Preparatory School Years and Maternal Employment in Romania

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Outline

Unsplash/Emilia Morariu

1 Introduction

2 Background and Program Description

3 Theoretical Rationale

4 Data and Empirical Strategy

5 Results

6 Conclusions

Introduction

Persistently low labor force participation rates among women remains one of the main development puzzles

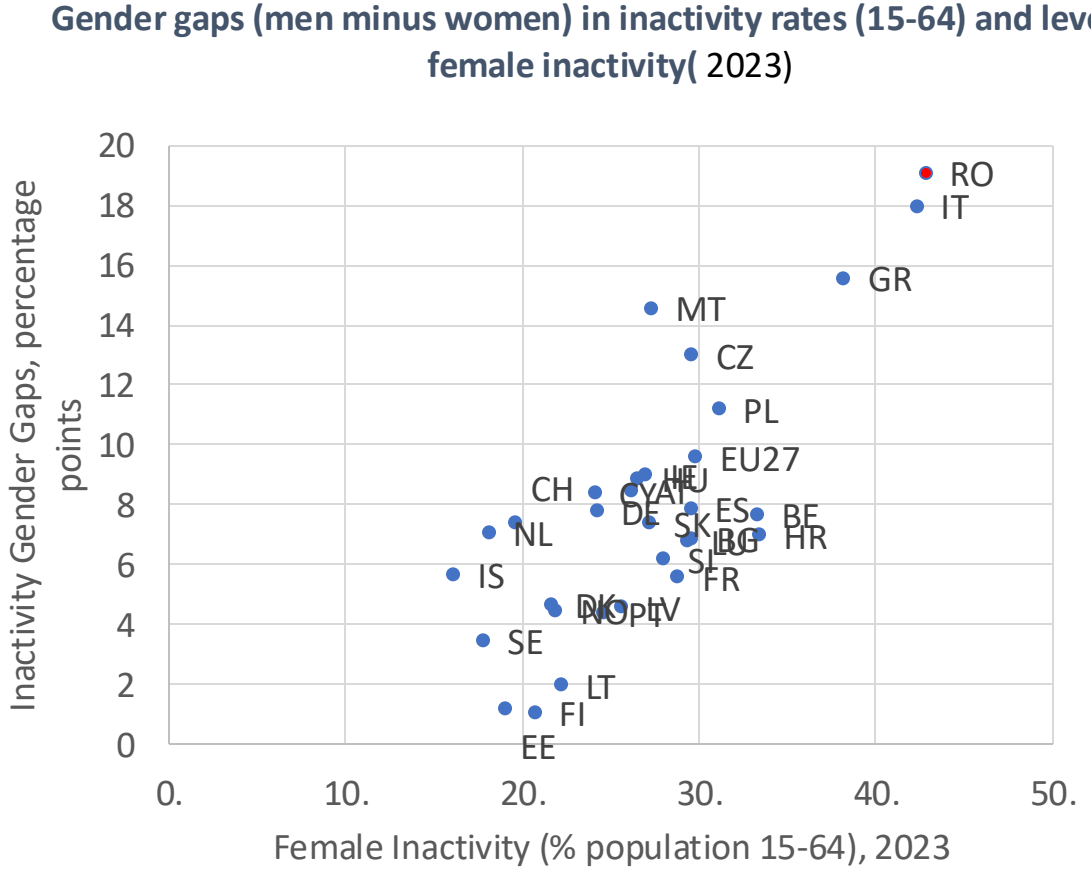
- **Not even half of the women** above 15 years old participate in the labor market globally(World Bank, 2023)
- **Average female labor force participation rate** has **declined** globally
- **Gender gap** remains significant
- **Impact of policies** aimed to address the gender gap in labor force participation **well studied**
  - tax credits, changes in parental leave policies, and the introduction of universal childcare
- …but **not clear which policy options are most effective**

We explore the introduction of a preschool reform in Romania to study the impact on maternal labor supply

- Policy (introduced in 2012) is a **natural subsidy for childcare by the government**
  - Introduction of pre-primary, compulsory, preparatory classes in Romania for six-year-old children
  - impact of childcare services provided by the government on maternal labor supply
- **Difference-in-difference estimation strategy**
  - Mothers of three- to four-year-old children as our control group
- Data from European Labor Force Survey (EU-LFS) from 2010 to 2019

Romania is an interesting case of study given that it is among the worst performers in the EU

