

A GMM approach for an explanation of the fertility change upward in Tunisia

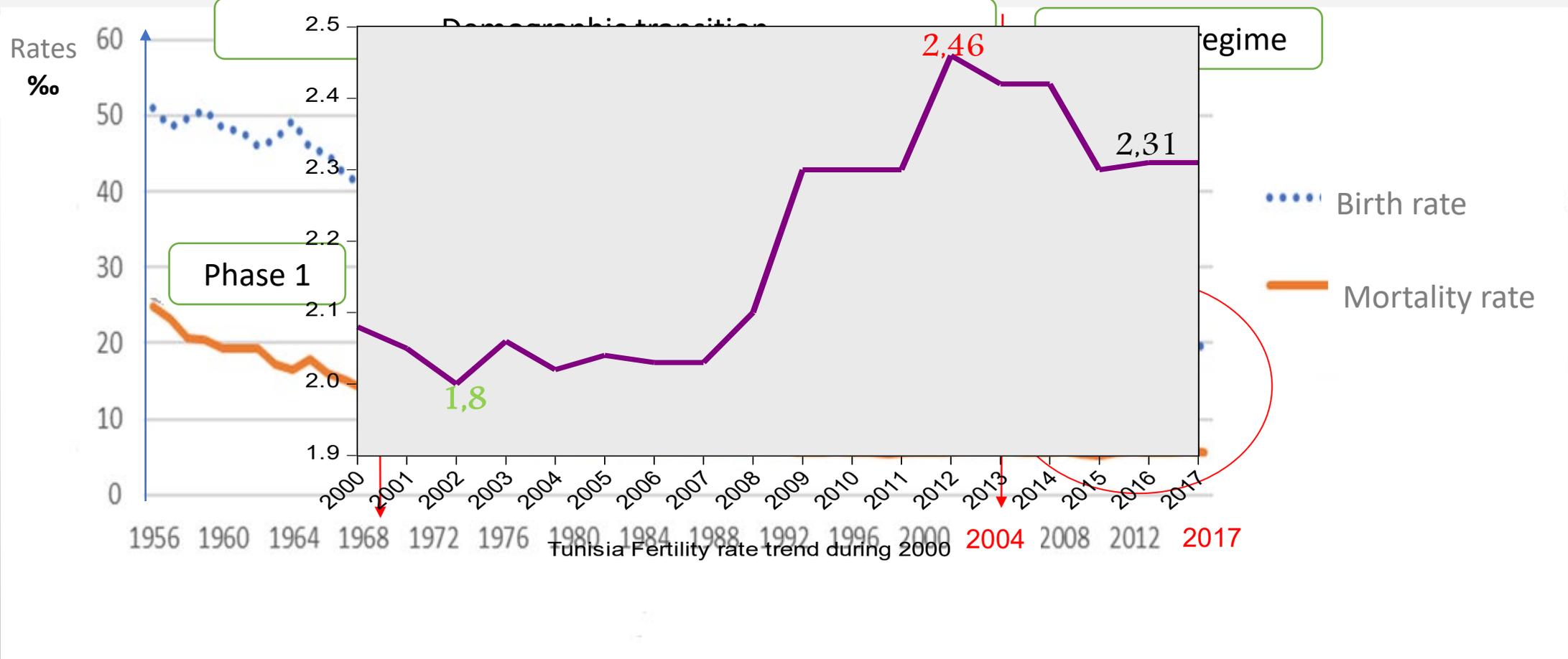
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Fertility evolution during 2000-2017 in Tunisia



Motivation
&
Issue

Theoretical
discussion

Tunisian case

Data and
Model
specification

Results and
Interpretations

Conclusion

Policy
&
recommandations



**Is fertility will keep its rise and what are
the causes of this trend change upward ?**

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No clear and convincing explanation have been advanced

Courb...
unde...
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Paper target: Give some light at this current and unexpected demographic issue in Tunisia

Revisit the main fertility decrease determinants (as contraception, marriage, education,..) **during the post-transition period**, in order to inspect if they do no longer influence fertility downward.

