reform allows us to test one of the principles of the economic theory on maternal labor supply, which centers around households allocating time between childcare and labor (Fong and Lokshin (1999); Ho

and Pavoni (2020)). We expect positive effects of the policy on the labor force participation rate of mothers of children aged six years old.

To estimate the impact of the reform, we apply a difference-in-difference estimation strategy and use mothers of three- to four-year-old children as our control group. We rely on data from the European Labor Force Survey (EU-LFS), which contains information on labor market outcomes and allows us to identify the age of the youngest child in each household as well as the mother of each child in each household. We only have access to data from 2010 to 2019, which limits our analysis of parallel trends.

We find that the 2012 reform led to an increase in the maternal labor supply of affected children by 2.6 to 4.1 percentage points. Results from a triple difference-in-difference estimation strategy that relies on information on children's average participation in pre(primary) classes are less stable than our difference-in-difference estimators, probably driven by low sample sizes.

Women who previously experienced more severe restrictions to labor market opportunities, by living in rural areas, caring for additional children, being self-employed, or having greater economic safety due to the presence of a spouse or employed member in the household, report larger effects. Women living with an elderly person experience lower effects, but the difference is insignificant.

We also show that the probability of working part-time increased among women affected by the reform. This result is not surprising given that preparatory classes only took place in the morning. Consequently, the reform only represents a partial substitution of the care responsibilities endured by the primary caregiver. Nevertheless, the average number of hours usually worked during the week slightly increased. So did the average gross employee cash or near cash income. Future research should disentangle if these income increases are mainly driven by mothers entering the workforce, or if there was also a parallel increase in existing earnings.

Romania is an interesting setting for the underlying question, given that gender gaps in

labor force participation rates are significantly larger than in most European countries.[1] In addition, the country registered increasing gender gaps over the last 20 years, mainly driven by declining female labor force participation rates, while the European Union (EU) on average reported decreasing gender gaps in labor force participation (World Bank 2023). In addition, female labor force participation is among the lowest in the EU. There are also signs of gender norms around childcare usage that could deteriorate female labor market participation. According to data from the World Value Survey (2018) 37.2 percent of Romanians thought that a preschool child with a working mother suffers.

While these trends already make for an interesting country setup, Romania is also an interesting case given its communist past and its long history of centralized public planning. In the pre-transition period, Romania registered one of the highest female labor force participation rates in the world, also driven by a wide range of childcare programs subsidized by the government (Fong and Lokshin 1999). The availability of public childcare services dropped significantly in the post-transition period and in 2020 the share of households with children below six years old that relied on these services was less than 1 percent (EU-SILC 2020).[2]

Our setting provides a clean policy setup to study the underlying research question. We find no evidence of confounding policies or trends that affected maternal employment of six-year-olds differently from the one of three- to four-year-olds. While the government introduced several policies that potentially impacted employment decisions, it is unlikely that these policies resulted in different dynamics between mothers of six-year-olds and those of three to four-year-old children.

Our paper contributes to the economic literature studying drivers behind female labor force participation and employment. Next to the literature analyzing the impact of universal childcare, our work is closely related to a number of papers studying childcare subsidies

[1] In 2021, Romania's female-to-male labor force participation ratio stood at 66 percent, compared to the EU average of 81 percent (World Bank 2023)

[2] We define public childcare service as the share of households with children younger than six years old who spent at least one hour in center-based or day-care centers.

and costs. Connelly (1992) demonstrates that rising childcare costs significantly decrease maternal labor force participation. Similarly, Herbst and Barnow (2008) show that childcare accessibility in terms of geographic availability significantly influences female labor force participation. The other way around, Haan and Wrohlich (2011) demonstrate that increasing childcare subsidies increases female labor supply and fertility. In line with this evidence, Bratti, Frattini, and Scervini (2018) illustrate that greater availability of grandparents for childcare results in an increase of maternal labor supply, as does full-time public childcare for 3-year-olds (Nollenberger and Rodríguez-Planas 2015). Givord and Marbot (2015) explore a French reform that expanded childcare subsidies and find rising maternal labor force participation rates, especially among mothers with large families. We argue that our paper connects to this literature as the 2012 educational reform is equivalent to a public subsidy of childcare.

Furthermore, we make an important contribution to the current state of the literature, which mainly focuses on developed countries, by analyzing the impact of reform in a country with a communist history. It is interesting to analyze if the effects on maternal employment differ between these country settings. Our results show that the impact is in line with previous findings, showing mainly positive effects on maternal employment and labor force participation. Similar to previous papers, we also generate evidence that public childcare might crowd out some of the informal childcare services applied previously to the reform.

Our paper is most closely related to work by Fitzpatrick (2010) who explores the introduction of universal preschool in three states in the United States to study the impact of childcare on maternal labor supply. In contrast to our findings, she demonstrates negligible impacts on maternal labor supply. These differences could be due to the compulsory setup in the case of Romania, as well as due to age differences in targeted children. Children targeted in the case of Romania were older than the ones affected by the US reform.

In addition, our work is related to previous studies analyzing the impact of children on the labor market outcomes of women. To name some examples, Hardoy, Schøne, and

Østbakken (2017) show that the within-couple gender gap in management positions increases significantly with the arrival of the firstborn child. Angelov, Johansson, and Lindahl (2016) generate similar evidence for the within-couple gender gap in earnings. More recently, the literature on the impacts of the COVID-19 pandemic has discussed the influence of unequal care distribution on unequal employment outcomes for men and women (Alon et al. (2020); Del Boca et al. (2020); Farré et al. (2020)). We confirm this line of evidence by showing that care responsibilities might indeed reduce female labor force participation and employment, and that addressing this trade-off results in an increase in maternal employment rates.

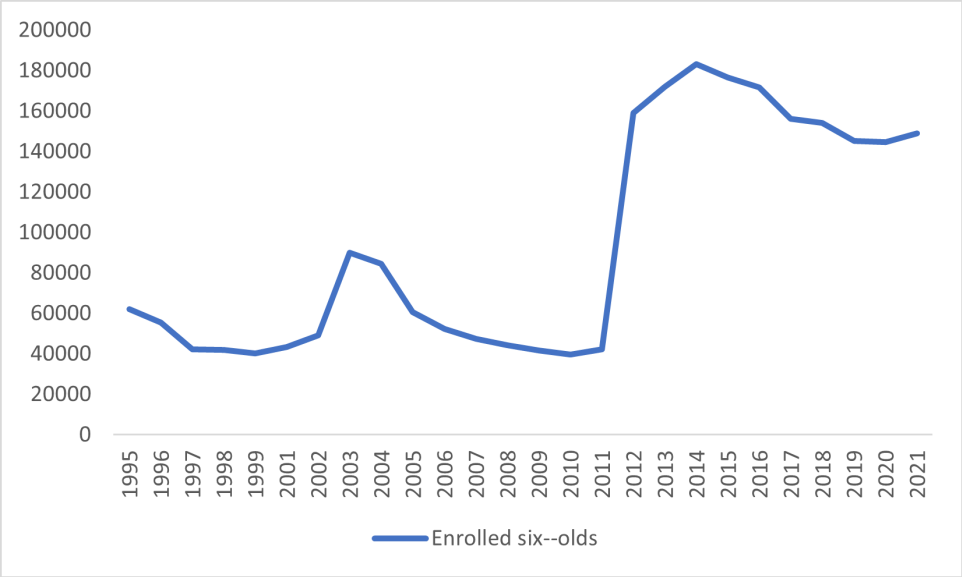
2 Institutional Background and Program Description

Pre-primary education is voluntary in Romania. Compulsory education traditionally started at the age of seven with the start of primary school (Ministry of Education 2016). Children had to be seven years old by the start of the school year or by the end of the given calendar year if their level of development was appropriate. In 2012, the Romanian government introduced a preparatory school year into its primary education system to better customize and prepare children for school. From then onwards, children who turn six years old by the beginning of the school year have to be enrolled in preparatory classes. Children who turn six by the end of the given calendar year can participate in these classes by request of their parents if they show appropriate socio-emotional development levels.[3]

Most preparatory classes take place within school buildings and during the morning (Langa 2015). According to research by Langa (2015), the program resulted in children being better prepared for primary education and improved equal access to and opportunities within the schooling system in Romania, independent of children's origin (Langa 2015). Figure 1 plots the number of enrolled six-year-old children and demonstrates that the policy

[3]We take this possibility into account by conducting a robustness test and including children who are five years old in the treatment group. In this robustness test, we additionally include children who are seven years old in the treatment group because they could potentially have been six years old when the school year started.

