Changes in Maternity Leave Coverage: Implications for Fertility, Labour Force Participation and Child Mortality

Salma Ahmed

Australian Gender Economics Workshop
RMIT, Melbourne
14 February 2019

ADI
ALFRED DEAKIN INSTITUTE FOR CITIZENSHIP AND GLOBALISATION

DEAKIN UNIVERSITY

Background and Motivation of this Study

- The ILO Convention extended the period of paid maternity leave (ML) from 12 to 14 weeks (ILO 2000). Internationally, the recent trend in most jurisdictions is to promote longer entitlements (e.g. between 20 and 70 weeks). Examples include Australia (2011), UK (2007), Denmark (2002) and Canada (2000).
- The primary motivation of longer entitlements is to improve the health and wellbeing of both mothers and children.
- Longer ML can lead to longer periods of breastfeeding (Baker and Milligan 2008; Khanam et al. 2016; Albagli and Rau 2018), lower mortality rates among infants and children (Ruhm 2000; Tanaka 2005; Fallon et al. 2017), better postpartum physical and mental health for women (Aitken et al. 2015 ; Albagli and Rau 2018) and higher fertility rates (Risse 2006; Luci-greulich and Thévenon 2013). These findings are largely based on developed countries.

Background and Motivation of this Study (Cont'd)

- Findings derived from developing countries are limited (Chang 2004; İlkkaracan 2012; Nandi et al. 2016; Ahmed 2017; Fallon 2017).

- Except for Nandi et al. (2016) and Fallon et al. (2017), studies in a developing context tend to be either non-empirical or focus on limited case studies (Chang 2004; İlkkaracan 2012; Ahmed 2017).

- Nandi et al. (2016) used a DID approach via the Demographic and Health Surveys (DHS) to examine 20 low- and middle-income countries from 2000 to 2008 but they caution that their findings may not be generalised beyond these countries.

- Fallon et al. (2017) used a cross-sectional time-series approach to investigate 121 low- and middle-income countries from 1999 to 2012 but excluded countries like Afghanistan and Maldives.

Objective of this Study

- To examine the relationship between paid ML (duration and compensation or wage replacement rate (WRR)) and three demographic indicators in South Asia.
  - Primary outcomes are infant mortality rates (IMR) under 1 year, the ratio of employed women to adult population (EP 15+) and total fertility rates (TFR).
- Address a key question: to what extent has paid ML contributed to significant changes in IMR and TFR in South Asia?

Why South Asia?

- Nearly all countries in South Asia have had policies that mandate at least 84 days (or 12 weeks) of paid ML.
- Many of these policies have been significantly revised with a greater emphasis on longer periods of leave duration in recent years.
- There has been remarkable progress in key demographic indicators, e.g., IMR and TFR since the early 2000s. However, sluggish growth is observed in women's labour force participation rates.
- It is not well understood whether recent demographic shifts in South Asia are due to changes in paid ML policies.

Hypotheses of this Study

- **Three hypotheses:**

i. The duration of ML and a higher WRR lowers infant/child mortality rate.

Due to income and substitution effects of paid ML.

ii. The duration of ML and the WRR reduce women's labour force participation.

Due to reduced human capital where leaves are lengthy or if benefits are financed by the employer (Summers 1989).

Also, women tend to already be in the labour force in developing countries due to poverty (Fallon et al. 2017).

iii. A higher WRR is expected to have a positive effect on fertility while the duration of ML will not be associated with fertility.

Although ML is usually paid, it is of short duration and would not be sufficient to provide care for young children.

With higher initial fertility rates in developing countries, extended coverage might discourage women from having more children as their job security and continuity increases.

Contributions of this Study

- This paper contributes to the literature in several ways:
  - It broadens the scope of the study with respect to previous findings by including both Afghanistan and Maldives.
  - Provides a more complete view of the impact of ML policies across the South Asia and hence, contributes to regional development policy.
  - Examines the likely impact for other health policies, e.g. abortion policy.
  - Extends the prior study by Fallon et al. (2017) by considering simultaneity between infant/child mortality rates, fertility and women's labour force participation.
  - Uses a longer time series and a wider set of time-varying and potentially confounding factors that include a country's institutional context.