We re-examine the education-fertility interrelationship to check if education does no longer play its role in reducing fertility as strongly acclaimed by Becker (1960 and 1965), and as proved in the previous work on Tunisian case (e.g. Cochrane et Guilkey, 1995, Frini and Muller, 2012).
Explore new factors in favor of fertility rise, such as divorce, unemployment and longevity in line with Easterlin approach (Easterlin 1975 and 1978 and Easterlin, Pollak et al. 1980).

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Demographic
transition

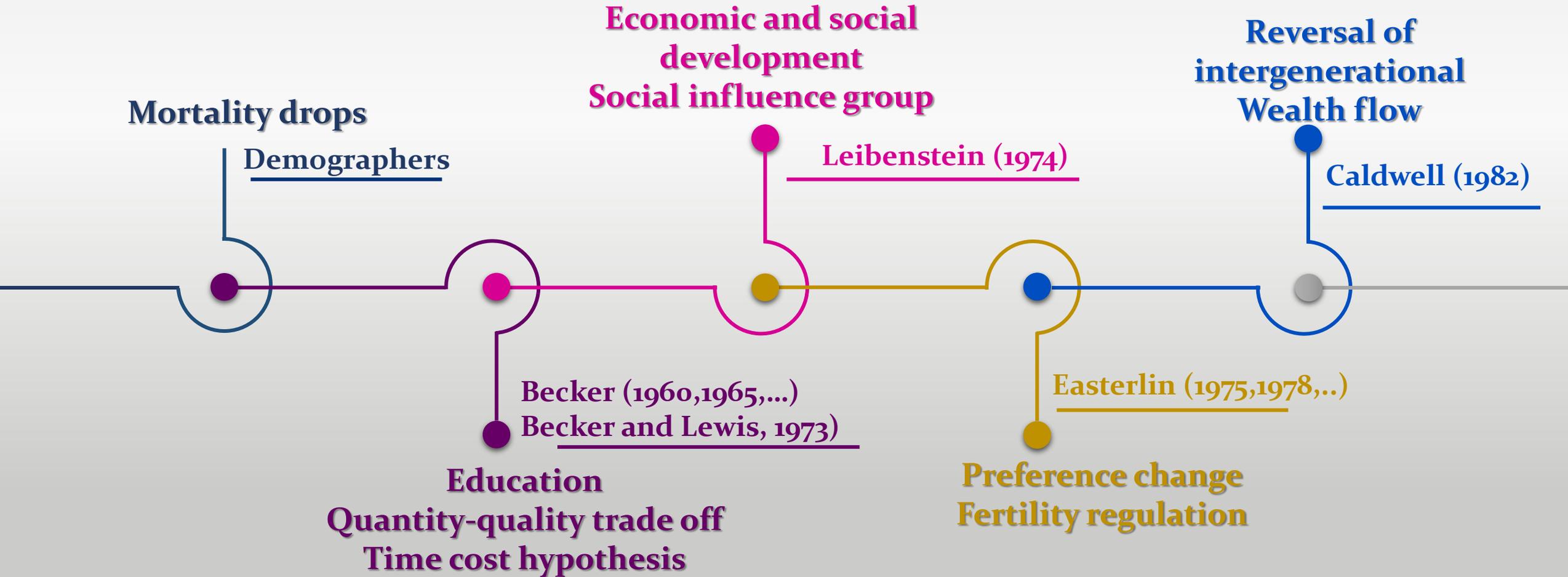
- A move in demographics, from high birth and death rates, what is called a “traditional demographic system”, to low rates.

Post demographic
transition
Modern demographic
regime

- Population continues to grow very slowly; mortality and birth rates are at low level.



