



Changing conditions of labour force participation and childbearing in Poland

Anna Matysiak

*Institute of Statistics and Demography
Warsaw School of Economics*

**SOCIAL EXCLUSION AND THE CHANGING DEMOGRAPHIC
PORTRAIT OF EUROPE**

The 4th International Conference of the EAPS Working Group SDT

Budapest, 6-8.09.2007

Structure



1. Objective
2. Theoretical background
3. Context: fertility and labour market developments
4. Data
5. Method
6. Results
7. Conclusions

Objective



to study the inter-dependencies between fertility and women's work in Poland after 1989

assuming:

1. sequential decision-making (exogeneity)
2. simultaneous decision-making (endogeneity)

Theoretical perspective



Theoretical models of decision-making:

economic perspective (Willis 1973, Becker 1993, Cigno 1990)

psychological perspective – value-expectancy models (Ajzen and Fishbein 1980)

$$I \sim \sum b_i a_i$$

I – intention to perform a behaviour

b_i – belief about the consequences of the behaviour

a_i – assessment of the contribution of these consequences to the individual needs

from the perspective of individual's life goals (career orientations)

Theoretical perspective



Correlation between work and family orientations induce a selection bias in the work-fertility relationship:

Adverse selection

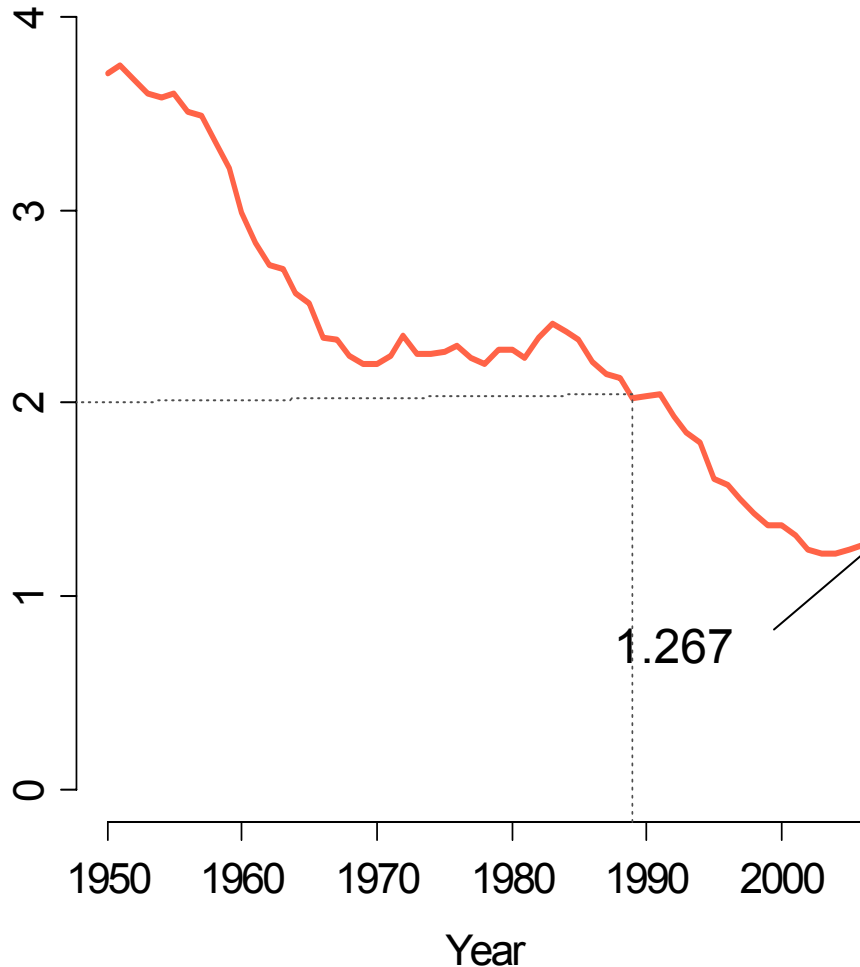
Women who plan a child might self-select themselves into non-employment -> overestimation of the negative relationship between fertility and women's work