Figure 1: Number of enrolled six-year-old over time



Notes: The figure plots the number of enrolled six-year-old children in primary education over time. The reform was introduced in 2012. Source: Administrative data published by the National Institute for Statistics (2023).

was effective in raising the number from 42,288 in 2011 to 158,936 one year later. We are confident to relate this increase to the policy reform because the number of six-year-old children did not increase between these years, staying at around 215,000 children, according to data published by the National Institute for Statistics (2023). Based on this data, this jump is not related to a potential increase in the birth cohort between 2011 and 2012.

These numbers also reveal that the reform was unsuccessful in reaching all children of the targeted age group. Nevertheless, enrollment rates of six-year-old children increased significantly from 19.7 percent in 2011 to 73.9 percent in 2012.

3 Theoretical Rationale

To help frame our empirical research question and findings, we briefly review the existing theoretical literature on the effect of childcare on women's labor market participation.

The theoretical literature most relevant for our work is on the interaction between child-

care and maternal labor force participation in Romania by Fong and Lokshin (1999). The authors argue that households maximize welfare by choosing the optimal level of consumption of childcare quality, market goods, and leisure. The optimal amount of childcare quality is a function of childcare provided by the mother, purchased on the market, and provided by other household members or relatives. The budget constraint is determined by exogenous non-wage household income, each household member's labor income - a function of each member's wage and hours worked -, the number of children, the unit-price of quality childcare, and the quantity of quality childcare provided by each household member and the market. Based on their model, Fong and Lokshin (1999) predicts that an increase in the price of care negatively affects the number of hours mothers work.

Our analysis connects to this work by exploring the 2012 educational reform, which was an exogenous shock that increased publicly provided childcare for children of age six. We argue that this policy led to a sudden decrease in the price of childcare because the government started to provide a form of childcare during the time children participate in mandatory, preparatory classes. At the same time, it liberates the time constraints of primary caregivers. We expect an increase in the labor force participation and employment of mothers of children affected by the reform. Given that preparatory classes are obligatory and universal in Romania, we can address endogeneity concerns around unobservable household characteristics that might influence the optimal combination of quality childcare purchased on the market. This is a considerable contribution to the literature to date.

Other theoretical work closely related to our paper is by Ho and Pavoni (2020). They focus on the optimal design of childcare subsidies in their analysis of maternal labor supply. They argue that household members optimize welfare by allocating time between childcare and the labor market and find a positive effect of childcare subsidies on formal childcare. They raise an important point about optimal subsidy design entailing higher subsidies for lower-income households. The reform we investigate in this paper can be understood as a universal childcare subsidy, given that it incorporated an entire cohort of children into the

formal education system.

4 Data and Empirical Strategy

To estimate the impact of introducing preparatory school years in Romania on maternal employment we employ difference-in-difference (DiD) estimation techniques and estimate equation 1; we compare the employment rate of women with and without kids aged six years old, before and after 2012:

$$P(E_{ist}) = f(\beta_1 Mom6_{ist} + \beta_2 Post2012_{ist} + \beta_3 Mom6_{ist} \times Post2012_{ist} + \beta_4 X_{ist} + \delta_s + \gamma_t + \epsilon_{ist}). \tag{1}$$

The variable E_{ist} is binary and denotes if a mother with a six-year-old child is employed. i identifies a mother at the individual level, s the respective state, and t the time period. $Mom6_{ist}$ determines if a woman is a mother of a six-year-old child, while $Post2012_{ist}$ indicates if a year is after the reform in 2012. $Mom6_{ist} \times Post2012_{ist}$ is the DiD effect of interest. We expect the effect of β_2 to be positive given that the preparatory school year replaced childcare provided by mothers. X_{ist} are individual-level controls that vary at the individual, state, and year-level, δ_s are state-fixed effects to control for time-invariant, state-specific characteristics and γ_t are time-specific, state-invariant characteristics. ϵ_{ist} is an error term. We report average marginal effects from a logit specification throughout (unless otherwise stated). Standard errors are clustered at the state level.

We estimate equation 1 using data from the European Labor Force Survey (EU-LFS) from 2010 to 2019. The treatment group consists of all mothers with the youngest child of age six. We consider two different control groups. First, we consider mothers with the youngest child of age three or four given that this group of women might be more similar to our treatment group on unobservable characteristics. We do not consider younger children because previous evidence shows that parents are less reluctant to put children below three

years old into childcare (Fong and Lokshin 1999). Given that five-year-old children can also participate in preparatory classes by request of their parents under certain circumstances, we do not consider their mothers as part of the control group. To validate our results, we also consider women without children as an additional control group. Nevertheless, we believe that mothers of three- to four-year-old children might be a better control group as they might be more similar to mothers of six-year-old children on unobservable characteristics, and also might confront unobservable shocks in a more similar fashion.

Table 1 shows summary statistics for all three groups. Women of all three groups are in their early to mid-thirties and the share of migrants[4] is negligible. While nearly nine out of ten women whose youngest child is three, four, or six years old are married, only half of the women without children are married. The divorce rate is also larger for women without children. Similarly, nearly all women with little children indicate that their partner lives with them in the household, while only every second woman without children does so. These numbers imply that there are some significant differences between treated and untreated women when considering women without children as the control group. In line with these patterns of results, women without children also differ in their skill distribution when compared to the other two groups. A significantly lower share is low-skilled. Moreover, they live on average in smaller households, and a higher share of household members is employed but also inactive. Table 1 also reveals that women without children are more likely to be employed, belong on average to a slightly higher labor income decile, work more hours, and are less likely to work part-time. In addition, the share of women without children who seek employment is larger when compared to women whose youngest child is six, three, or four years old. See Online Appendix A for data and sample details.

The difference in employment shares of the three groups described in Table 1 also becomes evident in Figure 2 and 3. The left graph plots the employment rate of mothers with children aged six years old, mothers with children between three and four years old, and women

[4]The EU-LFS collects information on the country of birth of each respondent. We define a migrant as a person whose country of birth is not Romania.

Table 1: Summary Statistics

	(1) Mother (6-year-old)		(2) Mother (3-to-4-year-old)		(3) Women without kids	
	mean	sd	mean	sd	mean	sd
Age	34.62	5.75	32.26	5.88	34.78	9.20
Migrant	0.00	0.02	0.00	0.04	0.00	0.03
Married	0.87	0.33	0.86	0.34	0.49	0.50
Divorced	0.05	0.22	0.04	0.20	0.08	0.27
Partner lives in household	0.92	0.27	0.92	0.27	0.54	0.50
Low-skilled	0.28	0.45	0.28	0.45	0.16	0.37
Middle-skilled	0.53	0.50	0.48	0.50	0.59	0.49
High-skilled	0.19	0.40	0.24	0.43	0.25	0.43
Youngest child six years old	1.00	0.00	0.00	0.00	0.00	0.00
Age of the youngest child in the household, aged less than 15 years	6.00	0.00	3.50	0.50	.	.
Number of children in the household aged less than 15 years	1.64	0.77	1.73	0.90	0.00	0.00
Number of persons in the household, whatever the age	4.32	1.40	4.43	1.58	2.77	1.30
Number of employed persons in the household aged 15 years and more	1.72	0.90	1.71	0.98	1.87	1.21
Number of inactive adults in the household aged 15 years and more	0.67	0.90	0.74	0.94	0.75	1.00
Employed	0.65	0.48	0.62	0.49	0.72	0.45
Part-time work	0.06	0.23	0.05	0.22	0.04	0.20
Seeking work	0.04	0.19	0.04	0.19	0.05	0.23
Monthly take-home pay from main job (deciles)	4.99	2.93	5.08	2.95	5.11	2.85
Number of hours per week usually worked in main job	34.53	14.11	35.71	12.72	36.68	11.90
Observations	8948		15837		189951	

Notes: Skill levels follow the official definition of the EU-SILC and is the highest education attainment level according to ISCED 2011. The low-skilled have at most lower secondary education, the middle-skilled at most upper secondary education, and the high-skilled tertiary education degress. Source: EU-LSF (2010-2019).

without children. In all three cases, we restrict the sample to women between 20 and 50 years old. The black, vertical line indicates the year of the reform. The graph reveals a clear gap between women with and without children in the age group analyzed. Based on these unadjusted trends there is no evidence of significant changes after the introduction of the reform. The right figure plots the magnitude of the employment gap between women without children and women with children aged six years old. The employment gap seems to increase after the introduction of the reform, mainly driven by an increase in the employment rate of mothers without children. This evidence might support our hypothesis that mothers of three- to four-year-old children might be the better control group as women without children might be subject to different unobservables.