- **Gender gaps** in labor force participation are **the largest in the EU**
- **High female inactivity levels**
- **Increasing gender gaps** over the last 20 years, while decline in EU on average
- **Signs of gender norms** around childcare usage that could deteriorate female labor market participation
- **Long history of centralized public planning**



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We contribute to the literature analyzing the impact of universal childcare, childcare subsidies, and childcare costs on labor market outcomes

- **Universal childcare and childcare subsidies**
  - rising childcare costs decrease maternal labor force participation (Connelly, 1992)
  - increasing childcare subsidies increases female labor supply and fertility (Haan and Wrohlich, 2011)
- **Availability of childcare**
  - childcare (geographical) accessibility influences female labor force participation (Herbst and Barnow, 2008)
  - the greater availability of grandparents for childcare increases maternal labor supply (Bratti, Frattini, and Scervini, 2018), as does full-time public childcare for three-year-olds (Nollenberger and Rodríguez-Planas 2015)
- **Impacts of the COVID-19 pandemic**
  - influence of unequal care distribution on employment outcomes (Alon et al., 2020; Del Boca et al., 2020; Farre et al., 2020)

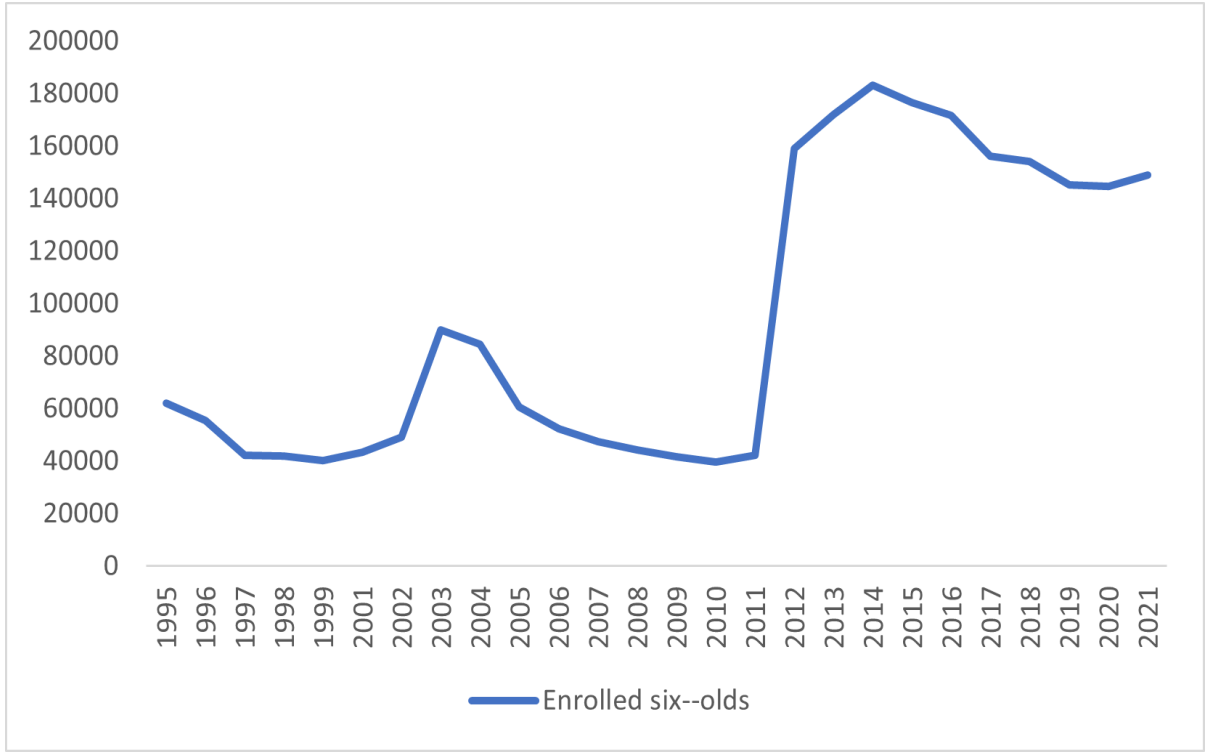
❖ Our study: Care responsibilities reduce female labor force participation and employment → addressing this trade-off results in an increase in maternal employment

Institutional Background and Program Description

In 2012, the Romanian government introduced a preparatory school year into its primary education system to better prepare children for school

- Pre-primary education is **voluntary** in Romania
- **Compulsory** education traditionally started at the **age of seven** with the start of primary school
- **2012**: introduction of **preparatory school classes** targeting six-year-old children
- **Enrollment rates of six-year-old children increased significantly**, going from 19.7 percent in 2011 to 73.9 percent in 2012
- The reform **was unsuccessful in reaching all children** of the targeted age group (but reached most of them)