Literature overview



The potentially liable factors of fertility rise

1

Contraceptive prevalence decline and fertility control looseness by ONFP board

1 *2* *3* *4* *5* *6* *7* *8* *9* *10* *11* *12* *13* *14* *15* *16* *17* *18* *19* *20* *21* *22* *23* *24* *25* *26* *27* *28* *29* *30* *31* *32* *33* *34* *35* *36* *37* *38* *39* *40* *41* *42* *43* *44* *45* *46* *47* *48* *49* *50* *51* *52* *53* *54* *55* *56* *57* *58* *59* *60* *61* *62* *63* *64* *65* *66* *67* *68* *69* *70* *71* *72* *73* *74* *75* *76* *77* *78* *79* *80* *81* *82* *83* *84* *85* *86* *87* *88* *89* *90* *91* *92* *93* *94* *95* *96* *97* *98* *99* *100* *101* *102* *103* *104* *105* *106* *107* *108* *109* *110* *111* *112* *113* *114* *115* *116* *117* *118* *119* *120* *121* *122* *123* *124* *125* *126* *127* *128* *129* *130* *131* *132* *133* *134* *135* *136* *137* *138* *139* *140* *141* *142* *143* *144* *145* *146* *147* *148* *149* *150* *151* *152* *153* *154* *155* *156* *157* *158* *159* *160* *161* *162* *163* *164* *165* *166* *167* *168* *169* *170* *171* *172* *173* *174* *175* *176* *177* *178* *179* *180* *181* *182* *183* *184* *185* *186* *187* *188* *189* *190* *191* *192* *193* *194* *195* *196* *197* *198* *199* *200* *201* *202* *203* *204* *205* *206* *207* *208* *209* *210* *211* *212* *213* *214* *215* *216* *217* *218* *219* *220* *221* *222* *223* *224* *225* *226* *227* *228* *229* *230* *231* *232* *233* *234* *235* *236* *237* *238* *239* *240* *241* *242* *243* *244* *245* *246* *247* *248* *249* *250* *251* *252* *253* *254* *255* *256* *257* *258* *259* *260* *261* *262* *263* *264* *265* *266* *267* *268* *269* *270* *271* *272* *273* *274* *275* *276* *277* *278* *279* *280* *281* *282* *283* *284* *285* *286* *287* *288* *289* *290* *291* *292* *293* *294* *295* *296* *297* *298* *299* *300* *301* *302* *303* *304* *305* *306* *307* *308* *309* *310* *311* *312* *313* *314* *315* *316* *317* *318* *319* *320* *321* *322* *323* *324* *325* *326* *327* *328* *329* *330* *331* *332* *333* *334* *335* *336* *337* *338* *339* *340* *341* *342* *343* *344* *345* *346* *347* *348* *349* *350* *351* 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*684* *685* *686* *687* *688* *689* *690* *691* *692* *693* *694* *695* *696* *697* *698* *699* *700* *701* *702* *703* *704* *705* *706* *707* *708* *709* *710* *711* *712* *713* *714* *715* *716* *717* *718* *719* *720* *721* *722* *723* *724* *725* *726* *727* *728* *729* *730* *731* *732* *733* *734* *735* *736* *737* *738* *739* *740* *741* *742* *743* *744* *745* *746* *747* *748* *749* *750* *751* *752* *753* *754* *755* *756* *757* *758* *759* *760* *761* *762* *763* *764* *765* *766* *767* *768* *769* *770* *771* *772* *773* *774* *775* *776* *777* *778* *779* *780* *781* *782* *783* *784* *785* *786* *787* *788* *789* *790* *791* *792* *793* *794* *795* *796* *797* *798* *799* *800* *801* *802* *803* *804* *805* *806* *807* *808* *809* *810* *811* *812* *813* *814* *815* *816* *817* *818* *819* *820* *821* *822* *823* *824* *825* *826* *827* *828* *829* *830* *831* *832* *833* *834* *835* *836* *837* *838* *839* *840* *841* *842* *843* *844* *845* *846* *847* *848* *849* *850* *851* *852* *853* *854* *855* *856* *857* *858* *859* *860* *861* *862* *863* *864* *865* *866* *867* *868* *869* *870* *871* *872* *873* *874* *875* *876* *877* *878* *879* *880* *881* *882* *883* *884* *885* *886* *887* *888* *889* *890* *891* *892* *893* *894* *895* *896* *897* *898* *899* *900* *901* *902* *903* *904* *905* *906* *907* *908* *909* *910* *911* *912* *913* *914* *915* *916* *917* *918* *919* *920* *921* *922* *923* *924* *925* *926* *927* *928* *929* *930* *931* *932* *933* *934* *935* *936* *937* *938* *939* *940* *941* *942* *943* *944* *945* *946* *947* *948* *949* *950* *951* *952* *953* *954* *955* *956* *957* *958* *959* *960* *961* *962* *963* *964* *965* *966* *967* *968* *969* *970* *971* *972* *973* *974* *975* *976* *977* *978* *979* *980* *981* *982* *983* *984* *985* *986* *987* *988* *989* *990* *991* *992* *993* *994* *995* *996* *997* *998* *999* *1000*