Figure 2: Un-adjusted employment trends (2010-2019)

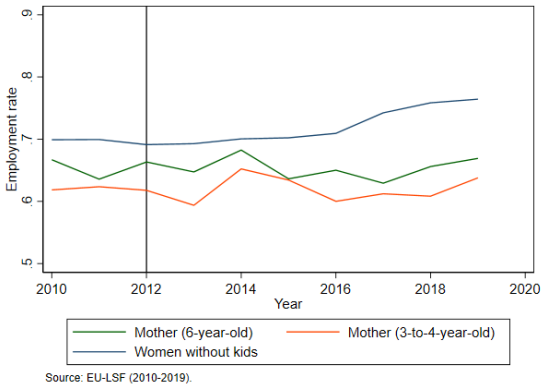
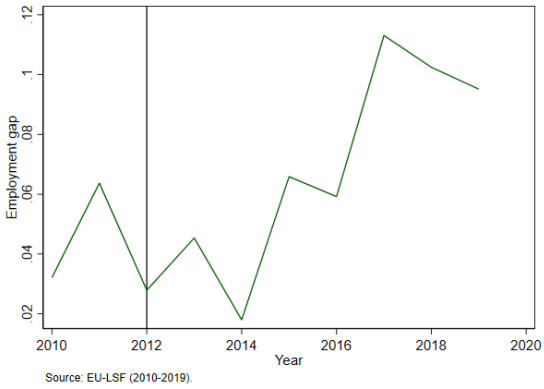


Figure 3: Un-adjusted employment gaps (2010-2019)



Notes: The left panel plots the employment rate for mothers (six-year-old) (in Green), mothers (three-or-four-year-old) (in Orange), and women without children (in Blue). The right panel plots the employment gap between women without children and mothers with six-year-old children. We restrict the sample to 20- to 50-year old. The vertical black line indicates the year Romania introduced obligatory, preparatory classes for six-year-old children. Source: EU-LFS (2010-2019).

5 Preparatory Years and Maternal Labor Supply

5.1 Average Treatment Effects

We estimate the average effect of preparatory classes on maternal employment of six-year-old children using equation (1) in Table 2. We use EU-LFS survey weights and add controls cumulatively across columns. Column 1 only includes an indicator variable for being a mother of a six-year-old child, an indicator variable for the post-reform periods, and the DD estimator (Mom(six-year-old $\times$ Post2012). Column 2 adds individual-level characteristics that vary over time to account for differences in the age and skill decomposition, migration background, marriage status, the presence of a partner in the same household, as well as differences in the household decomposition concerning the number of employed household members. Column 3 adds state and year-fixed effects to account for annual shocks affecting all mothers and idiosyncratic state traits. Column 4 adds region-by-year unemployment rates to account for economic conditions. Columns 5 and 6 show that results are robust to a probit and OLS estimation, although insignificant and considerably smaller in the case

of OLS. Given that OLS regressions are subject to important empirical limitations in the case of binary outcome variables (Stock and Watson 2015) we are not worried about the insignificance in Column 6.

Table 2: The 2012 reform effect on employment rates

	Logit	Logit	Logit	Logit	Probit	OLS
Mom(six-year-old) × Post2012	0.0263	0.0386	0.0401	0.0403	0.0405	0.00191
	(0.0143)	(0.00788)	(0.00886)	(0.00905)	(0.0106)	(0.0182)
Mean (Dep. Var)	.612	.612	.612	.612	.612	.612
St. Dv. (Dep. Var.)	.487	.487	.487	.487	.487	.487
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	26,114	26,114	26,114	26,114	26,114	26,114

Notes: The sample consists of mothers of six-year-old children (the treatment group) and three- to four-year-old children (the control group). Standard errors are clustered and in parentheses. Source: EU-LSF (2010-2019).

Across each set of controls, the DD estimate is stable between 2.6 and 4.1 percentage points (or 4.3 percent and 6.6 percent from an average of 61.2 percent). Results are significant at the one-percent significance level. These findings imply that the reform led to a considerable increase in the maternal labor supply of mothers of six-year-old children and that substituting maternal childcare with childcare provided by the government is an effective way to increase the maternal labor supply.

The size of the effect is similar to the impact of the EITC on maternal employment in the US (Bastian 2020) or the impact of the universal childcare reforms in Germany (Geyer, Haan, and Wrohlich 2015). The impact is lower than the one found for universal, full-time public childcare for 3-year-olds in Spain (Nollenberger and Rodríguez-Planas 2015) or for greater grandparent availability (Bratti, Frattini, and Scervini 2018), which could be due to preparatory classes only taking place in the morning.

Results are robust to restricting the age range of mothers (Online Appendix Table B1 and B2), abstracting from survey weights (Online Appendix Table B3), using women without

children as a comparison group (Online Appendix Table B4), measuring the effect on labor force participation (Online Appendix tables B5, and B6 with age restriction), or including five- and seven-years-old children in the treatment group (Online Appendix Table B7).

5.2 Heterogeneous and Subgroup Treatment Effects

In Table 3 we test if the reform differs across groups of women to shed light on some of the mechanisms that could drive the increase in maternal employment of mothers with six-year-old children.

Table 3: The 2012 reform effect on employment rates by groups

	Rural	Child	Elderly	Partner in HH	Employed in HH	Self-employed
Mom(six-year-old) × Post2012 × Group	0.0420	0.0425	-0.0165	0.0388	0.0426	0.0366
	(0.0138)	(0.0128)	(0.0195)	(0.00842)	(0.0127)	(0.0169)
Mean (Dep. Var)	.612	.612	.612	.612	.612	.612
St. Dv. (Dep. Var.)	.487	.487	.487	.487	.487	.487
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region by year unemployment rate	Yes	Yes	Yes	Yes	Yes	Yes
N	26114	26114	26114	26114	23836	24601

Standard errors in parentheses

Source: EU-LSF (2010-2019). Standard errors are clustered.

The sample consists of mothers of children between 3 and 4 or 6 years old.

Given the rural-urban divide on many development indicators in Romania, we test if mothers of six-year-old children living in rural areas benefit differently from the program than the ones living in urban areas. Figure 4 demonstrates that there is a clear urban-rural gap in the case of mothers of six-year-old and three- to four-year-old children in Romania. In addition, Figure 5 shows that the number of creches in rural areas is significantly lower than the number of creches in urban areas. As nearly half of the population in Romania lives in rural areas, these results indicate that mothers of children of pre-school age face significantly more constraints in rural than urban areas. The coefficient in Column 1 is positive and significant. These results indicate that exposed women in rural areas benefited more on average, which might be related to the fact that they had less access to public childcare previous to the reform.