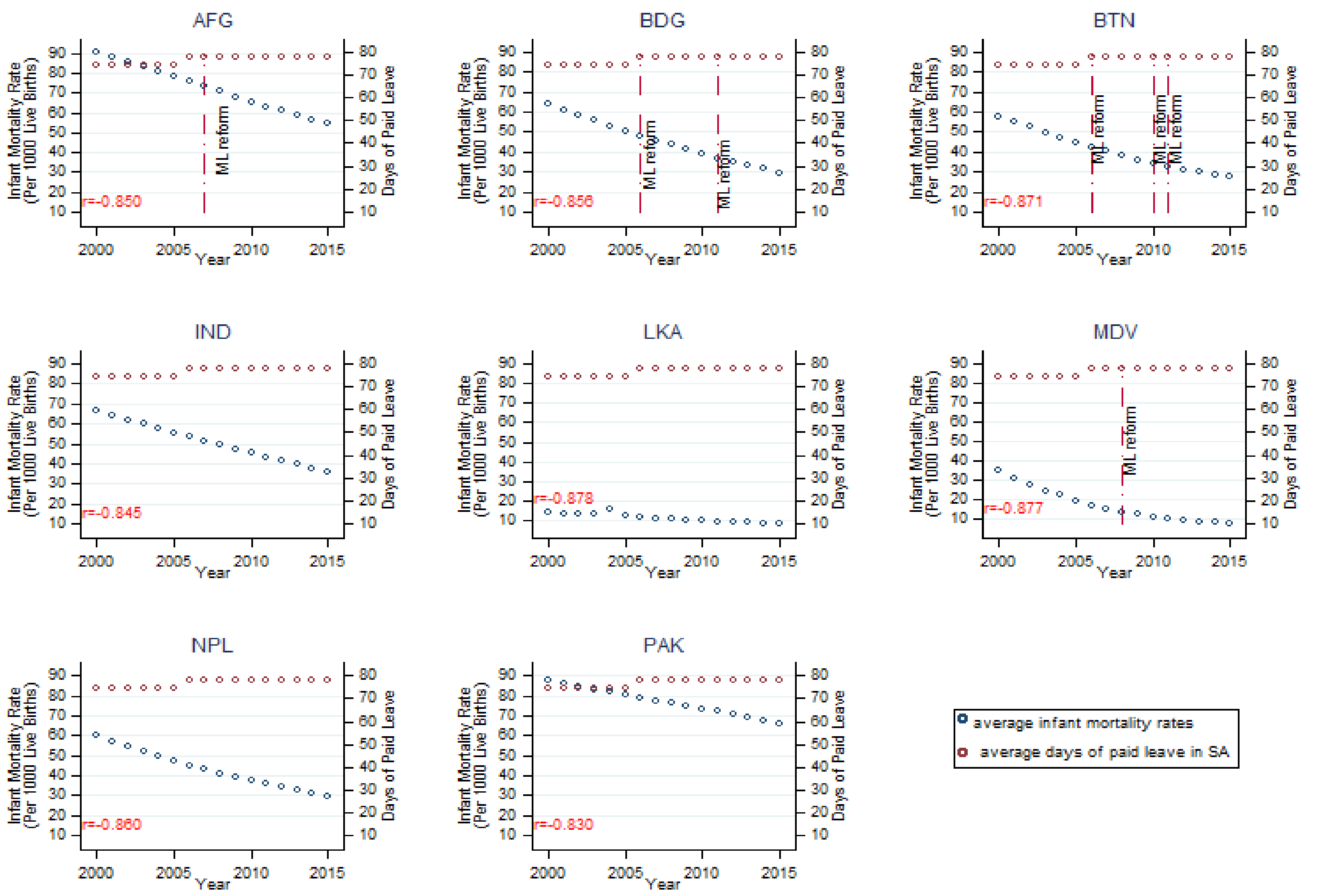
Maternity Leave Policy in South Asia in 2015

Country	Days of paid leave	Rate of pay	Funding	Source
Afghanistan	90 days	100%	Employer	ILO (2013), Labour Law 2007
Bangladesh	112 days	100%	Employer	ILO (2013), Labour Act 2006
Bhutan	56 days	100%	Employer	The Royal Civil Service Commission 2006, 2010 and 2012
India	84 days	100%	Social security (Employer since 2009)	ILO (2013), Maternity Benefits Act 1961
Nepal	52 days	100%	Employer	ILO (2013), Labour Act 1992 and Civil Servant Act 1992
Pakistan	84 days	100%	Employer	ILO (2013), Maternity Benefits Ordinance 1958
Maldives	60 days	100%	Employer	ILO (2013), Employment Act 2008, Civil Service Act 2007
Sri Lanka	84 days	85%	Employer	ILO (2013), Goonetilleke (2016)