Increase of marriage

2 Medical staff and managers motivation in contact with that of ONFP

3 A frequent... During 2004-2014 *Slow education development*

4 • A decrease of the celibacy rate from 42.2% to 36.9%

Divorce increase

• The school dropout rate increased to reach 10 % for primary and 11 % for the secondary in 2019

5 Divorce doubled from 0.6 % to 1.3 % during 1994- 2014

Longevity gain

6 Births at age group [40-45] increased, from 6000 births per year during 2000-2004 to 9196 in 2014.

Enduring and high Unemployment

Motivation & issue

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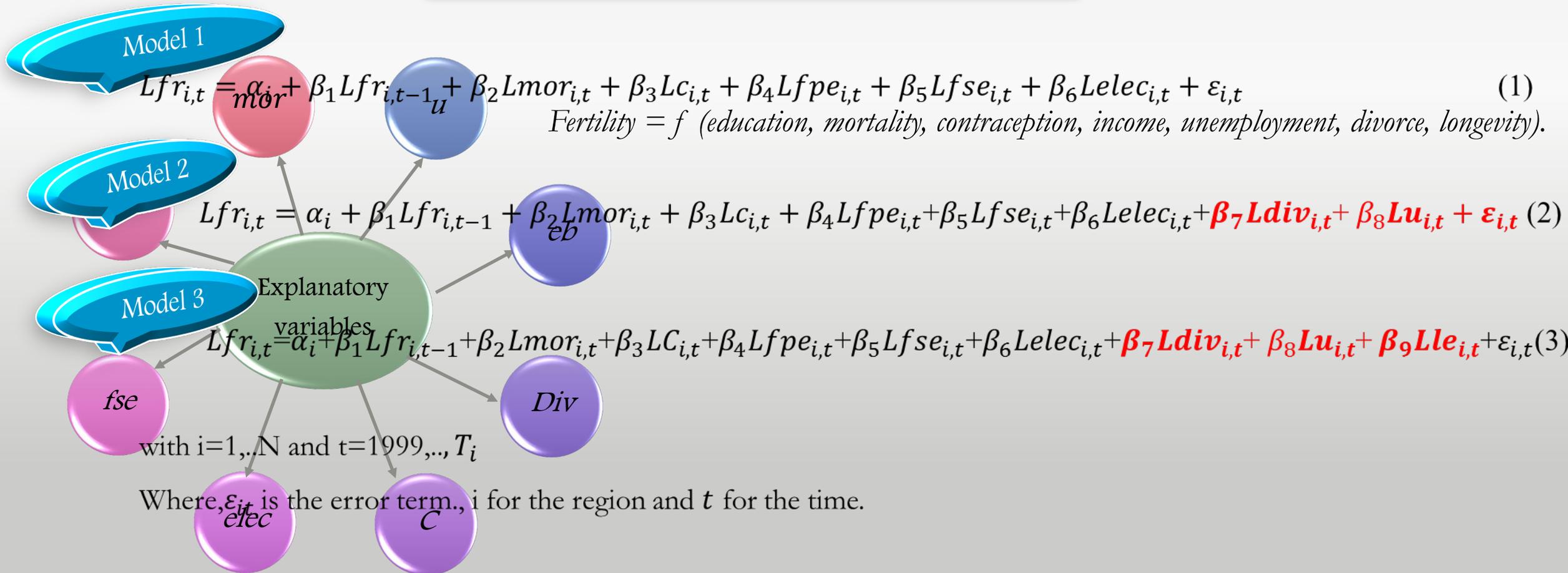
Data and Model specification