Figure 4: Employment rates of treated and untreated mothers in rural and urban areas (2010-2019)

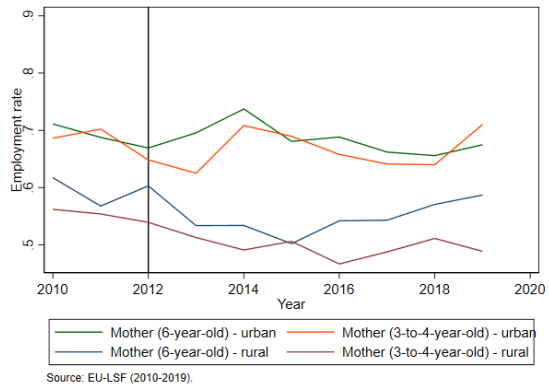
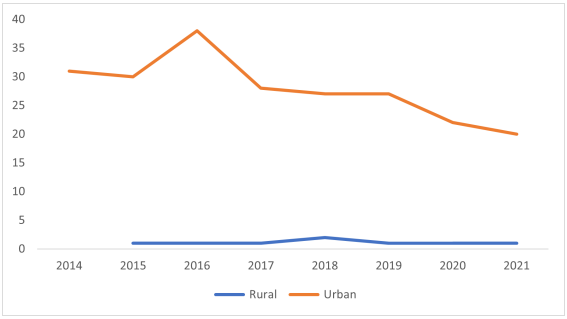


Figure 5: Number of creches (the ante-preschool level) in Romania in rural and urban areas (2014-2021)



Notes: The left panel plots the employment rate for mothers (six-year-old) in urban areas (in Green), mothers (three-or-four-year-old) in urban areas (in Orange), mothers (six-year-old) in rural areas (Blue), and mothers (three-or-four-year-old) in rural areas (in Red). The vertical black line indicates the year Romania introduced obligatory, preparatory classes for six-year-old children. The right panel plots the number of creches in Romania in urban areas (in Orange) and in rural areas (in Blue). Source: EU-LFS (2010-2019), and administrative data published by the National Institute of Statistics (2023).

Mothers with more than one child might face greater care responsibilities than mothers with only one child. Based on this rationale, we analyze if the impact of preparatory classes differs between mothers of six-year-old children with and without additional children. Similar to the previous argument, the impact might be larger for women with greater restrictions previous to the reform. Results for households with and without additional children, which are displayed in Column 2, differ significantly. The coefficient is positive and significant. These results seem counter-intuitive at first. While the reform does not alleviate the greater care responsibilities involved in bringing up more than one child, it at least alleviates the constraints imposed by taking care of a young child. Future research could analyze potential household mechanisms at play in households with more than one child in more detail.

Next, we investigate if the impact of the program differs for mothers living with elderly people and those living without them. There are two reasons why this differentiation is interesting. First, previous research shows that grandmothers might absorb some of the care responsibilities originally faced by mothers (Bratti, Frattini, and Scervini 2018). Second,

women might face additional care responsibilities concerning eldercare (Pezzin and Schone (1999); Johnson and Lo Sasso (2006)). In both cases, the reform might be less effective in raising maternal labor supply, given that it does not substitute for eldercare responsibilities, or as women had already found alternative models to substitute their care responsibilities.

The evidence in Column 3 of Table 3 indicates that eldercare indeed seems to counteract the positive effect of the reform on maternal labor supply although the coefficient is insignificant at the 10-percent significance level. Mothers of six-year-old children in households with elderly experience lower effects than mothers of six-year-old children without elderly. Based on these results, we conclude that eldercare is a parallel problem policymakers should take into account when targeting a higher labor force participation rate of women as it might impose additional time constraints on primary caretakers. If the impact is simply smaller because mothers already substituted for childcare responsibilities by relying on grandparents, then this just stresses the importance of providing care models that facilitate the incorporation of women into the labor market.

To analyze which of the two possibilities around the negative effect of elderly people is more likely to persist, we estimate the impact of the 2012 reform on employment rates of elderly people living in households with children who are five years old. The control group consists of elderly people in households with children who are three or four years old. We identify the elderly as all people who are older than 60 years old.[5] If the first channel is more likely to drive the negative interaction term observed in Column 3 of Table 3, then we would expect to see a positive effect on the employment rates of elderly people because they face similar time deliberations as mothers. Indeed, the evidence presented in Table B8 speaks for this channel. The 2012 reform has a positive effect on employment rates of elderly people in households with six-year-old children when compared to those in households with three- to four-year-old children. The effect is significant at the 1 percent

[5]One important limitation of our analysis is retirement age. The standard retirement age for women is 61 years and 9 months and 65 years for men. A part of our sample might simply move into inactivity, or they might already be inactive. For this group, we do not observe changes in the probability of being self-employed.

significance level in most cases, but insignificant when estimating an OLS model. The important influence of grandparents in the impact of childcare policies is in line with recent evidence by Karademir, Laliberté, and Staubli (2023) showing important intergenerational effects of childcare policies.

In addition, we investigate if the presence of the mother's partner in the same household influences the impact of the program.[6] This analysis is interesting given that partners could absorb some of the care responsibilities faced by women. Incorporation back into the labor force under the reform might then be more feasible. However, at the same time, the need for women with income-generating partners to work might be lower. The evidence in Column 4 of Table 3 points to an important role of partners' presence in the household. The coefficient is positive and significant. Consequently, mothers of six-year-old children who live with their partners experience a larger effect. These results could mean that partners of women with six-year-old children assume an important role in household care responsibilities, but also in women's decision-making regarding labor force participation and employment.

Moreover, we analyze if the presence of additional employed household members impacts the effect of the reform on the maternal labor supply. If other household members are employed, there might be additional resources available for household and care responsibilities. Consequently, mothers in these households might be more able to outsource these activities. It might then be easier for them to participate in the labor market. In contrast, one could also argue that they face a lower necessity to work and generate income due to a greater safety net of additional income-generating individuals in the household. The coefficient in Column 5 is positive, showing that maternal employment in households with additional employed members indeed rises more than the one for mothers in households without additional employed members. These findings, together with our findings on the presence of spouses in households, could mean that the employment of other household members indeed plays an important role in the decision-making of mothers about participating in the labor market.

[6]The EU-LFS indicates if the partner of a person is present in the same household by an indicator variable.

Lastly, the impact is larger for mothers of six-year-old children who are self-employed. These results are not surprising, as entrepreneurs might themselves be especially affected by a lack of childcare possibilities, and drop out of leading businesses or entrepreneurial activities.

In sum, these findings indicate that women who faced more impediments to labor market opportunities previously to the reform, for example in the form of less infrastructure in rural areas, the lower possibility to combine work with childcare responsibilities in the case of entrepreneurial activities, or due to a greater security network in form of other income-generating individuals in the household, experience greater effects of the reform.

5.3 DDD Effects

An omitted variable that affects the employment of mothers of six-year-old children differently than the employment of mothers of three- to four-year-old children could bias our estimates from difference-in-difference regressions. Adding a third difference might generate more reliable results (Angrist and Pischke 2009).

We add a third difference by differentiating between mothers of children who indeed participated in preparatory classes and preprimary childcare, and those who did not. This approach allows us to control for any factors that might impact mothers of six-year-old children differently than those of younger children. At the same time, it allows us to control for unobservable factors that could drive the employment of mothers who send their children to public childcare and early childhood education facilities and those who do not tend to take advantage of these services. One important shortfall of our triple difference estimation is the fact that preparatory classes are compulsory while all forms of early childhood education and childcare that target children younger than six years old are voluntary.

To identify these groups, we leverage data from the European Union Statistics on Income and Living Conditions (EU-SILC) from 2010-2020. In contrast to the EU-LFS, the EU-SILC, which collects data on living conditions and income in the European Union, contains infor-

mation on children's participation in (pre)primary education facilities. Appendix A presents detailed information on the data and the underlying variables. We estimate Equation 2 as follows:

$$\begin{aligned} P(E_{ist}) =& f(\beta_1 Assist_{ist} + \beta_2 Post2012_{ist} + \beta_3 Mom6_{ist} + \\ & \beta_4 Assist_{ist} \times Post2012_{ist} \times Mom6_{ist} + \beta_5 X_{ist} + \delta_s + \gamma_t + \epsilon_{ist}). \end{aligned} \tag{2}$$

We also control for additional interaction terms.[7] Table 4 presents the results. The estimate of β_4 is not stable across model specifications. Estimates vary in magnitude and size. This pattern of results might be driven by the small sample size. We also observe that estimates are insignificant in all model specifications. Results are similar when abstracting from the additional interaction terms (see Online Appendix Table B9). Estimates are more stable when restricting the sample to 20-to-48-year-old mothers. The estimates presented in Online Appendix tables B10 and B11 remain positive across most model specifications, but are insignificant at the common significance levels. The difference between the results presented in Tables 4 and 2 could be due to diverging concepts of work between the underlying surveys. The EU-SILC captures an annual and more stable concept of work than the EU-LFS.