Fig. 1 Maternity Leave in South Asia in 2015, by Mandatory Status

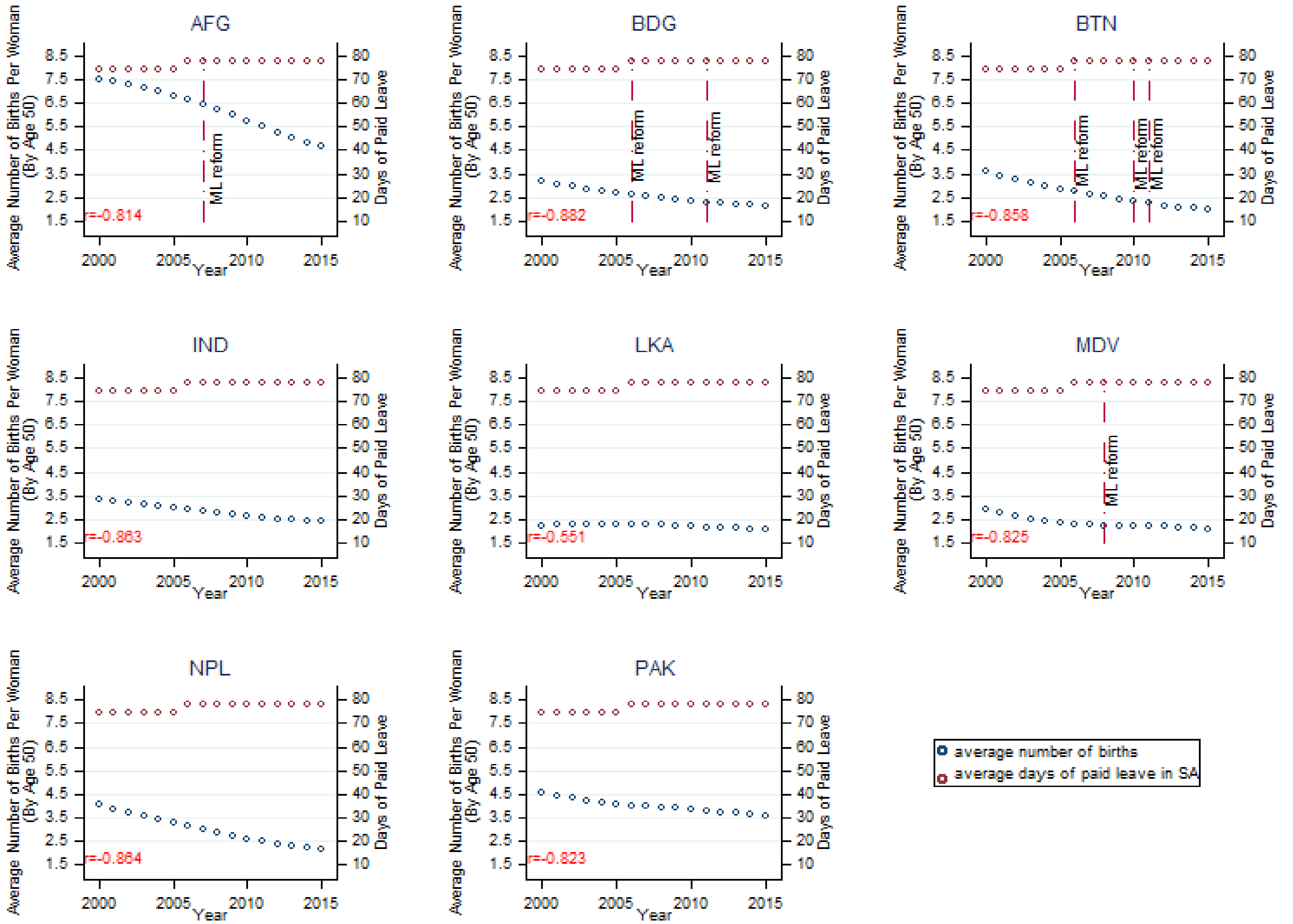
Source. Author's estimates
Notes. AFG: Afghanistan; BDG: Bangladesh; BTN: Bhutan; IND: India; MDV: Maldives; NPL: Nepal; PAK: Pakistan; LKA: Sri Lanka

