Child Care and Maternal Employment: Evidence from Vietnam

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UNE Business School Seminar

Armidale

November 2019

I. Introduction (1)

- Women earn less income, less likely to participate in the labor market, esp. in low- and middle-income countries (World Bank, 2012)
- We examine impacts of pre-school (age 1-5) child care on women's labor market outcomes in Vietnam
 - strong effect on women's LMP
 - increase probability of working in a formal wage-earning job
 - increase women's total annual wages, household income per capita and reduce poverty
 - effect of child care is larger for younger children, and younger and highly-educated mothers
- We address endogeneity issue with threshold in the birth months of children
 - children's enrollment in kindergartens or primary schools based on current age instead of completed age
 - use RDD method to compare children born in December vs. January in two adjacent years

I. Introduction (2)

- Our contributions
 - add to the thin literature on women's labor outcomes in developing countries
 - Iarger sample
 - nationally representative data
 - esp., mixed results on impacts of childcare for both richer and poorer countries
 - positive impacts in Argentina (Berlinksi et al, 2011), but zero effects for urban Chinese mothers (Li, 2017)
 - elasticity of maternal employment to child-care costs differs due to differences in samples of women and children, estimation methods, and country contexts (Blau & Currie, 2006; Akgunduz & Plantega, 2018)
 - study rich employment outcomes (quality aspects)
 - > self-employed, employed, farm and non-farm, skilled employment, and wage work
 - household-level outcomes, incl., income, poverty, household size, migration, and co-residence with grandparents
 - in the short term and the medium term
 - Vietnam is an interesting case study
 - despite solid growth, half (44%) self-employed in agriculture, and more than two-thirds (68%) of workers self-employed
 - Iower proportion of women working in a wage job (30%) than men (42%)
 - ➢ half (53%) of children age 1-5 do not attend child care

II. Data

- Vietnam Household Living Standard Surveys (VHLSS) from 2010 to 2016
- used full sample of the VHLSS to increase the number of children born in January and February
- Sample size
 - i. VHLSS 2010: 46,995 households with 185,696 household members.
 - ii. VHLSS 2012: 46,996 households with 182,042 household members.
 - iii. VHLSS 2014: 46,335 households with 178,267 household members.
 - iv. VHLSS 2016: 46,380 households with 175,340 household members.

III. Child care system

- Some main features
 - In 2016, 44% of urban children aged below 6 attended child care centers and kindergartens, for rural children 35%.





IV. Estimation method (1)

- Regression Discontinuity Design (RDD)

$$D_{i,j} = \alpha + \beta December_{i,j} + \gamma X_{i,j} + \epsilon_{i,j}$$
(2)
$$Y_{i,j} = \delta + \theta D_{i,j} + \pi X_{i,j} + u_{i,j}$$
(3)

- One-month bandwidth for children's born in December and January

Figure 2: Proportion of enrolled school-age children and month of birth



IV. Estimation results (1)

Figure 5. Dis. of children by month of birth



Further check on the instrument

Table 2. First-stage probit regression (marginal effects)

	Dependent variable is child care attendance					
Explanatory variables	Pooled sample	Children aged 1-3	Children aged 3-5			
Instrument (child born in	0.092***	0.080***	0.097***			
December)	(0.017)	(0.018)	(0.024)			
Age	0.046***	0.033**	0.048***			
	(0.013)	(0.014)	(0.017)			
Age squared	-0.639***	-0.548**	-0.697***			
	(0.189)	(0.213)	(0.249)			
Ethnic minority	0.021	-0.029	0.049			
	(0.022)	(0.021)	(0.032)			
Number of years of schooling	0.016***	0.012***	0.022***			
	(0.002)	(0.002)	(0.003)			
Dummy year 2010	Reference					
Dummy year 2012	0.025	-0.033	0.013			
	(0.021)	(0.021)	(0.032)			
Dummy year 2014	0.039*	0.015	0.089***			
	(0.022)	(0.024)	(0.033)			
Dummy year 2016	0.078***	0.025	0.088***			
	(0.023)	(0.024)	(0.032)			
Observations	3,863	1,718	2,145			
Pseudo R2	0.029	0.072	0.038			

This table reports the marginal effects from the logit regression of child care attendance on the instrumental variable and control variables of mothers. The observations in these regressions are mothers of children aged 1-6.

Heteroskedasticity-robust standard errors in parentheses. Standard errors are corrected for sampling weights and cluster correlation at the commune level.

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimation from VHLSS 2010, 2012, 2014 and 2016.