Numbers of six-year-old children in primary education, 1995-2021



Source: Administrative data published by the National Institute for Statistics (2023)
Note: The reform was introduced in 2012

Data and Empirical Strategy

We employ difference-in-difference (DiD) estimation techniques to estimate the impact of introducing preparatory school years on maternal employment

- We estimate the **average effect of preparatory classes on the employment** of mothers with six-year-old children:

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

  - E_{ist} denotes whether mother *i* with a six-year-old child is employed (at the respective state s, and in the time period *t*)
  - $Mom6_{ist}$ indicates whether a woman is a mother of a six-year-old child
  - $Post2012_{ist}$ indicates whether a year is after the reform in 2012
  - **$Mom6_{ist} \times Post2012_{ist}$ is the DiD effect of interest**
  - 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
  - γ_t are time-specific, state-invariant characteristics

- We report average marginal effects from a logit specification

We rely on two different control groups and review the reform environment for alternative confounding reforms

- The **treatment group** consists of all mothers whose youngest child is six years old
- We consider two different **control groups**:
    1. Mothers whose youngest child is three or four years old (more similar to treatment group)
    2. Women without children (alternative control group)
- Sample restricted to **women between 20 and 50 years old**
- **No other reforms** that influence the relative employment of mothers of six-year-old children

We use data from the European Labor Force Survey (EU-LFS) from 2010 to 2019

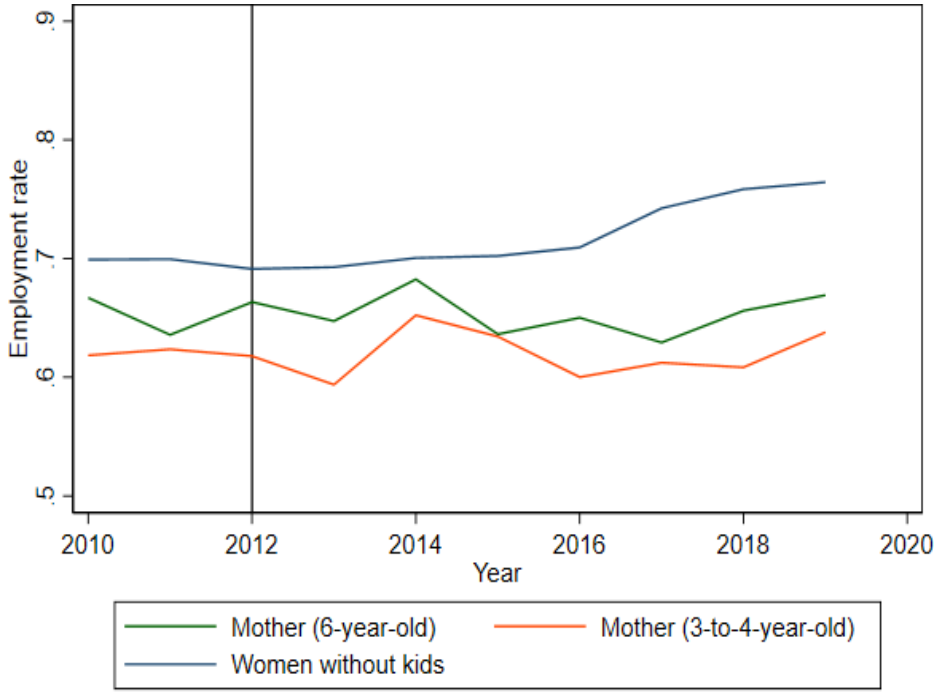
	Mother (6-year-old)		Mother (3- to 4-year-old)		Women without children	
	Mean	SD	Mean	SD	Mean	SD
Age	34.62	5.75	32.26	5.88	34.78	9.20
Migrant	0.00	0.02	0.00	0.04	0.00	0.03
Married	0.87	0.33	0.86	0.34	0.49	0.50
Divorced	0.05	0.22	0.04	0.20	0.08	0.27
Partner lives in household	0.92	0.27	0.92	0.27	0.54	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, less than 15	6.00	0.00	3.50	0.50	.	.
Number of children in the household less than 15	1.64	0.77	1.73	0.90	0.00	0.00
Number of persons in the household of all ages	4.32	1.40	4.43	1.58	2.77	1.30
Number of employed persons in the household ages 15+	1.72	0.90	1.71	0.98	1.87	1.21
Number of inactive adults in the household ages 15+	0.67	0.90	0.74	0.94	0.75	1.00
Employed full-time	0.65	0.48	0.62	0.49	0.72	0.45
Employed part-time	0.06	0.23	0.05	0.22	0.04	0.20
Seeking employment	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	8,948		15,837		189,951	