Fig. 2 Infant Mortality Rates in South Asia, 2000–2015



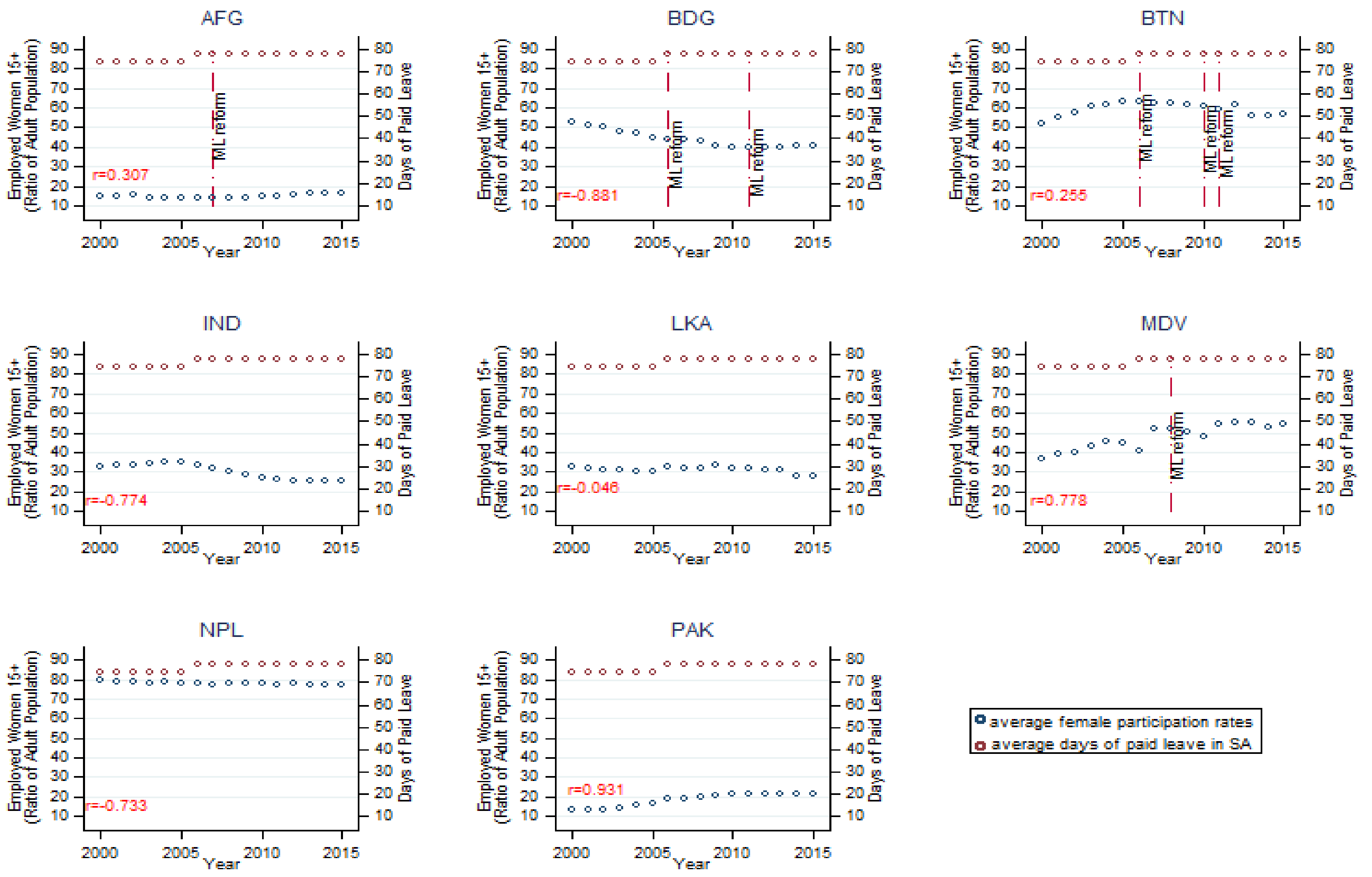
Source. Author's estimates.
Notes. AFG: Afghanistan; BDG: Bangladesh; BTN: Bhutan; IND: India; MDV: Maldives; NPL: Nepal; PAK: Pakistan; LKA: Sri Lanka. r=correlation coefficient

Fig. 3 Fertility Rates in South Asia, 2000−2015



Source. Author's estimates
Notes. AFG: Afghanistan; BDG: Bangladesh; BTN: Bhutan; IND: India; MDV: Maldives; NPL: Nepal; PAK: Pakistan; LKA: Sri Lanka. r= correlation coefficient

Fig. 4 Female Labour Force Participation in South Asia, 2000−2015



Source. Author's estimates
Notes. AFG: Afghanistan; BDG: Bangladesh; BTN: Bhutan; IND: India; MDV: Maldives; NPL: Nepal; PAK: Pakistan; LKA: Sri Lanka. r= correlation coefficient