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Policy & recommendations

Dynamic one-step generalized method of moments (GMM) method

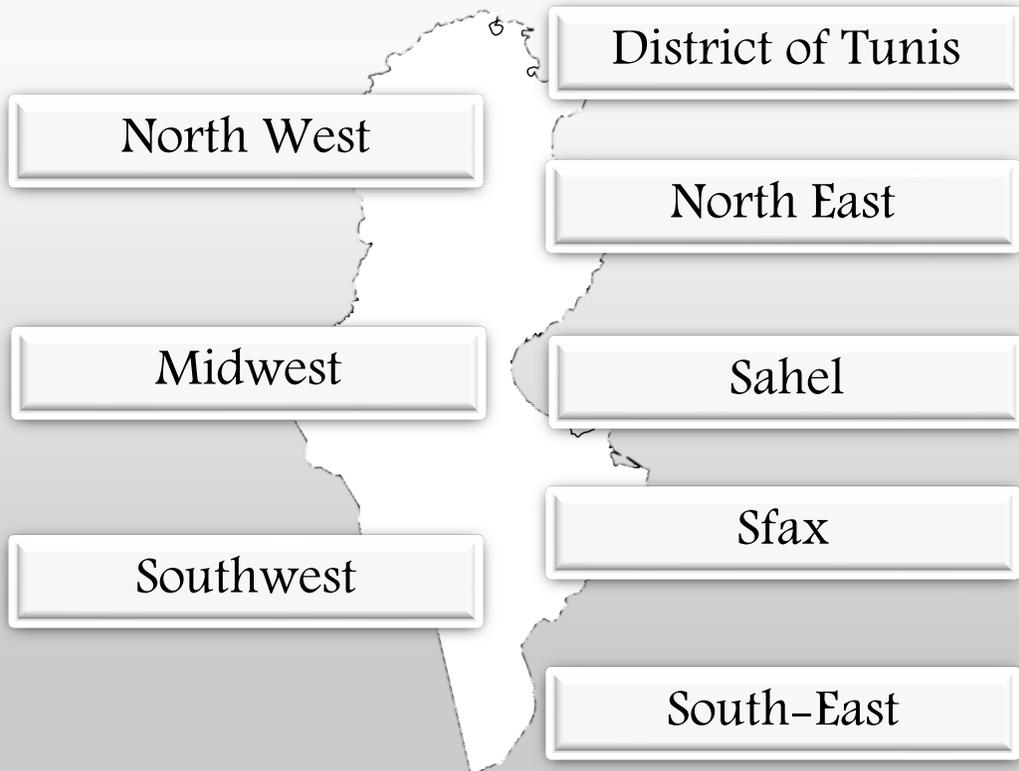




✓ Individual dimension
8 Tunisian regions

✓ Temporal dimension

1997-2017



✓ Number of observations

152

✓ Data Sources

Tunisian National
institute of
statistics



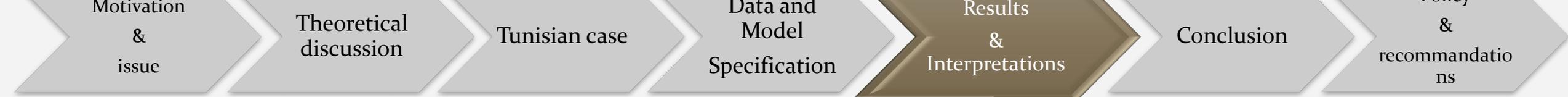
Table 1. Descriptive statistics of variables
Table 2. Correlation matrix