We conclude that estimates are less robust when employing a triple difference estimation. These results might be driven by the small sample size, or by unobservable confounding factors that impact mothers exposed to the reform and complying with it differently than mothers who are not exposed or who do not comply. While we rule out the existence of potential confounding shocks or policies later in this paper, we cannot rule out potentially significant differences in unobservable characteristics between the different groups of mothers.

[7] We control for $Assist_{ist} \times Post2012_{ist}$, $Post2012_{ist} \times Mom6_{ist}$, and $Assist_{ist} \times Mom6_{ist}$.

Table 4: The 2012 reform effect on employment rates - Triple difference estimation with additional interaction terms

	Logit	Logit	Logit	Logit	Probit	OLS
DiDiD effect	-0.0394	-0.00163	-0.00110	-0.000124	-0.00474	-0.0907
	(0.0413)	(0.0161)	(0.0166)	(0.0157)	(0.0182)	(0.0451)
Mean (Dep. Var)	.5262	.5262	.5262	.5262	.5262	.5262
St. Dv. (Dep. Var.)	.4994	.4994	.4994	.4994	.4994	.4994
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	2509	2502	2502	2502	2502	2509

Standard errors in parentheses

Source: EU-SILC (2010-2020). Standard errors are clustered.

The sample consists of mothers of children between 3 and 4 or 6 years old.

6 Hours Worked, Part-time Employment, and Earnings

One particularity of the 2012 reform is that compulsory, preparatory classes only took place during morning classes. Consequently, the childcare subsidy by the public sector only took place during half of the day. It is therefore not surprising that we find an increase in the probability of being employed part-time as a consequence of the reform (Table 5). Nevertheless, the reform resulted in a slight increase in the average number of usual hours worked per week (Table 6).

Table 7 demonstrates a significant increase in gross monthly employee cash or near cash income for affected women. The coefficient in Column 4, the baseline specification, is equivalent to a 1.7 percent increase. The provision of public childcare could therefore also contribute to closing the gender pay gap. Nevertheless, the coefficients presented are insignificant at the common significance levels. Future research should investigate if these results are entirely driven by women working more, or because some of them also face earning increases.

Table 5: The 2012 reform effect on Part-time work

	Logit	Logit	Logit	Logit	Probit	OLS
Mom(six-year-old) x Post2012	0.0114	0.00624	0.00377	0.00379	0.00494	0.0116
	(0.0129)	(0.00679)	(0.00493)	(0.00499)	(0.00556)	(0.00746)
Mean (Dep. Var.)	.052	.052	.052	.052	.052	.052
St. Dv. (Dep. Var.)	.223	.223	.223	.223	.223	.223
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	15920	15920	15920	15920	15920	15920

Standard errors in parentheses

Source: EU-LSF (2010-2019). Standard errors are clustered.

The sample consists of employed mothers of children between 3 and 4 or 6 years old.

Table 6: The 2012 reform effect on Number of hours per week usually worked in main job

	OLS	OLS	OLS	OLS
Mom(six-year-old) x Post2012	1.099	0.625	0.772	0.771
	(0.543)	(0.578)	(0.610)	(0.615)
Mean (Dep. Var)	35.229	35.229	35.229	35.229
St. Dv. (Dep. Var.)	13.287	13.287	13.287	13.287
Demographic controls	No	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes
State fixed effects	No	No	Yes	Yes
Region by year unemployment rate	No	No	No	Yes
N	15920	15920	15920	15920

Standard errors in parentheses

Source: EU-LSF (2010-2019). Standard errors are clustered.

The sample consists of employed mothers of children between 3 and 4 or 6 years old.

Table 7: The 2012 reform effect on Employee cash or near cash income

	OLS	OLS	OLS	OLS
Mom(six-year-old) × Post2012	-271.4	52.99	36.88	36.86
	(508.3)	(371.1)	(381.7)	(382.2)
Mean (Dep. Var)	2172.895	2172.895	2172.895	2172.895
St. Dv. (Dep. Var.)	3690.202	3690.202	3690.202	3690.202
Demographic controls	No	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes
State fixed effects	No	No	Yes	Yes
Region by year unemployment rate	No	No	No	Yes
N	1279	1279	1279	1279

Standard errors in parentheses

Source: EU-SILC (2010-2020). Standard errors are clustered.

The sample consists of employed mother of children between 3 and 4 or 6 years old.

7 Ruling out Contemporaneous Shocks

A causal interpretation of DD requires that there are no other contemporaneous factors that influence the relative employment of mothers of six-year-old children. Even though it is unlikely that parallel introduced policies or other contemporaneous shocks only influenced the employment outcomes of mothers of six-year-olds, while leaving the employment of mothers of three-to-four-year-olds unaffected, we investigate this possibility in more detail.

To this end, we search for important policy reforms between 2010 and 2014. The Romanian government introduced several policy reforms that could potentially have affected employment decisions, such as a cut in public sector wages, or the introduction of a flat tax rate. Nevertheless, most of them were concluded by 2010. In addition, we believe that none of these should have impacted the maternal employment rates of mothers with six-year-old children differently from those mothers with three to four-year-old children.

8 Conclusion

In one of the first systematic studies of the introduction of compulsory, preparatory, preprimary school classes for six-year-old children in Romania, we find that this reform led to an increase in maternal employment of 2.6 to 4.1 percentage points.

Using a placebo group of mothers of children who did not attend these compulsory, preparatory, preprimary school classes in a DDD specification to net out unobservable confounding factors, such as birth control, divorce laws, or abortions, results in less stable estimates, probably driven by small sample sizes.

We argue that the educational reform acts as a public subsidy for childcare and thus liberates the working time of mothers. The 2012 reform in Romania provides a clean policy setting and also eliminates other potential confounding factors around the interaction between childcare and maternal employment (Fong and Lokshin (1999); Ho and Pavoni (2020)), such as costs and quality of childcare, based on its compulsory and universal design.

Mothers of six-year-old children experience a larger impact in rural areas, for the self-employed, when they have additional children, live with their partner, or with additional employed household members. These results point towards effects at the extensive margin. Women who experienced larger restrictions previously to the reform, due to lower availability of public childcare, because of additional care responsibilities, or based on greater comfort due to partners or other employed household members, experience larger effects on employment rates as a consequence of the reform. We argue that they might face a larger alleviation of their care responsibilities.

Given that the 2012 reform in Romania only introduced preparatory school classes during morning hours, it is not surprising that the probability to work part-time increased as a result of the reform among affected mothers. Nevertheless, the average hours usually worked during a week increased slightly. Moreover, we demonstrate an increase in average monthly earnings among affected women of 10.7 percent. These results indicate that public, universal childcare could contribute to closing the gender wage gap.

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Online Appendix

A Data Appendix

A.1 European Labor Force Survey

The European Labor Force Survey (EU-LFS) is a quarterly survey conducted in the European Union from 1983 to the present. It is a household survey that targets the population aged 15 and above. The data only contains private households and abstracts from individuals living in public institutions. Eurostat coordinates the data elevation and National Statistical Institutes are responsible for the sample design, preparing the questionnaires, conducting the interviews, and forwarding the results to Eurostat.

Information gathered in the survey surrounds a diverse set of topics, such as employment and labor, education, health, housing and land use planning, social stratification, and family life, as well as demography and migration. Data gathered as part of the EU-LFS is representative of the NUTS-2 level. Several variables are only available at aggregate levels. Examples are citizenship (aggregated to up to 16 groups), economic sectors (available at NACE 1-digit codes), and income (only provided in deciles). A full list of variables included in the survey and their respective codification is available in Eurostat (2018).

We dispose of data from the years 2010 to 2019, a total sample of 2,313,986 observations. To derive the level of skills, we rely on the generated variable on educational levels published by Eurostat (denoted as hatlev1d). We also rely on previously by Eurostat constructed variables on the number of children younger than 15 years per household, the number of household members, the number of employed household members, and the number of inactive household members.