Data and Sample

- Constructed macro panel data covering the 2000–2015 period for eight South Asian countries: Afghanistan (AFG), Bangladesh (BGD), Bhutan (BTN), India (IND), Maldives (MDV), Nepal (NPL), Pakistan (PAK), Sri Lanka (LKA). The sample consists of 128 country-period observations.
- Sources of data include ILO's ILOSTAT, Conditions of Work and Employment Laws database, UN's World Abortion Policies, WHO database and World Bank's World Development Indicators.
- Main independent variables are days of paid leave (DYSMLV) and wage replacement rates (WRR). Other variables are selected based on their relationship to outcome variables.
- Paid ML is distinguished from parental leave and does not include family leave, adoption leave or child-rearing leave.
- Country-specific time trends are also included to capture idiosyncratic changes in national contexts.

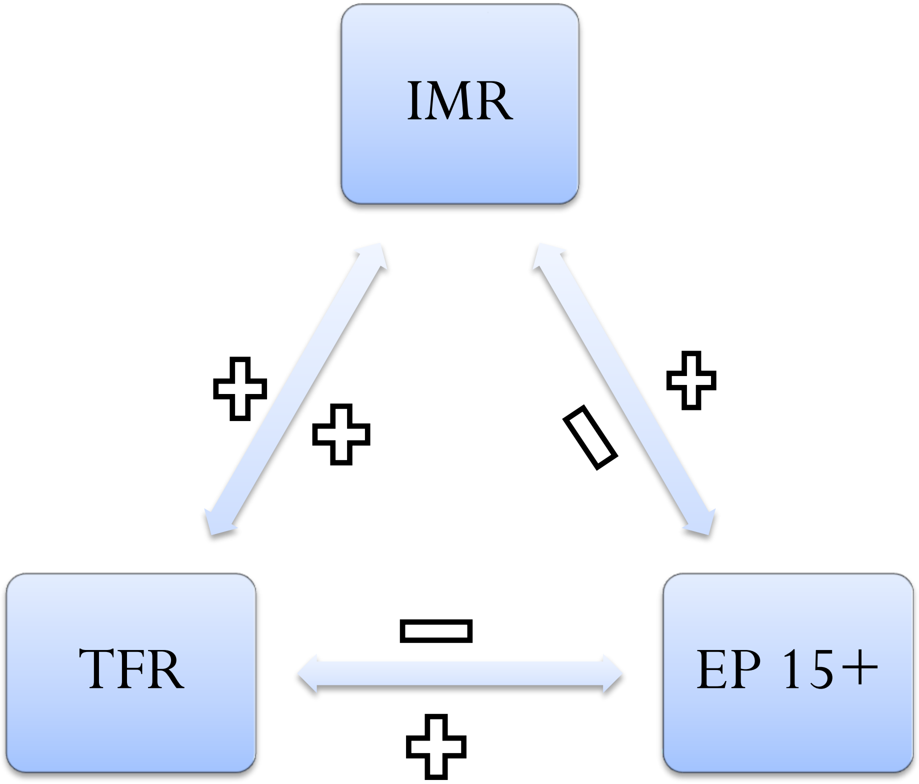
Table 1. Summary Statistics

	Symbol	N	Mean	SD
Dependent variables				
Mortality rate, under 1 (per 1,000 live births per annum)	IMR	128	44.7	23.44
Ratio of employed women to adult population, age 15+	EP 15+	128	40.55	20.32
Fertility rate, total (births per woman by age 50)	TFR	128	3.22	1.33
Independent variables				
Maternity leave duration (days)	DYSMLV	128	76.44	17.58
Wage replacement rate (%)	WRR	128	98.13	4.98
Mean age at childbirth	MEANAGE	128	28.03	1.4
Square of mean age	MEANAGESQ	128	787.79	77.81
Divorce rate, imputed (females age 15–49)	DIV	128	1.01	1.6
GDP per capita, ppp (constant 2011 dollars)	GDPPC	128	1766.82	1731.46
Practicing open defecation (% of population)	DEFEC	128	21.09	19.64
Access to electricity (% of population)	ELECTRICITY	128	68.01	23.63
Public health expenditure, total (% of GDP)	SPENDING	128	2.36	2.05
Dependency rate, imputed (population age 65+ relative to population age 15-64, %)	DEP	128	7.34	1.81
Unemployment rate, total imputed (female to male ratio)	UNEMP	128	1.56	0.49
Abortion policy (liberal = 1; not liberal = 0)	ABORT	128	0.25	0.43