Source: EU-LFS (2010–2019)

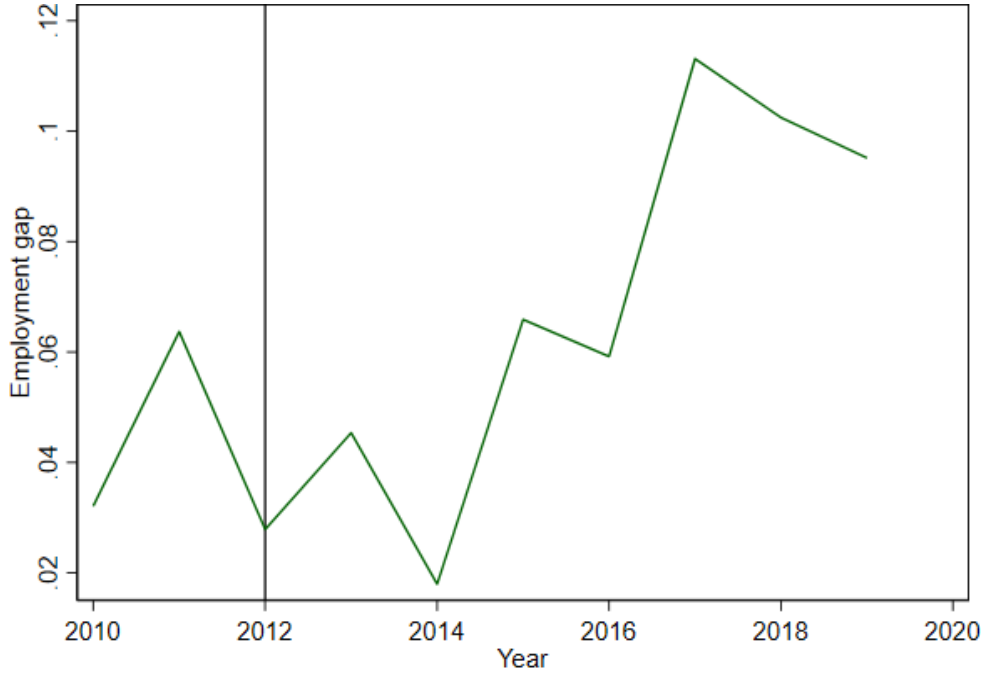
Note: Skill levels follow the official definition of the EU-SILC and is the highest education attainment level according to ISCED 2011. The low-skilled have at most lower secondary education, the middle-skilled at most upper secondary education, and the high-skilled tertiary education degrees

The difference in employment shares of the three groups is evident

Unadjusted employment trends for women with young children and women without children in Romania, 2010–2019



Unadjusted employment gaps for women with young children and women without children, 2010–2019



Source: EU-LFS (2010–2019)

Note: The sample is restricted to women 20 to 50 years old. The vertical black line indicates the year Romania introduced obligatory preparatory classes for six-year-old children

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Results: Preparatory Years and Maternal Labor Supply

The reform led to a considerable increase in the labor supply of mothers of six-year-old children

- **DiD estimate is stable between 2.6 and 4.1 p.p**. (or 4.3 percent and 6.6 percent from an average of 61.2 percent)
- Substituting maternal childcare with **childcare provided by the government is an effective way to increase the maternal labor supply**

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
SD (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

Source: EU-LFS (2010–2019)

Note: The sample consists of mothers of six-year-old children (treatment) and of three- to four-year-old children (control). Standard errors clustered and in parentheses

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The impact is in line with previous findings of mainly positive effects on maternal employment and labor force participation

- The **size of the effect is close to** similar reforms:
  - Earned Income Tax Credit on maternal employment in the United States (Bastian, 2020)
  - Universal childcare reforms in Germany (Geyer, Haan, and Wrohlich, 2015)

- **Impact is lower than:**
  - Universal, full-time public childcare for three-year-olds in Spain (Nollenberger and Rodríguez-Planas, 2015)
  - Greater grandparent availability (Bratti, Frattini, and Scervini 2018)
  - Potential explanation: Preparatory classes' only taking place in the morning

