A Model of Voluntary Childlessness

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Motivation

What is the relationship between childlessness and completed fertility ?

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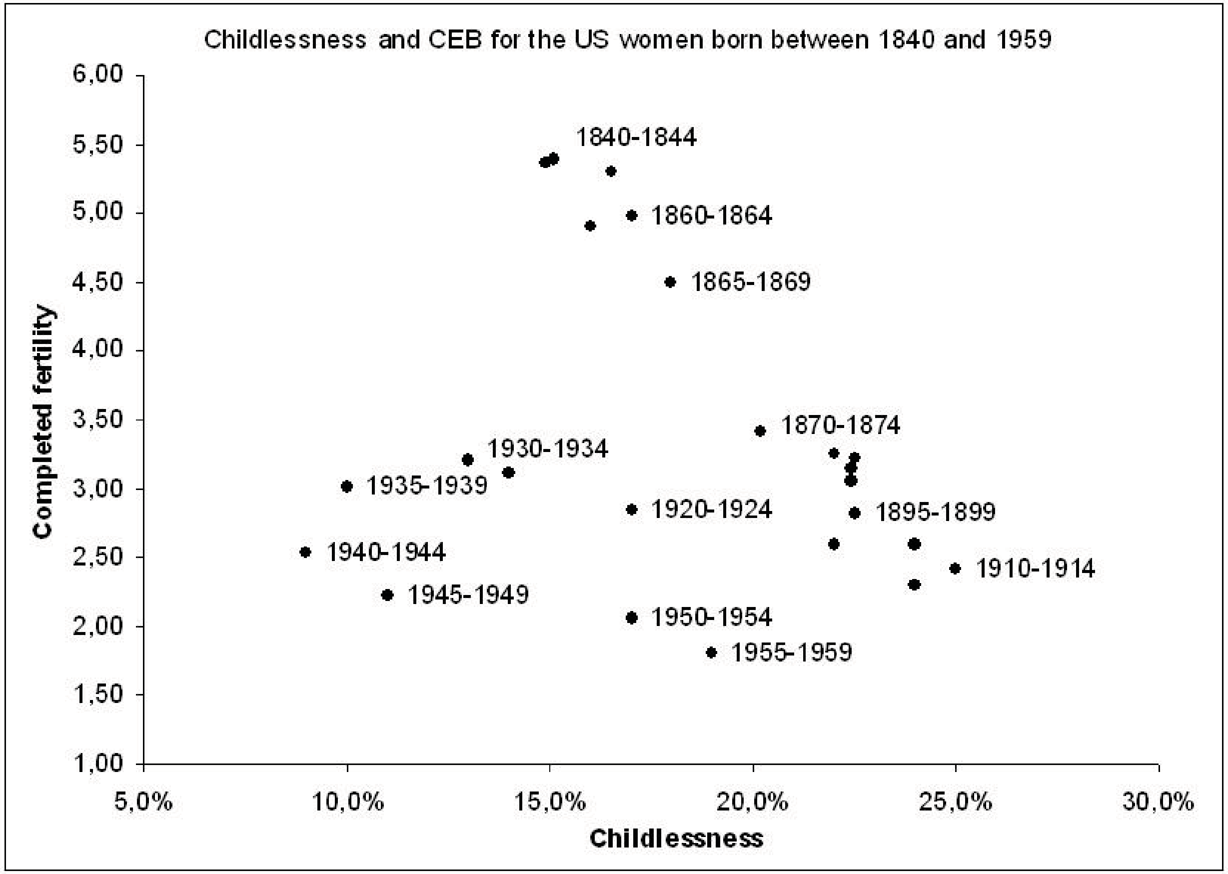
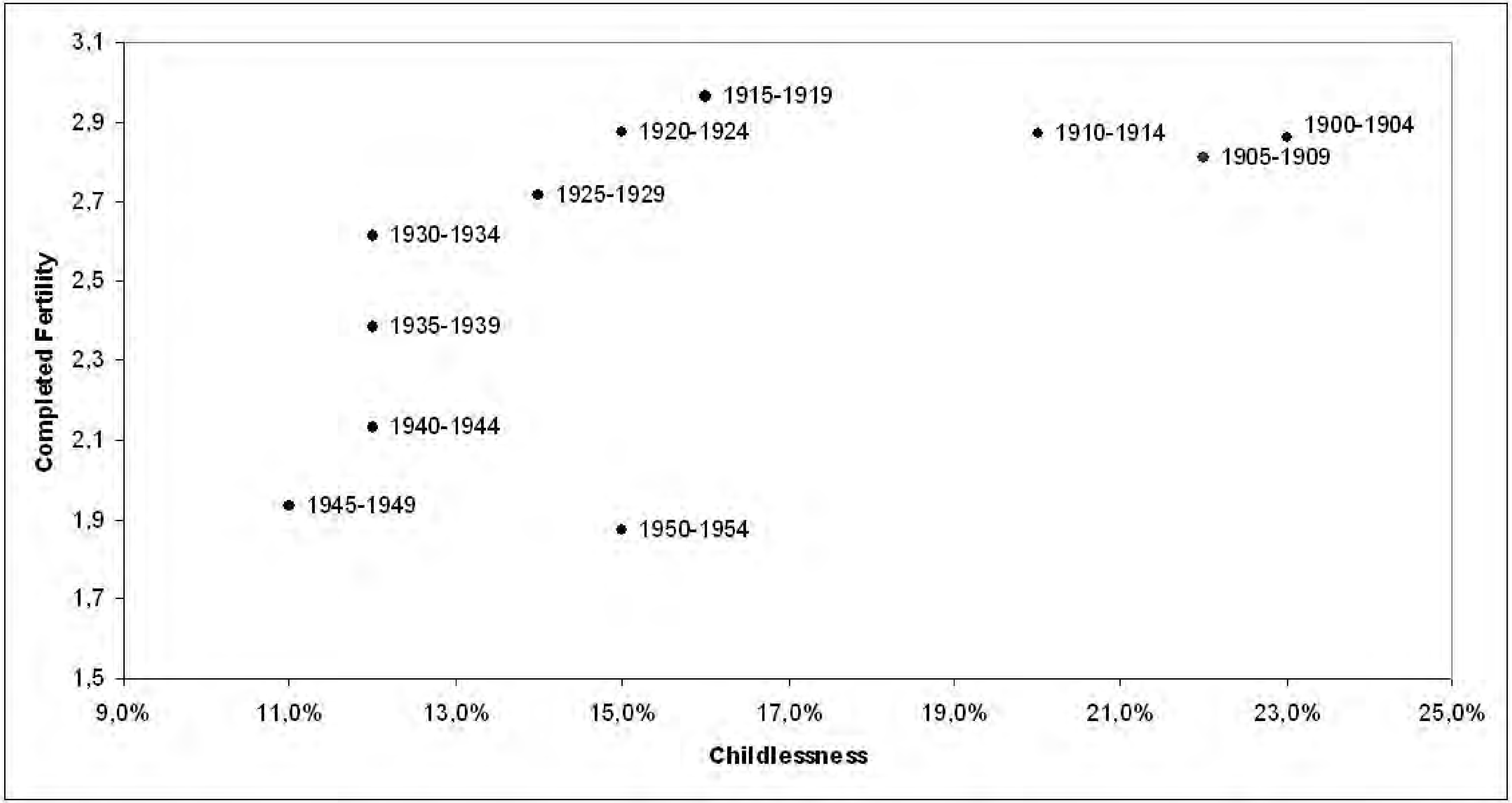