To identify mothers in our sample, we take advantage of the fact that the survey gathers information on the mother's ID for each person. The value is zero if the mother does not live in the same household and equal to the sequential number of the household member who is

the mother otherwise. We create a binary variable that is equal to one if the mother ID for children is equal to the sequential number of a household member. We verify this approach by analyzing mothers' gender and the number of children.

One important data limitation for the paper at hand is that age is only reported in groups in the case of Romania. Consequently, we cannot identify mothers of six-year-old children but only mothers of children belonging to the age group five to nine. Luckily, there is also information on the exact age of the youngest child in the household, at least at the yearly level. We use this information to identify our target group instead of relying on all children in the households and argue that the reform might be ineffective in households with six-year-old children and younger children. If publicly provided childcare substitutes mothers' childcare of six-year-old children, but the mother still has to take care of younger children in the household, the impact on her available working hours might be minimal.

Similarly, we construct our main control group relying on the information on the age of the youngest child. To identify the control group, we construct a binary variable that is equal to one for mothers whose youngest child is three or four years old.

We face additional data limitations when constructing our alternative control group, women without children. The EU-LFS does not collect data on the number of children outside the household. It only asks about the number of children (younger than 25 or 15 years old) in each household. While the survey includes a question on whether the child lives in the same household or not, this variable assumes the same value for those without children and children living outside the household. Due to this data limitation, we assume that a woman has no children if there are no children younger than 25 years old in the household. This is an important caveat of this paper.

A.2 European Statistics on Income and Living Conditions

For our triple difference in difference regression, we use the European statistics on income and living conditions survey (EU-SILC). The survey is a yearly survey that collects data on

income, poverty, social exclusion, and living conditions for each country in the European Union.

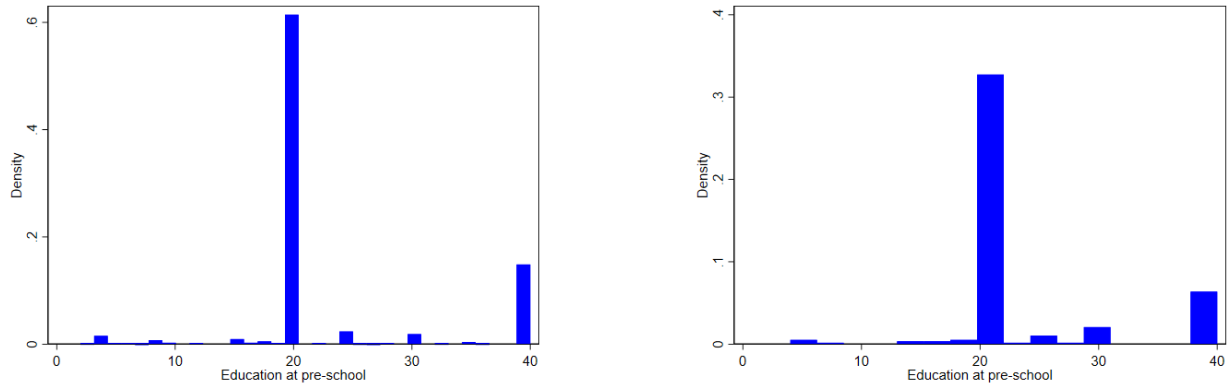
We take advantage of the fact that the survey contains information on children's school assistance. More specifically, the survey asks for the number of hours of education at a preschool during a usual week. Table A1 shows the cross-tabulation of an indicator variable generated from this variable that is equal to one for all cases that report a positive number of hours and zero otherwise with the age of all children below 16 years old. The table shows that there are 1,064 children in our main target group of interest, the six-year-old. Of these, 258 attend a preschool for at least one hour during a usual week. Figure A1 demonstrates that most children who attend preschool do so for at least 20 hours. These results hold when restricting the sample to six-year-old children (see Figure A1).

Table A1: Data on preschool assistance

	0	1	Total
0	376	5	381
1	471	30	501
2	533	139	672
3	402	424	826
4	267	655	922
5	217	783	1000
6	806	258	1064
7	1161	8	1169
8	1292	3	1295
9	1404	1	1405
10	1504	3	1507
11	1523	1	1524
12	1563	0	1563
13	1581	0	1581
14	1595	0	1595
15	1638	0	1638
Total	16333	2310	18643
N	18643		

Notes: The Table shows the cross-tabulation of an indicator variable generated from a variable measuring the hours of preschool attendance. The variable is equal to one for all cases that report a positive number of hours and zero otherwise with age for all children below 16 years old. Source: EU-SILC (2010-2020).

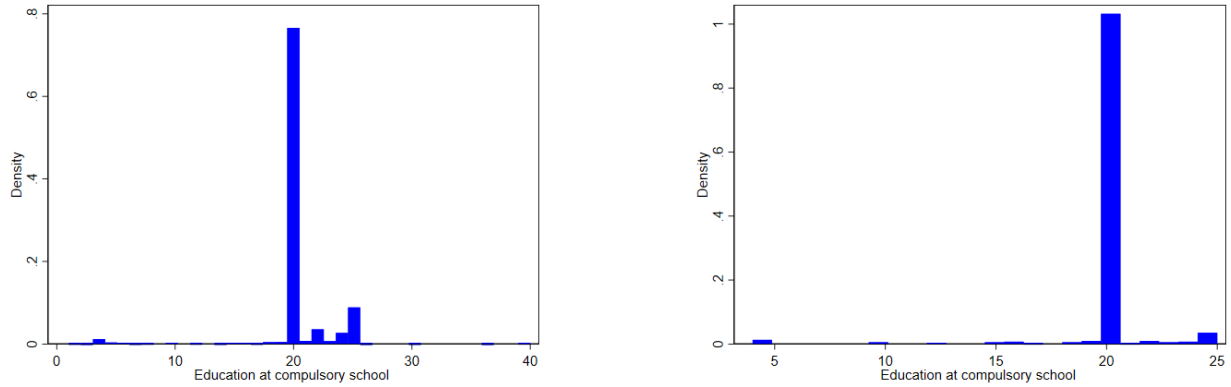
Figure A1: Histogram of hours at preschool in a usual week



Notes: The left graph shows the number of non-zero hours children attend at a preschool during a usual week. The right graph shows the same estimates restricting the sample to six-year-old children. Source: EU-SILC (2010-2020).

We next explore similar information on children who attend compulsory schooling. Table A2 shows that there is additional valuable information on six-year-old children gathered as part of this variable. Of the 1,064 children, 620 attend compulsory schooling. Similar to our results on preschool attendance, most children attend compulsory schools for 20 or more hours (see Figure A2).

Figure A2: Histogram of hours at compulsory schooling in a usual week



Notes: The left graph shows the number of non-zero hours children attend at a compulsory school during a usual week. The right graph shows the same estimates restricting the sample to six-year-old children. Source: EU-SILC (2010-2020).

Table A2: Data on compulsory school assistance

	0	1	Total
0	380	1	381
1	501	0	501
2	672	0	672
3	826	0	826
4	919	3	922
5	991	9	1000
6	444	620	1064
7	95	1074	1169
8	88	1207	1295
9	112	1293	1405
10	132	1375	1507
11	231	1293	1524
12	518	1045	1563
13	1580	1	1581
14	1595	0	1595
15	1638	0	1638
Total	10722	7921	18643
N	18643		

We then combine these variables into one indicator variable that measures the attendance rates of children. Table A3 shows the resulting estimator by age. Of 1,064 six-year-old children, 878 attend preschool or compulsory schooling. Applying survey weights results in an average attendance rate of 80.7 percent for the period under consideration.

Figure A3 plots the number of hours attended in a usual week for all children with positive values as well as those who are six-year-old and attend for at least one hour of preschool or compulsory school.