- **Results are robust to:**
  - restricting the age range of mothers
  - abstracting from survey weights
  - using women without children as a comparison
  - measuring the effect on labor force participation
  - including mothers of five- and seven-year-old children in the treatment group

The effect of the reform differs across groups of women with different levels of restrictions

- The **impact** might be **larger** for women with **greater restrictions** prior to the reform
- Reform does not alleviate greater care responsibilities with more than one child

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
SD (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	26,114	26,114	26,114	26,114	23,836	24,601

Source: EU-LFS (2010–2019)

Note: The sample consists of mothers of children between 3 and 4 or 6 years old. Standard errors clustered and in parentheses

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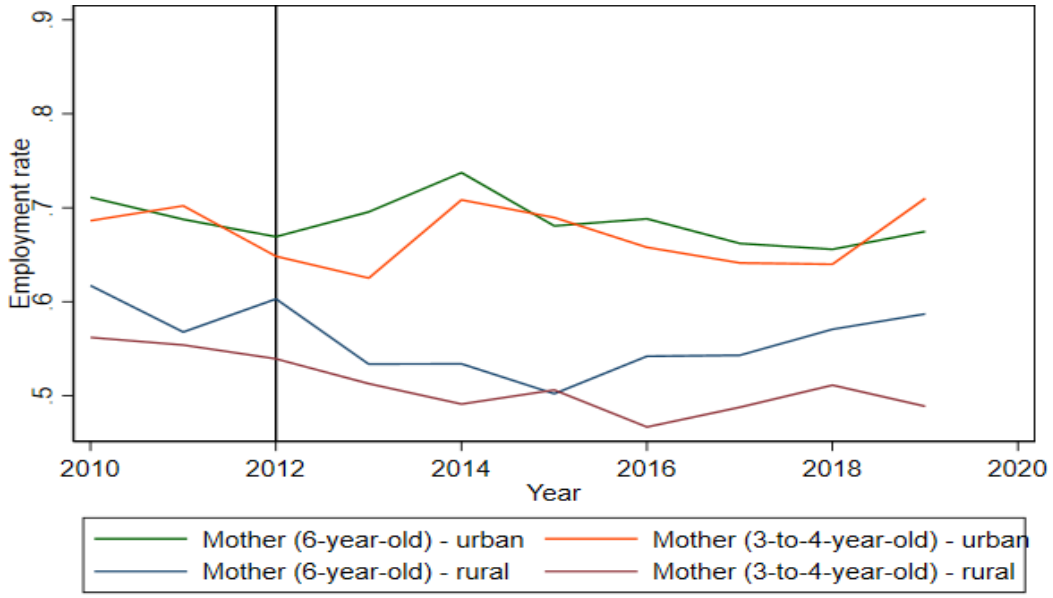
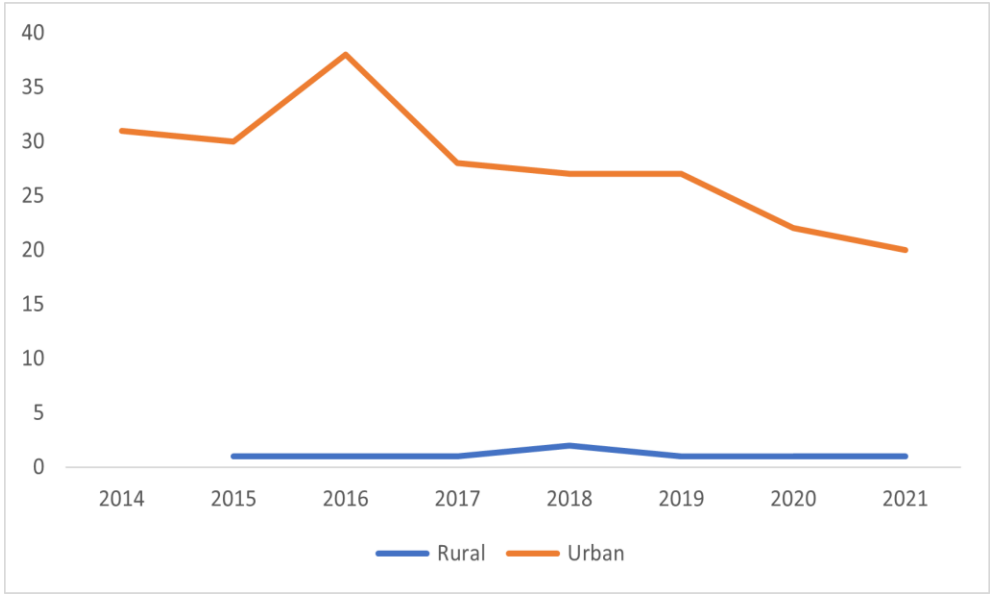
Women in rural areas exposed to the treatment benefited more on average, probably because they had less access to public childcare prior to the reform