	Lfr	Lc	Lmor	Lfpe	Lfse	Lelec	Lu	Lle	Ldiv
Lfr	1								
Lc	-0.408	1							
Lmor	-0.064	0.044	1						
Lfpe	-0.191	0.592	0.024	1					
Lfse	-0.315	0.640	0.000	0.616	1				
Lelec	0.035	-0.158	-0.149	-0.233	0.027	1			
Lu	0.345	-0.350	0.020	0.006	-0.153	-0.077	1		
Lle	0.524	-0.270	-0.032	-0.226	-0.002	0.490	0.191	1	
Ldiv	-0.067	0.363	-0.226	0.615	0.682	0.200	0.061	0.291	1

Variables	Model 1	Model 2		Model 3	
		With regional unemployment rate ($u_{i,t}$)	With aggregate female unemployment rate ($uf_{i,t}$) (Robust test)		
$Lfr_{i,t-1}$	0,945*** (0.247)	0,929*** (0.232)	0.785** (0.285)	0,873*** (0.228)	
$Lmor_i$	0.032	0.041	0.052	0.023	
$Lc_{i,t}$	Test of Arellano–Bond AR(1) (first order negative correlation) P-value AR1	-2,37**	-2,43**	-2.65**	-2,39**
$Lfpe_i$	Test of Arellano–Bond AR(2) (Second order correlation) P-value AR2	0.075	0.062	0.052	0.051
$Lfse_i$	Statistic of Sargan of overid.restrictions	-0,770	-0,710	0.834	-0,850
$Lelec_i$	P-value of Sargan statistic	0.701	0.392	0.124	0.491
$Ldiv_i$	Observations	0,221	0,383	0.323	0,308
$Lu_{i,t}$		0.503	0.309	0.390	0.221
$Luf_{i,t}$		144	144	144	144
$Lle_{i,t}$				0.432* (0.212)	
Constant				1.364* (0.536)	1,443** (0.418)
				-0.665** (0.216)	-4,885** (1.612)

The validity of the instruments and the absence of autocorrelation

Note: Robust standard errors are in parentheses and *, **, *** denote significant at 10%, 5% and 1% respectively.



Variables	Model 1	Model 2		Model 3
		With regional unemployment rate ($u_{i,t}$)	With aggregate female unemployment rate ($uf_{i,t}$) (Robust test)	
$Lfr_{i,t-1}$	0,945*** (0.247)	0,929*** (0.232)	0.785 (0.285)	0,873*** (0.228)
$Lmor_{i,t}$	0,032 (0.044)	0,041 (0.056)	0.052 (0.031)	0,023 (0.053)
$Lc_{i,t}$	-0,021 (0.015)	-0,013 (0.010)	-0.021 (0.018)	-0,020 (0.017)
$Lfpe_{i,t}$	-0,010 (0.007)	-0,012 (0.011)	0.024 (0.013)	0,014 (0.013)
$Lfse_{i,t}$	-0,014 (0.011)	-0,033 (0.034)	-0.076 (0.035)	-0,057** (0.023)
$Lelec_{i,t}$	0,236** (0.096)	0,195* (0.091)	0.291* (0.137)	0,156* (0.073)
$Ldiv_{i,t}$		0,027** (0.012)	0.023* (0.011)	0,018* (0.009)
$Lu_{i,t}$		0,035** (0.012)		0.56** (0.214)
$Luf_{i,t}$			0.432* (0.212)	
$Lle_{i,t}$			1.364* (0.536)	1,443** (0.418)
Constant	-0,725 (0.529)	-0,365 (0.540)	-0.665** (0.216)	-4,885** (1.612)

A positive impact of fertility delayed value with 1 % significance level

The classic variables no longer play their reducing role

The three new variables explain rising fertility

Note: Robust standard errors are in parentheses and * ** *** denote significant at 10%, 5% and 1% respectively.

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Fertility change toward the rise is mainly due to a lose of the fertility reductant factors influence

Family planning program no longer plays its role assigned at its creation namely the birth control.

The negative interaction education–fertility is no longer obvious.

The income effect dominates the substitution one to favoring fertility increase.

Divorce, unemployment and longevity act in favor of fertility increase.

Fertility decision is more directed by the social and cultural factors to reply more to Easterlin's approach than to Becker one.

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&
implications

Policy implications



**Revise their
population strategy
and orientation**

Thank you for your attention