Source: Author's estimates

Empirical Framework

- There is a complex interconnection between TFR, IMR and EP 15+ and hence, a 3SLS model is used



Empirical Framework (Cont'd)

ADI ALFRED DEAKIN INSTITUTE FOR CITIZENSHIP AND GLOBALISATION
DEAKIN UNIVERSITY

- The 3SLS model consisted of three equations and is specified in a linear form:

$$\text{IMR}_{jt} = a_0 + a_1 C_j + a_2 T_t + a_3 \text{DYSMLV}_{jt} + a_4 \text{WRR}_{jt} + a_5 \text{TFR}_{jt} + a_6 \text{EP}_{jt} + a_7 X_{jt} + \mu_{1jt} \quad (1)$$

$$\text{EP}_{jt} = b_0 + b_1 C_j + b_2 T_t + b_3 \text{DYSMLV}_{jt} + b_4 \text{WRR}_{jt} + b_5 \text{TFR}_{jt} + b_7 X_{jt} + \mu_{2jt} \quad (2)$$

$$\text{TFR}_{jt} = c_0 + c_1 C_j + c_2 T_t + c_3 \text{DYSMLV}_{jt} + c_4 \text{WRR}_{jt} + c_5 \text{IMR}_{jt} + c_6 \text{EP}_{jt} + c_7 X_{jt} + \mu_{3jt} \quad (3)$$

- where j indexes country and t year, C is country-specific fixed effects, X is a vector of other control variables and μ is an error term.
- Eqs (1)-(3) are estimated under four alternative models.
- Empirical tests are conducted to check the endogeneity of both DYSMLV and WRR and the exogeneity of excluded variables from each equation.
- Reverse causality between ML variables and demographic indicators is addressed by taking up lagged values of DYSMLV and WRR. Abortion policy is also subjected to this test.

Table 2. Effects of Paid Maternity Leave on Fertility, Labour Force Participation and Infant Mortality

	IMR				**EP 15+**				**TFR**			
	Model A	Model B	Model C	Model D	Model A	Model B	Model C	Model D	Model A	Model B	Model C	Model D
DYSMLV	-0.006***	-0.005*			-0.252***	-0.251***			0.013	-0.003		
	(0.002)	(0.003)			(0.045)	(0.054)			(0.008)	(0.009)		
WRR			-0.167	-0.472			0.057	-0.429			0.018	0.066***
			(0.458)	(0.341)			(0.389)	(0.619)			(0.013)	(0.009)
IMR									1.502***		1.318***	
									(0.371)		(0.275)	
EP 15+	-0.007	-0.009	-0.003	-0.010					0.023	0.005	-0.005	0.032
	(0.007)	(0.008)	(0.017)	(0.011)					(0.029)	(0.038)	(0.023)	(0.034)
TFR	0.309	0.287	0.381	0.198	3.572	3.379	3.295	9.726				
	(0.231)	(0.373)	(0.341)	(0.431)	(4.602)	(7.977)	(5.308)	(8.333)				
ABORT									-3.969**	-3.800	-3.176***	-5.725**
									(1.898)	(2.432)	(0.581)	(2.552)
Constant	-20.374	-35.865***	0.0001	0.0001	26.335	27.699	0.0001	0.0001	-0.985	7.551***	0.0001	0.0001
	(15.238)	(13.726)	(0.0001)	(0.0001)	(35.895)	(61.821)	(0.0001)	(0.0001)	(2.285)	(1.886)	(0.0001)	(0.0001)
R^2	0.994	0.994	0.993	0.993	0.988	0.988	0.985	0.982	0.992	0.991	0.994	0.988
Hansen *j* test	1.06	1.06	1.51	1.51	8.08	0.449	2.47	2.49	0.601	7.69	8.51	7.64
	(p = 0.786)	(p = 0.786)	(p = 0.681)	(p = 0.681)	(p = 0.088)	(p = 0.978)	(p = 0.779)	(p = 0.644)	(p = 0.987)	(p = 0.103)	(p = 0.074)	(p = 0.105)
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	128	128	128	128	128	128	128	128	128	128	128	128

Standard errors are in parentheses and are estimated based on 200 bootstrapped replications. Variables included but not reported for different specifications are MEANAGE, MEANAGESQ, DIV, DEP, UNEMP, GDPPC, DEFEC, ELEC, and SPEND. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 3. Reverse Causality Test