- The **number of creches in rural areas is significantly lower** than the number of creches in urban areas
- **Mothers** of children of preschool age face significantly **more constraints in rural** than urban areas

Employment rates of treated and untreated mothers in rural and urban areas, 2010–2019



Number of creches (the ante-preschool level) in rural and urban areas, 2014–2021



Source: EU-LFS (2010–2019) and administrative data published by the National Institute of Statistics (2023)
Note: The vertical black line indicates the year Romania introduced obligatory preparatory classes for six-year-old children

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Additional household members (partners; grandparents) influence the impact of the reform on maternal labor supply

- Households with **partners experienced a larger effect**
  - Presence of partners influences household decisions about labor participation of secondary caregiver (e.g., reservation wages?)
- Households with **additional employed members experience larger effects**
- **Self-employed women experience larger effects**
  - Entrepreneurs especially affected by a lack of childcare options
  - Drop out of leading businesses or entrepreneurial activities
- Households with **elderly experienced lower effects**
  - The reform might be less effective as constraint were less severe: grandparents as informal childcare
  - Elderly care as a parallel problem

The impact of the reform is larger for those women that face larger restrictions

- Women who faced **more impediments** to labor market opportunities prior to the reform **benefit more**
  - Less infrastructure (rural areas)
  - Entrepreneurial activities
  - Higher level of economic security

The estimates are less robust when employing a triple difference estimation

- We add a **third difference estimation:**
  - Mothers of children who did participate in preparatory classes and mothers whose children did not
  - Data from the EU-SILC 2010-2020
- **Small sample size**
- **unobservable confounding factors** impacting mothers exposed to the reform and complying with it differently than mothers who were not exposed or who did not comply

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
SD (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	2,509	2,502	2,502	2,502	2,502	2,509

Source: EU-SILC (2010-2020)

Note: The sample consists of mothers of children between 3 and 4 or 6 years old. Standard errors clustered and in parentheses

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Results:
Hours Worked, Part-time Employment, and Earnings

We find an increase in the probability of being employed part-time as a consequence of the reform

- **Compulsory, preparatory classes only during the morning**
  - Childcare subsidy by the public sector amounted to a half and not a full day

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
SD (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	15,920	15,920	15,920	15,920	15,920	15,920

Source: EU-LFS (2010–2019)
Note: The vertical black line indicates the year Romania introduced obligatory preparatory classes for six-year-old children

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Affected women experienced a significant increase in gross monthly employee cash or near cash income

- The provision of public childcare could therefore also **contribute to closing the gender pay gap**

Effect of the 2012 reform 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
SD (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	1,279	1,279	1,279	1,279

Source: EU-LFS (2010–2019)
Note: The vertical black line indicates the year Romania introduced obligatory preparatory classes for six-year-old children

Conclusions

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Investing in universal, compulsory public childcare is beneficial and could significantly increase female employment and labor force participation rates

- We find that this **reform led to an increase in maternal employment** of 2.6 to 4.1 percentage points
- We argue that the **reform acted as a public subsidy for childcare** and thus increase the working time of mothers
- Mothers of six-year-old children experienced a **larger impact** when they lived in rural areas, were self-employed, had additional children, or lived either with their partner or in a household in which additional members were employed. We argue that **they might have faced a larger alleviation of their care responsibilities**
- The **probability of working part-time increased** among affected mothers
- 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**

Thank you

Appendix

Theoretical rationale

- The study most relevant for our work is Fong and Lokshin (1999), who investigate the interaction between childcare and maternal labor force participation in Romania. Based on their model, they **predict that an increase in the price of childcare negatively affects the number of hours mothers work**
- Another theoretical work closely related to our paper is that of Ho and Pavoni (2020). 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
- The **2012 educational reform**, which was an **exogenous shock** that increased the availability of publicly provided childcare for children of age six
- We argue that this policy led to a sudden **decrease in the price of childcare**, and at the same time **it reduced 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

Nevertheless, the reform resulted in a slight increase in the average number of hours worked per week

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
SD (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	15,920	15,920	15,920	15,920

Source: EU-LFS (2010–2019)
Note: The vertical black line indicates the year Romania introduced obligatory preparatory classes for six-year-old children

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