IV. Estimation results (2)

Table 3: The effect of child care attendance on mothers' employment

Dependent variables	Panel	A. Short-term	effects	Panel B	Panel B. Medium-term effects		
	All children	Children	Children	All children	Children	Children	
		aged 1-3	aged 3-5		aged 1-3	aged 3-5	
Bivariate probit model (ma	arginal effects)						
Working	-0.110	-0.170	-0.128	-0.016	0.037	0.146	
	(0.126)	(0.144)	(0.090)	(0.110)	(0.060)	(0.124)	
In wage-paying job	0.411***	0.490***	0.408***	0.377***	0.477***	0.333***	
	(0.010)	(0.033)	(0.021)	(0.024)	(0.038)	(0.087)	
In self-employed	-0.103	-0.240**	0.070	0.043	-0.004	0.089	
nonfarm work	(0.105)	(0.092)	(0.149)	(0.108)	(0.150)	(0.145)	
In self-employed farm	-0.454***	-0.563***	-0.440***	-0.419***	-0.384***	-0.297***	
work	(0.011)	(0.053)	(0.008)	(0.032)	(0.078)	(0.103)	
In skilled work	0.108	-0.146	0.043	-0.055	0.187	-0.239	
	(0.835)	(1.260)	(0.238)	(0.384)	(0.143)	(0.157)	
In a formal job	0.257***	0.172	0.264***	0.149	0.382	0.017	
	(0.035)	(0.229)	(0.077)	(0.206)	(0.349)	(0.296)	
2SLS							
Log of monthly working	0.155	0.378	-0.009	0.293	0.489	0.206	
hours	(0.209)	(0.358)	(0.255)	(0.312)	(0.470)	(0.463)	
Log of hourly wage	0.572	0.948	0.141	-0.275	-0.104	-0.421	
	(0.460)	(0.649)	(0.568)	(0.478)	(0.511)	(0.842)	
Log of wage for the last	0.525	0.951	0.113	-0.078	0.071	-0.286	
month	(0.410)	(0.586)	(0.521)	(0.523)	(0.580)	(0.895)	
Log of total wage for the	0.903*	1.165	0.645	-0.068	0.397	-0.527	
past 12 months	(0.524)	(0.743)	(0.666)	(0.678)	(0.733)	(1.183)	

IV. Estimation results (3)

- Robustness checks
 - <u>2SLS and control functions</u> (Rivers and Vuong, 1988; Woolridge, 2015)
 - vary bandwidths to 2 or 3 months
 - <u>falsification analysis</u>

IV. Estimation results (4)

Table 5. 2SLS regression of household-level outcomes on child care attendance

Explanatory variables	Log of income per capita	Household is poor	Living with grandparents	Mothers are migrating	Household size
Child care attendance	0.428*	-0.222*	0.009	0.029	0.047
	(0.237)	(0.124)	(0.053)	(0.050)	(0.363)
Ethnic minority	-0.970***	0.547***	0.021***	-0.017***	0.527***
	(0.030)	(0.018)	(0.008)	(0.005)	(0.058)
Dummy year 2010	Reference				
Dummy year 2012	0.328***	-0.011	0.039***	-0.008	0.112**
	(0.034)	(0.019)	(0.006)	(0.006)	(0.050)
Dummy year 2014	0.530***	-0.070***	0.034***	-0.007	0.094*
	(0.039)	(0.021)	(0.007)	(0.007)	(0.057)
Dummy year 2016	0.678***	-0.106***	0.041***	0.005	0.127**
	(0.041)	(0.021)	(0.009)	(0.009)	(0.061)
Constant	9.316***	0.323***	-0.008	0.014	4.193***
	(0.101)	(0.053)	(0.022)	(0.021)	(0.153)
Observations	3,863	3,863	3,863	3,863	3,863

IV. Estimation results (5)

Table 6. Probability of having a wage job with interactions between child schooling and demographic variables of children and mothers (probit models)

Interaction variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Child care attendance * age	-0.003					
	(-0.330)					
Child care attendance *		0.010**				
schooling years		(2.222)				
Child care attendance * ethnic			-0.071*			
minority			(-1.744)			
Child care attendance * boy				0.004*		
				(1.794)		
Child care attendance * birth					-0.038	
order					(-1.439)	
Child care attendance *						-0.063
Lagged grandparents in household						(-1.028)
Observations	3,863	3,863	3,863	3,863	3,863	3,863
Pseudo R2	0.103	0.104	0.103	0.103	0.106	0.106

IV. Estimation results (6)

Table 7. Probability of having a wage job with interactions between child schooling and demographic variables of children and commune variables