	IMR				EP 15+				TFR			
	Model A		Model C		Model A		Model C		Model A		Model C	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
DYSMLV, 10-year lead	0.002				0.000				-0.005***			
	(0.002)				(0.033)				(0.002)			
DYSMLV	-0.001	-0.005***			-0.218**	-0.226***			-0.001	0.011***		
	(0.004)	(0.001)			(0.088)	(0.043)			(0.005)	(0.004)		
WRR, 10-year lead			-0.003				0.270***				0.014***	
			(0.003)				(0.072)				(0.003)	
WRR			-0.249	-0.149			0.104	-0.110			0.009	0.010
			(0.188)	(0.128)			(0.167)	(0.170)			(0.006)	(0.007)
ABORT, 10-year lead										0.001		0.045
										(0.029)		(0.030)
ABORT										-3.882***		-2.920***
										(0.706)		(0.669)
Constant	-12.470*	-15.955**	0.0001	0.0001	17.310	22.859	0.0001	0.0001	0.012	-1.884	0.0001	0.0001
	(7.373)	(7.359)	(0.0001)	(0.0001)	(21.013)	(16.711)	(0.0001)	(0.0001)	(1.342)	(1.336)	(0.0001)	(0.0001)
R^2	0.995	0.995	0.994	0.993	0.988	0.988	0.987	0.985	0.994	0.993	0.996	0.995
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	118	118	118	118	118	118	118	118	118	118	118	118

Standard errors are in parentheses and are estimated based on 200 bootstrapped replications. Explanatory variables used for models A and C of Table 2 are used in this table. * p<0.10, ** p<0.05, *** p<0.01.

Table 4. Effects of Paid Maternity Leave on Fertility, Labour Force Participation and Infant Mortality, Correcting for Endogeneity

	(1)	(2)	(3)	(4)	(5)	(6)
	IMR		**EP 15+**		**TFR**	
	Model A	Model C	Model A	Model C	Model A	Model C
DYSMLV, 1-year lag	-0.000		-0.081***		0.002	
	(0.001)		(0.028)		(0.002)	
DYSMLV	-0.005***		-0.192***		0.010***	
	(0.002)		(0.046)		(0.004)	
WRR, 1-year lag		0.001		0.156		-0.008
		(0.004)		(0.134)		(0.005)
WRR		-0.173		-0.172		0.028***
		(0.152)		(0.251)		(0.010)
Constant	-15.711*	0.0001	43.067***	0.0001	-1.063	0.0001
	(8.121)	(0.0001)	(14.455)	(0.0001)	(1.221)	(0.0001)
R^2	0.994	0.993	0.989	0.985	0.992	0.994
Country	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Time trend	Yes	Yes	Yes	Yes	Yes	Yes
N	126	126	126	126	126	126

Standard errors are in parentheses and are estimated based on 200 bootstrapped replications. Explanatory variables used for models A and C of Table 2 are used in this table. * p<0.10, ** p<0.05, *** p<0.01.

Robustness Checks

- Alternative dependent variables for infant mortality and female labour force participation
  - Re-estimate Models A and C of Table 2 with post-neonatal infant deaths (between 28 days and 1 year of age per 1000 live births) and child mortality rates (deaths between 1 and 5 years of age per 1000 live births). The results lend support to Hypothesis 1, except child mortality.
  - Re-estimate Models A and C of Table 2 with EP 15-25 and EP 25+. Similar results are observed as those obtained using the EP 15+.
- Additional explanatory variables are included in Models A and C to explore the relevance of a potential channel. In so doing,
  - **First:** test whether ML measures have a significant effect on the channel variable, such as prenatal care, the share of children who received immunisations (e.g. DTP and measles), the length of breastfeeding and a number of battle-related deaths.
    - Results suggest that DYSMLV does have effect on the incidence of breastfeeding and battle-related deaths and WRR on pre-natal care, prevalence of anaemia and battle-related deaths.

Robustness Checks (Cont'd)

- **Second:** re-estimate Model A with a control of incidence of breastfeeding and battle-related deaths and Model C with a control of pre-natal care, prevalence of anaemia and battle-related deaths.

  - Results suggest that the effect of DYSMLV is less precise in the mortality equation, suggesting that the effect of DYSMLV passes at least partly through the length of breastfeeding or battle-related deaths (Model A).

  - The coefficient on WRR gains in magnitude and statistical significance once the battle-related deaths variable is included in the fertility equation (Model C).