Positive selection

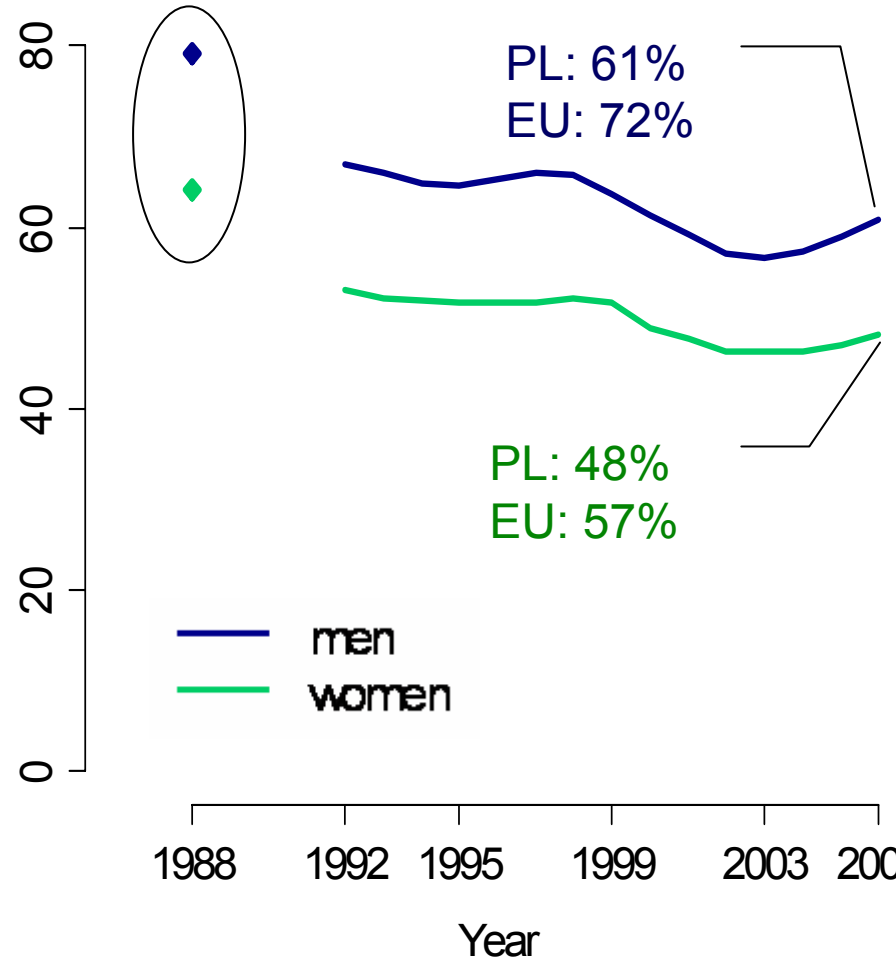
Women who plan a child will try to find a job first -> underestimation of the negative relationship between fertility and women's work

Fertility and employment trends

Period Total Fertility Rate



Employment rates, 15-64



Labour market developments



Competing developments:

- increase in the responsibility of the family for its economic well-being resulting from the withdrawal of the state from the social support,
- increase in consumer aspirations,
- rise in difficulties to find and maintain a job (to secure the economic well-being).

Individuals adjusted their fertility behaviour to the changing conditions of labour force participation.

Data



DATA:

- Employment, Family and Education Survey (conducted in 2006),
- Retrospective: fertility, partnership and employment histories since age 15
- Sample: 3,000 women born 1966-1981: aged 8-23 in 1989 and 25-40 in 2006

Sample under study:

- women in cohabitation or marriage,
- who did not give birth before 1989,
- who did not experience twin-birth,
- who did not have any foster or adopted children.

Altogether: 2233, out of which over 90% were only in one union.

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Each woman is followed:

- since union formation or 1989, whatever comes later,
- until the event, union dissolution or date of the interview, whatever comes first,
- women who separated with the partner and entered another union are observed again since that time.

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Clocks of duration dependence:

$T(t)$ – calendar time

$A(t)$ – time since the age 15

$NE(t)$ – time since employment exit

$D_{kj}(t)$ – time since the age 15 (for 1st conception) or since the last conception

$E(t)$ – time since employment entry

$U(t)$ – time since union formation

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Clocks of duration dependence:

$A(t)$ – time since the age 15

$D_{kj}(t)$ – time since the age 15 (for 1st conception) or since the last conception

$T(t)$ – calendar time

$NE(t)$ – time since employment exit

$E(t)$ – time since employment entry

$U(t)$ – time since union formation

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Clocks of duration dependence:

$A(t)$ – time since the age 15

$D_{kj}(t)$ – time since the age 15 (for 1st conception) or since the last conception

$T(t)$ – calendar time

$NE(t)$ – time since employment exit

$E(t)$ – time since employment entry

$U(t)$ – time since union formation

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Clocks of duration dependence:

$A(t)$ – time since the age 15

$D_{kj}(t)$ – time since the age 15 (for 1st conception) or since the last conception

$T(t)$ – calendar time

$NE(t)$ – time since employment exit

$E(t)$ – time since employment entry

$U(t)$ – time since union formation

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Clocks of duration dependence:

$A(t)$ – time since the age 15

$D_{kj}(t)$ – time since the age 15 (for 1st conception) or since the last conception

$T(t)$ – calendar time

$NE(t)$ – time since employment exit

$E(t)$ – time since employment entry

$U(t)$ – time since union formation

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Clocks of duration dependence:

$A(t)$ – time since the age 15

$D_{kj}(t)$ – time since the age 15 (for 1st conception) or since the last conception

$T(t)$ – calendar time

$NE(t)$ – time since employment exit

$E(t)$ – time since employment entry

$U(t)$ – time since union formation

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t-t_e) + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t-t_c) + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t-t_c) + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Potential endogenous covariates:

$E(t-t_e)$ – time since entering employment

$p(t)$ – birth order

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Potential endogenous covariates:

$E(t-t_e)$ – time since entering employment

$p(t)$ – birth order

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C (p^u) + \lambda_2^C (p^o) + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Spell order:

p^u – birth order within union

p^o – birth order outside union

s^n – order of non-employment spell

s^e – order of employment spell

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Spell order:

p^u – birth order within union

p^o – birth order outside union

s^n – order of non-employment spell

s^e – order of employment spell

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Spell order:

p^u – birth order within union

p^o – birth order outside union

s^n – order of non-employment spell

s^e – order of employment spell

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Other exogenous time-varying covariates:

education level, place of residence (urban, rural), work experience (in employment equations) and home ownership (in conception equation)

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Unobserved heterogeneity components:

- person-specific: ε, ξ, η
- transition-specific: $\mu^C, \mu^{EN}, \mu^{EX}$

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Person-specific unobserved heterogeneity components:

\mathcal{E} - woman-specific propensity to conceive (family-orientation)

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Person-specific unobserved heterogeneity components:

ξ - woman-specific propensity to enter employment

Method



1. Hazard of conception j:

$$\ln\{h_j^C(t)\} = \alpha_1^C A(t) + \alpha_2^C T(t) + \alpha_3^C D_{kj}(t) + \alpha_4^C U_k(t) + \alpha_5^C E(t - t_e) \\ + \lambda_1^C p^u + \lambda_2^C p^o + \sum_l \gamma_l^C w_l(t) + \varepsilon + \mu_j^C$$

2. Hazard of employment entry:

$$\ln\{h_j^{EN}(t)\} = \alpha_1^{EN} A(t) + \alpha_2^{EN} T(t) + \alpha_3^{EN} NE_j(t) + \alpha_4^{EN} U_k(t) + \alpha_5^{EN} C(t - t_c) \\ + \lambda_1^{EN} s^n + \lambda_2^{EN} p + \sum_l \gamma_l^{EN} w_l(t) + \xi + \mu_j^{EN}$$

3. Hazard of employment exit:

$$\ln\{h_j^{EX}(t)\} = \alpha_1^{EX} A(t) + \alpha_2^{EX} T(t) + \alpha_3^{EX} E_j(t) + \alpha_4^{EX} U_k(t) + \alpha_5^{EX} C(t - t_c) \\ + \lambda_1^{EX} s^e + \lambda_2^{EX} p + \sum_l \gamma_l^{EX} w_l(t) + \eta + \mu_j^{EX}$$

Person-specific unobserved heterogeneity components:

η - woman-specific propensity to exit employment

Method



The heterogeneity components are assumed to be jointly normally distributed:

$$\begin{pmatrix} \varepsilon \\ \xi \\ \eta \end{pmatrix} \sim N \left(\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_{\varepsilon}^2 & \rho_{\varepsilon\xi} & \rho_{\varepsilon\eta} \\ \sigma_{\xi}^2 & \rho_{\xi\eta} & \\ \sigma_{\eta}^2 & & \end{pmatrix} \right)$$

Critical test for endogeneity between fertility and women's work is whether:

$$\rho_{\varepsilon\xi} = 0 \quad \text{and} \quad \rho_{\varepsilon\eta} = 0$$

Results



Correlations between unobserved heterogeneity terms:

Fertility and employment entry	0.34**
Fertility and employment exit	-0.30*

significance: * -10%; ** - 5%; *** - 1%

Results



Relative risk of employment on childbearing

	no unobserved heterogeneity	unobserved heterogeneity	endogeneity
employment entry	0.93		

The observed insignificant effect of employment on childbearing consists of two effects:

- **direct and negative**, reflecting the time conflict,
- **indirect and positive**, caused by the unobserved preference of women to have a job before birth.

Results



Relative risk of conception on employment entry

	no unobserved heterogeneity	unobserved heterogeneity	endogeneity
1st conception	0.43 ***		
2nd conception	0.45 ***		
3rd conception	0.43 ***		

The observed negative effect of childbearing on employment entry consists of two effects:

- **direct and negative**, reflecting the time conflict,
- **indirect and positive**, caused by conditioning the fertility decision on the possibility to enter employment after birth.

Results



Relative risk of conception on employment exit

	no unobserved heterogeneity	unobserved heterogeneity	endogeneity
1st conception	2.97 ***		
2nd conception	2.00 ***		
3rd conception	2.11 ***		

The observed positive effect of childbearing on employment exit consists of two effects:

- **direct and positive**, reflecting the time conflict,
- **indirect and negative**, caused by conditioning the fertility decision on keeping a job after birth.

Conclusions



- 1. There has been a strong conflict between fertility and women's work in Poland after 1989**
- 2. Preferences for children are positively correlated with preferences for employment**
- 3. Women decide to have a child once they establish a position in the labour market and can to some extent be certain they can return to work after birth**
- 4. Policies oriented at easing the incompatibilities between fertility and women's work are required in order to create better conditions for childbearing.**



**Thank you
for your attention**

amatys@sgh.waw.pl