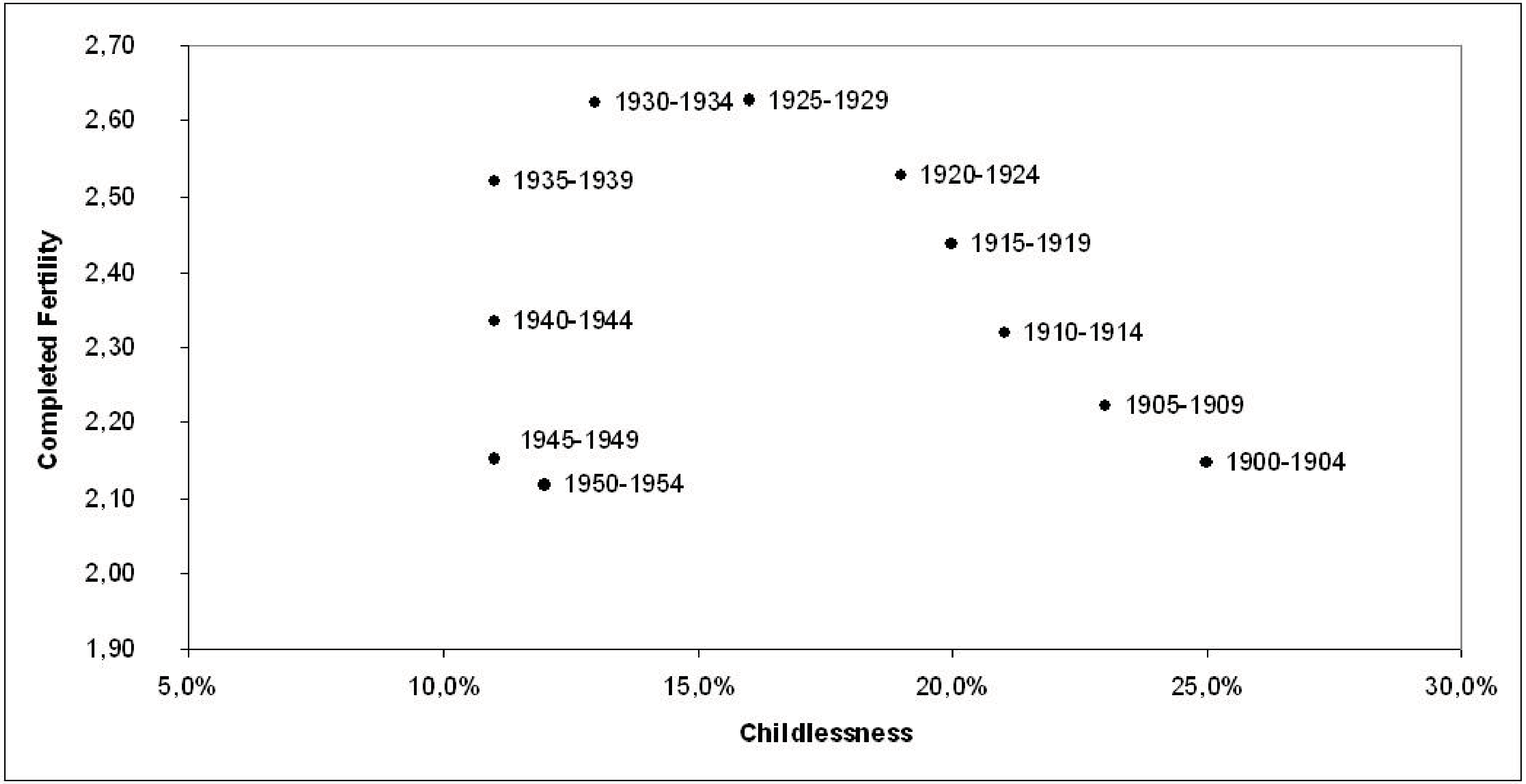
Sources : Jones and Tertilt (2006) for completed fertility and Rowland (2007) for childlessness. $R = -0.98$ for cohorts 1840-1899 and $R = -0.34$ for cohorts 1900-1959 ($R = -0.22$ for all cohorts).