Interaction variables	Model 1	Model 2	Model 3	Model 4	Model 5
Child care attendance * Public	-0.104				
child care center	(-1.415)				
Child care attendance * distance		-0.006***			
to nearest town		(-2.795)			
Child care attendance * village			-0.035		
accessible by car			(-0.782)		
Child care attendance *				-0.028	
kindergarten in village				(-0.678)	
Child care attendance * log of					0.063*
district per capita income					(1.801)
Observations	3,863	2,853	2,853	2,853	3,863
R-squared	0.105	0.071	0.065	0.067	0.123

VI. Conclusion

- We offer first rigorous study of impacts of pre-school (age 1-5) child care on women's labor market outcomes in Vietnam
 - strong effect on women's LMP
 - increase probability of working in a formal wage-earning job
 - increase women's total annual wages, household income per capita and reduces poverty
 - effect of child care is larger for younger children, and younger and highly-educated mothers

- Policy relevance

- \checkmark child care services can reduce the gender gaps
- ✓ perhaps priority should be given to rural areas, or areas with poor infrastructure
- ✓ opportunity costs for not participating in the labor market will be larger for women as the economy develops.

Thank you

Additional results

Table A.9. The effect of child care attendance on maternal employment using different models

Dependent variables	2SLS	Control function	Control function
		with the first step	with both probit
		a linear	(marginal effects)
		probability model	
		(marginal effects)	
Working	-0.160	-0.149	-0.213
	(0.123)	(0.166)	(0.169)
In a wage-earning job	0.526***	0.511***	0.393***
	(0.199)	(0.087)	(0.129)
In self-employed nonfarm work	-0.104	-0.124	-0.099
	(0.141)	(0.109)	(0.123)
In self-employed farm work	-0.582***	-0.495***	-0.446***
	(0.202)	(0.060)	(0.084)
In skilled work	0.029	0.079	0.002
	(0.177)	(0.154)	(0.158)
In a formal job	0.244*	0.262*	0.227
	(0.146)	(0.140)	(0.146)



Additional results

Table A.10. The effect of child care attendance on maternal employment using different models and bandwidths

Dependent variables	2-month bandwidth	3-month bandwidth
Bivariate probit model (marginal effects)		
Working	-0.031	-0.031
	(0.073)	(0.059)
In a wage-earning job	0.405***	0.398***
	(0.008)	(0.007)
In self-employed nonfarm work	-0.073	-0.061
	(0.064)	(0.050)
In self-employed farm work	-0.409***	-0.374***
	(0.019)	(0.024)
In skilled work	0.233**	0.155
	(0.130)	(0.138)
In a formal job	0.255***	0.265***
	(0.026)	(0.018)
2SLS		
Log of monthly working hours	0.242	0.207*
	(0.147)	(0.107)
Log of hourly wage	0.489*	0.490**
	(0.294)	(0.223)
Log of wage for the last month	0.603**	0.519**
	(0.298)	(0.221)
Log of total wage for the past 12 months	0.705*	0.773***
	(0.378)	(0.287)

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Additional results

Table A.3. OLS regression of the instrument on demographic variables of women

	Dependent variables					
	Children born in	Children born in	Children born in			
Explanatory variables	December (one-	November and	October to			
	month bandwidth)	December (two-	December (three-			
		months	months			
		bandwidth)	bandwidth)			
Age	0.000	-0.010	-0.009			
	(0.012)	(0.008)	(0.006)			
Age squared	-0.012	0.122	0.121			
	(0.178)	(0.122)	(0.091)			
Ethnic minority	-0.037	-0.033**	-0.023*			
	(0.024)	(0.016)	(0.012)			
Number of years of schooling	0.003	0.005***	0.003**			
	(0.002)	(0.002)	(0.001)			
Dummy year 2010	Reference					
Dummy year 2012	-0.036	-0.015	-0.000			
	(0.024)	(0.016)	(0.013)			
Dummy year 2014	-0.065***	-0.018	0.000			
	(0.025)	(0.017)	(0.013)			
Dummy year 2016	-0.020	0.015	0.016			
	(0.025)	(0.017)	(0.013)			
Constant	0.488**	0.650***	0.663***			
	(0.197)	(0.134)	(0.102)			
Observations	3,863	8,159	12,730			
R-squared	0.004	0.004	0.002			

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Additional results ²

Figure 6. P-value in the placebo analysis



Panel C. 2-month difference: 3.0% with P-value<=0.05



Panel B. 1-month difference: 1.8% with P-value<=0.05

Panel D. 3-month difference: 5.5% with P-value<=0.05

.4 Pvalue

.6

.8

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0

.2