Given that we are ultimately interested in maternal labor force participation and not attendance rates, we next aggregate this variable at the household level. Figure A4 plots the share of households with six-year-old children who attend (pre)school over the period 2010-2020. The graph reveals that there was a clear increase after the introduction of the reform in 2012. While there was a slight drop in 2013, the share remains higher throughout

Table A3: Data on preschool and compulsory school assistance

	0	1	Total
0	375	6	381
1	471	30	501
2	533	139	672
3	402	424	826
4	264	658	922
5	208	792	1000
6	186	878	1064
7	87	1082	1169
8	85	1210	1295
9	111	1294	1405
10	129	1378	1507
11	230	1294	1524
12	518	1045	1563
13	1580	1	1581
14	1595	0	1595
15	1638	0	1638
Total	8412	10231	18643
N	18643		

the post-program period.

Table A5 shows that only 5 percent of all households in the sample have children who are six years old during the period 2010-2020. A slightly larger share has children between three- and four years old. Attendance rates are similar if measured at the household or individual level, and are higher for six- than three-to-four-year-old children, as expected.

We next identify mothers in these households. For this purpose, we take advantage of a variable that identifies the mother's ID of each child in the same household. By matching the person's ID to the mother's ID we can identify if a woman in a given household is a mother of a child in the same household. One limitation of the survey is that we cannot identify mothers if their children live in another household because information is restricted to the same household. Table A5 reveals that only a small share of individuals can be identified as mothers. An even lower share of individuals are mothers of six-year-old children, or children who are three- or four years old.

Table A6 presents the average characteristics of mothers of six-year-old children, the

Table A4: Summary statistics of households by children and attendance rates

	Mean	St. Dev.
HH with six-year-old child	0.05	0.22
Six-year-old attends (pre)school	0.81	0.39
HH with six-year-old attending (pre)school	0.80	0.40
HH with three- to four-year-old child	0.08	0.27
Three- to four-year-old attends (pre)school	0.62	0.49
HH with three-to four-year-old attending (pre)school	0.61	0.49
Observations	192115	

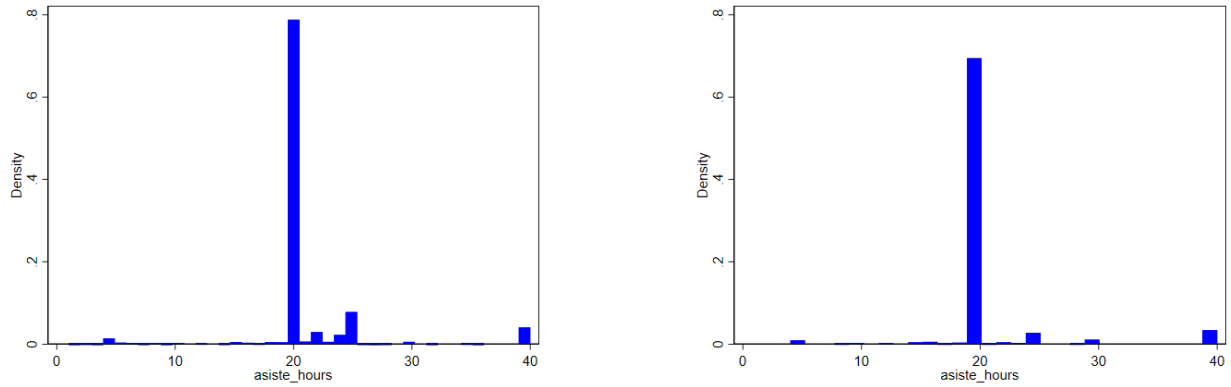
Notes: The table describes the share of households with six-year-old (three- to four-year-old children) and their average attendance rates in (pre)school for 2010-2020. It also shows the attendance rate of these children. Data is at the individual level and weighted accordingly using survey weights. Source: EU-SILC (2010-2020).

Table A5: Share of mothers in population

	Mean	St. Dev.
mother	0.1802	0.3843
Mother with six-year-old	0.0098	0.0983
Mother with three- or four-year-old	0.0163	0.1265
Observations	192115	

Notes: The table reports the share of mothers - overall, with six-year-old, and with three- to four-year-old children - in the EU-SILC for the period 2010-2020. Data is at the individual level and weighted accordingly using survey weights. Source: EU-SILC (2010-2020).

Figure A3: Histogram of hours at preschool or compulsory schooling in a usual week



Notes: The left graph shows the number of non-zero hours children attend at a preschool or compulsory school during a usual week. The right graph shows the same estimates restricting the sample to six-year-old children. Source: EU-SILC (2010-2020).

treatment group, and three- to four-year-old children, the control group. The table reveals that they are relatively similar to each other. There are some slight differences in the mean disposable household income. Mothers of six-year-old children live in households with slightly lower household incomes. The educational distribution also differs slightly between both groups.

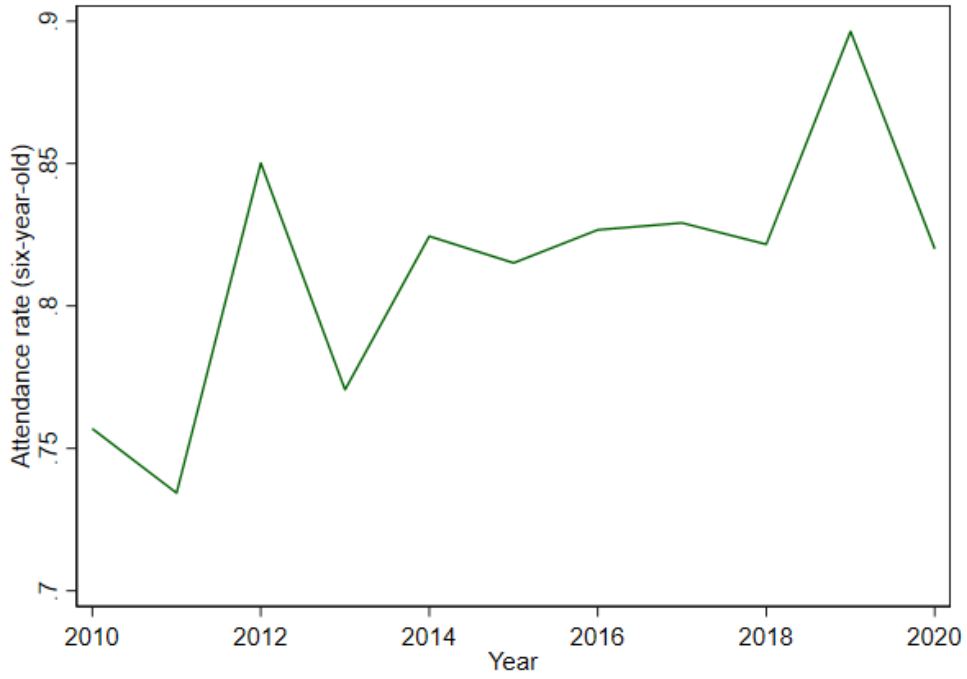
Table A6: Summary statistics of mothers

	(1)		(2)	
	Mothers (six-year-olds)		Mothers (three- to four-year-olds)	
	mean	sd	mean	sd
Age	40.38	12.78	40.09	13.40
Migrant	0.00	0.00	0.00	0.03
Married	0.80	0.40	0.79	0.41
Divorced	0.02	0.15	0.03	0.16
Partner in HH	0.08	0.27	0.08	0.27
No schooling	0.02	0.12	0.01	0.11
Primary educ.	0.08	0.28	0.09	0.29
Secondary educ.	0.57	0.49	0.53	0.50
Tertiary educ.	0.19	0.39	0.23	0.42
PhD	0.00	0.00	0.00	0.00
HH with child (<15)	2.19	1.30	2.04	1.16
HH members	4.88	1.83	4.77	1.68
No. of working HH members	1.70	0.86	1.71	0.89
Part-time work	0.00	0.05	0.00	0.06
Total disposable household income	6341.47	4991.31	6610.13	5213.89
Post-reform	0.81	0.39	0.80	0.40
Observations	1015		1655	

Source: EU-SILC (2010-2020).

Notes: The table shows average characteristics of mothers of six-year-old children, the treatment group, and three- to four-year-old children, the control group. Source: EU-SILC (2010-2020).