Country Case Study

- The estimated Models A and C assume that the effects of paid ML are identical in all South Asian countries.
- However, each country in South Asia is different in terms of implementation of paid ML and the availability of abortion.
- Also, ML pay is entirely funded by employers in South Asia, except in India until 2008.
- This calls for further clarity whether the paid ML coverage has the same effective influences in all countries of South Asia.
- To investigate such possible heterogeneity, Models A and C of Table 2 are re-estimated but each model includes interaction between country dummies with DYSMLV and WRR.
- Other determinants of TFR, IMR and EP 15+ assumed to be identical for all countries in South Asia.

Table 7. Effects of Paid Maternity Leave on Fertility, Labour Force Participation and Infant Mortality, by Country

	DYSMLV Model A						WRR Model C					
	IMR		EP 15+		TFR		IMR		EP 15+		TFR	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
AFG	-0.232*	-0.021**	0.041	-0.790***	0.002	0.061***	-0.167	-0.167	0.057	0.057	0.018	0.018
	(0.140)	(0.009)	(0.309)	(0.208)	(0.011)	(0.018)	(0.287)	(0.281)	(0.451)	(0.404)	(0.013)	(0.012)
BDG	-0.006***	-0.006***	-0.252***	-0.252***	0.013**	0.013*	-0.152	-0.152	0.526**	0.526***	-0.016	-0.016
	(0.002)	(0.001)	(0.040)	(0.042)	(0.006)	(0.007)	(0.296)	(0.292)	(0.219)	(0.201)	(0.018)	(0.017)
BTN	-0.348	-0.008***	1.057***	-0.278***	-0.078**	0.016**	-0.151	-0.151	0.625**	0.625***	-0.015	-0.015
	(0.231)	(0.003)	(0.281)	(0.089)	(0.032)	(0.007)	(0.294)	(0.290)	(0.256)	(0.231)	(0.021)	(0.020)
IND	-0.237	-0.010**	0.413**	-0.477***	-0.043***	0.020*	-0.153	-0.153	0.388	0.388	-0.014	-0.014
	(0.158)	(0.004)	(0.188)	(0.076)	(0.016)	(0.012)	(0.301)	(0.296)	(0.270)	(0.242)	(0.017)	(0.016)
LKA	-0.246	-0.019***	0.499***	-0.391***	-0.031**	0.032***	-0.191	-0.191	0.542*	0.542**	-0.005	-0.005
	(0.156)	(0.003)	(0.177)	(0.057)	(0.015)	(0.012)	(0.349)	(0.345)	(0.286)	(0.260)	(0.019)	(0.018)
MDV	-0.321	-0.004	0.160	-1.087***	-0.061***	0.028	-0.148	-0.148	0.135	0.135	-0.020	-0.020
	(0.217)	(0.003)	(0.383)	(0.099)	(0.020)	(0.032)	(0.296)	(0.292)	(0.309)	(0.287)	(0.017)	(0.015)
NPL	-0.382	-0.016***	1.643***	0.204*	-0.083*	0.019*	-0.155	-0.155	0.895***	0.895***	-0.007	-0.007
	(0.250)	(0.003)	(0.270)	(0.115)	(0.047)	(0.011)	(0.295)	(0.290)	(0.258)	(0.232)	(0.029)	(0.028)
PAK	-0.238	-0.012***	0.226	-0.665***	-0.029**	0.034**	-0.156	-0.156	0.234	0.234	-0.005	-0.005
	(0.154)	(0.004)	(0.269)	(0.138)	(0.014)	(0.016)	(0.294)	(0.289)	(0.361)	(0.328)	(0.016)	(0.015)
Constant	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
R^2	0.994	0.994	0.988	0.988	0.992	0.992	0.993	0.993	0.985	0.985	0.994	0.994
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	128	128	128	128	128	128	128	128	128	128	128	128

Standard errors are in parentheses and are estimated based on 200 bootstrapped replications. Explanatory variables used for models A and C of Table 2 are used in this table. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Concluding Remarks

- The amendment of paid ML length in South Asia tends to decrease IMR and labour force participation for women, as hypothesised.
- There is no evidence that paid ML (DYSMLV and WRR) affect fertility rates in South Asia.
- The findings regarding IMR and female labour force participation both support and contradict the findings of Fallon et al. (2017).
- This could be due to the use of different policy measures (e.g., WRR and abortion policy), duration of leave, and different geographical and period coverage.
- The effect of each policy measure (DYSMLV and WRR) varies by country in South Asia.
- There is a strong positive effect of DYSMLV on female labour force participation and negative effect on fertility in some areas of South Asia when combined with a liberal abortion policy.
- This is an important insight and suggests that the needs of women and their fertility intentions are very heterogeneous within the South Asian region.