Figure A4: Share of households with six-year-old children who attend (pre)school



B Robustness Checks

B.1 Difference-in-difference Estimation

Table B1: The 2012 reform effect on employment rates

	Logit	Logit	Logit	Logit	Probit	OLS
Mom(six-year-old) × Post2012	0.0334	0.00785	0.0101	0.0101	0.0136	0.0000787
	(0.0158)	(0.00964)	(0.0102)	(0.0103)	(0.0130)	(0.0202)
Mean (Dep. Var)	.632	.632	.632	.632	.632	.632
St. Dv. (Dep. Var.)	.482	.482	.482	.482	.482	.482
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	24,785	24,785	24,785	24,785	24,785	24,785

Standard errors in parentheses

Source: EU-LSF (2010-2019). Standard errors are clustered.

The sample consists of mothers between 20 and 49 years old with children between three and four or six years old.

Table B2: The 2012 reform effect on employment rates

	Logit	Logit	Logit	Logit	Probit	OLS
Mom(six-year-old) × Post2012	0.0303	0.00284	0.00526	0.00542	0.00692	-0.000989
	(0.0148)	(0.00891)	(0.00939)	(0.00950)	(0.0115)	(0.0199)
Mean (Dep. Var)	.632	.632	.632	.632	.632	.632
St. Dv. (Dep. Var.)	.482	.482	.482	.482	.482	.482
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	24,785	24,785	24,785	24,785	24,785	24,785

Standard errors in parentheses

Source: EU-LSF (2010-2019). Standard errors are clustered.

The sample consists of mothers between 20 and 49 years old with children between three and four or six years old.

Table B3: The 2012 reform effect on employment rates when abstracting from survey weights

	Logit	Logit	Logit	Logit	Probit	OLS
Mom(six-year-old) × Post2012	0.0262	0.0335	0.0340	0.0340	0.0335	-0.0159
	(0.0138)	(0.00773)	(0.00835)	(0.00839)	(0.00988)	(0.0174)
Mean (Dep. Var)	.61	.61	.61	.61	.61	.61
St. Dv. (Dep. Var.)	.488	.488	.488	.488	.488	.488
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	26114	26114	26114	26114	26114	26114

Standard errors in parentheses

Source: EU-LSF (2010-2019). Standard errors are clustered.

The sample consists of mothers of children between 3 and 4 or 6 years old.

Table B4: The 2012 reform effect on employment rates

	Logit	Logit	Logit	Logit	Probit	OLS
Mom(six-year-old) × Post2012	-0.0662	0.0153	0.0153	0.0154	0.0173	-0.0338
	(0.0136)	(0.00730)	(0.00576)	(0.00575)	(0.00628)	(0.00970)
Mean (Dep. Var)	.710	.710	.710	.710	.710	.710
St. Dv. (Dep. Var.)	.454	.454	.454	.454	.454	.454
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	198899	198899	198899	198899	198899	198899

Standard errors in parentheses

Source: EU-LSF (2010-2019). Standard errors are clustered.

The sample consists of 20-49-year-old mothers of six-year-old children and women without children.

Table B5: The 2012 reform effect on Labor force participation rate - no age restriction

	Logit	Logit	Logit	Logit	Probit	OLS
Mom(six-year-old) × Post2012	0.0269	0.0409	0.0422	0.0417	0.0418	0.00823
	(0.0176)	(0.00423)	(0.00559)	(0.00574)	(0.00721)	(0.00920)
Mean (Dep. Var)	.65	.65	.65	.65	.65	.65
St. Dv. (Dep. Var.)	.476	.476	.476	.476	.476	.476
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	26114	26114	26114	26114	26114	26114

Standard errors in parentheses

Source: EU-LSF (2010-2019). Standard errors are clustered.

The sample consists of mothers of children between 3 and 4 or 6 years old.

Table B6: The 2012 reform effect on labor force participation rates

	Logit	Logit	Logit	Logit	Probit	OLS
Mom(six-year-old) × Post2012	0.0343	0.0117	0.0132	0.0126	0.0152	0.00664
	(0.0177)	(0.00599)	(0.00718)	(0.00721)	(0.00966)	(0.00979)
Mean (Dep. Var)	.670	.670	.670	.670	.670	.670
St. Dv. (Dep. Var.)	.470	.470	.470	.470	.470	.470
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	24785	24785	24785	24785	24785	24785

Standard errors in parentheses

Source: EU-LSF (2010-2019). Standard errors are clustered.

The sample consists of 20-49-year-old mothers of children between 3 and 4 or 6 years old.

Table B7: The 2012 reform effect on employment rates when abstracting from survey weights

	Logit	Logit	Logit	Logit	Probit	OLS
Mom(six-year-old) × Post2012	0.0262	0.0450	0.0456	0.0459	0.0470	0.000818
	(0.0140)	(0.00531)	(0.00623)	(0.00629)	(0.00762)	(0.0140)
Mean (Dep. Var)	.61	.61	.61	.61	.61	.61
St. Dv. (Dep. Var.)	.488	.488	.488	.488	.488	.488
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	26114	26114	26114	26114	26114	26114

Standard errors in parentheses

Source: EU-LSF (2010-2019). Standard errors are clustered.

The sample consists of mothers of children between 3 and 4 or 6 years old.

B.2 Mechanisms

Table B8: The 2012 reform effect on employment rates of grand-parents

	Logit	Logit	Logit	Logit	Probit	OLS
Elderly in HH with six-year-old × Post2012	0.0204	0.0126	0.0139	0.0143	0.0120	0.00762
	(0.00670)	(0.00000)	(0.00462)	(0.00497)	(0.00506)	(0.0261)
Mean (Dep. Var)	.123	.123	.123	.123	.123	.123
St. Dv. (Dep. Var.)	.328	.328	.328	.328	.328	.328
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	5340	2082	5339	5339	5339	5340

Standard errors in parentheses

Source: EU-LSF (2010-2019). Standard errors are clustered.

B.3 Triple Difference Estimation

Table B9: The 2012 reform effect on employed rates - Triple difference estimation without additional interaction terms

	Logit	Logit	Logit	Logit	Probit	OLS
Triple difference effect	-0.0461	0.00325	0.00683	0.00735	0.00337	-0.0350
	(0.0485)	(0.0139)	(0.0133)	(0.0121)	(0.0131)	(0.0561)
Mean (Dep. Var)	.5262	.5262	.5262	.5262	.5262	.5262
St. Dv. (Dep. Var.)	.4994	.4994	.4994	.4994	.4994	.4994
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	2509	2502	2502	2502	2502	2509

Standard errors in parentheses

Source: EU-SILC (2010-2020). Standard errors are clustered.

The sample consists of mothers of children between 3 and 4 or 6 years old.

Table B10: The 2012 reform effect on employment rates - Triple difference estimation with age restriction

	Logit	Logit	Logit	Logit	Probit	OLS
Triple difference effect	-0.0461	0.00325	0.00683	0.00735	0.00337	-0.0350
	(0.0485)	(0.0139)	(0.0133)	(0.0121)	(0.0131)	(0.0561)
Mean (Dep. Var)	.625	.625	.625	.625	.625	.625
St. Dv. (Dep. Var.)	.484	.484	.484	.484	.484	.484
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	1839	1832	1832	1832	1832	1839

Standard errors in parentheses

Source: EU-SILC (2010-2020). Standard errors are clustered.

The sample consists of 20-to-49-year-old mothers of children between 3 and 4 or 6 years old.

Table B11: The 2012 reform effect on employment rates - Triple difference estimation with age restriction and interaction term

	Logit	Logit	Logit	Logit	Probit	OLS
Triple difference effect	-0.0461	0.00325	0.00683	0.00735	0.00337	0.0511
	(0.0485)	(0.0139)	(0.0133)	(0.0121)	(0.0131)	(0.102)
Mean (Dep. Var)	.625	.625	.625	.625	.625	.625
St. Dv. (Dep. Var.)	.484	.484	.484	.484	.484	.484
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	No	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	Yes	Yes
Region by year unemployment rate	No	No	No	Yes	Yes	Yes
N	1839	1832	1832	1832	1832	1839

Standard errors in parentheses

Source: EU-SILC (2010-2020). Standard errors are clustered.

The sample consists of 20-to-49-year-old mothers of children between 3 and 4 or 6 years old.