Netherlands



Sources : INED for completed fertility and Rowland (2007) for childlessness.
$R = 0.6$

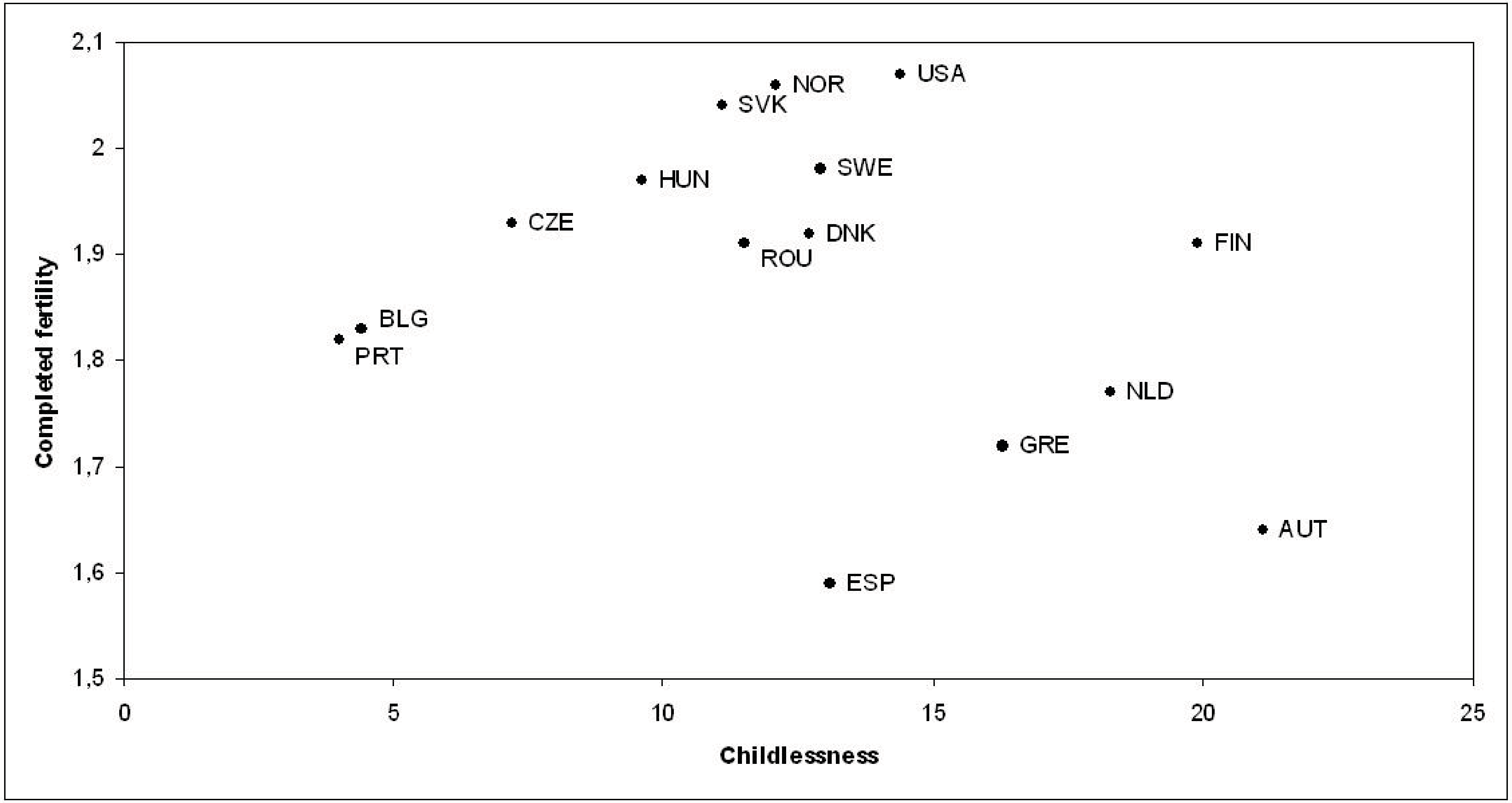
France



Sources : INED for completed fertility and Toulemon (1996) and Rowland (2007) for childlessness. $R = -0.18$

OECD countries

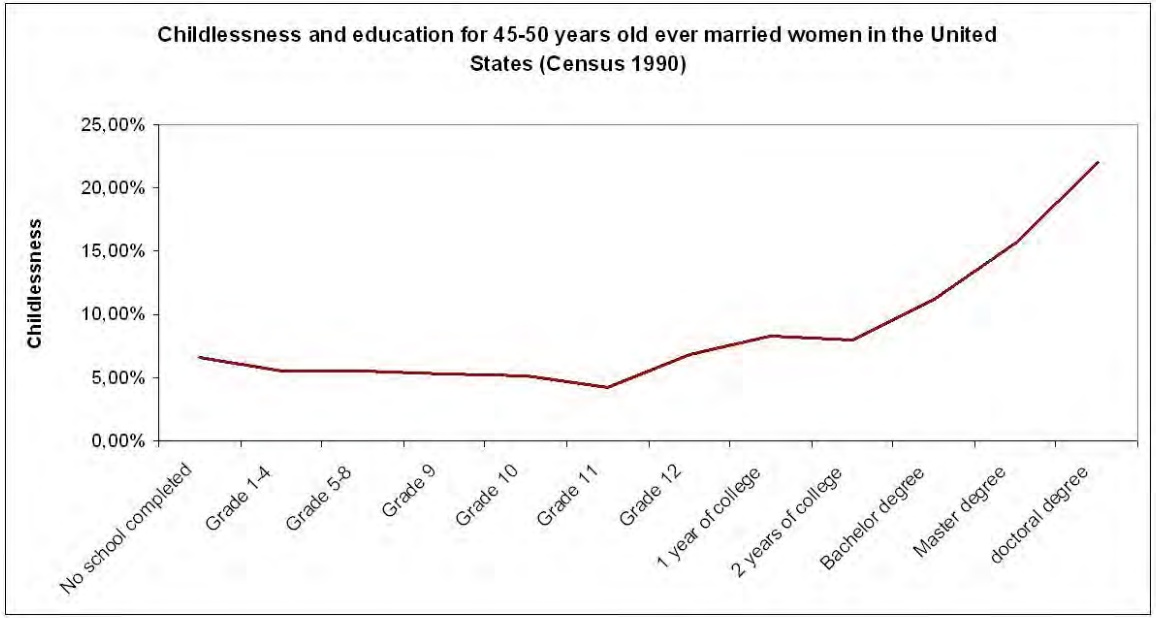
Definitive childlessness and completed fertility for women born in 1965



Source : OECD, 2008. $R = -0.27$

Who are these women (United States) ?

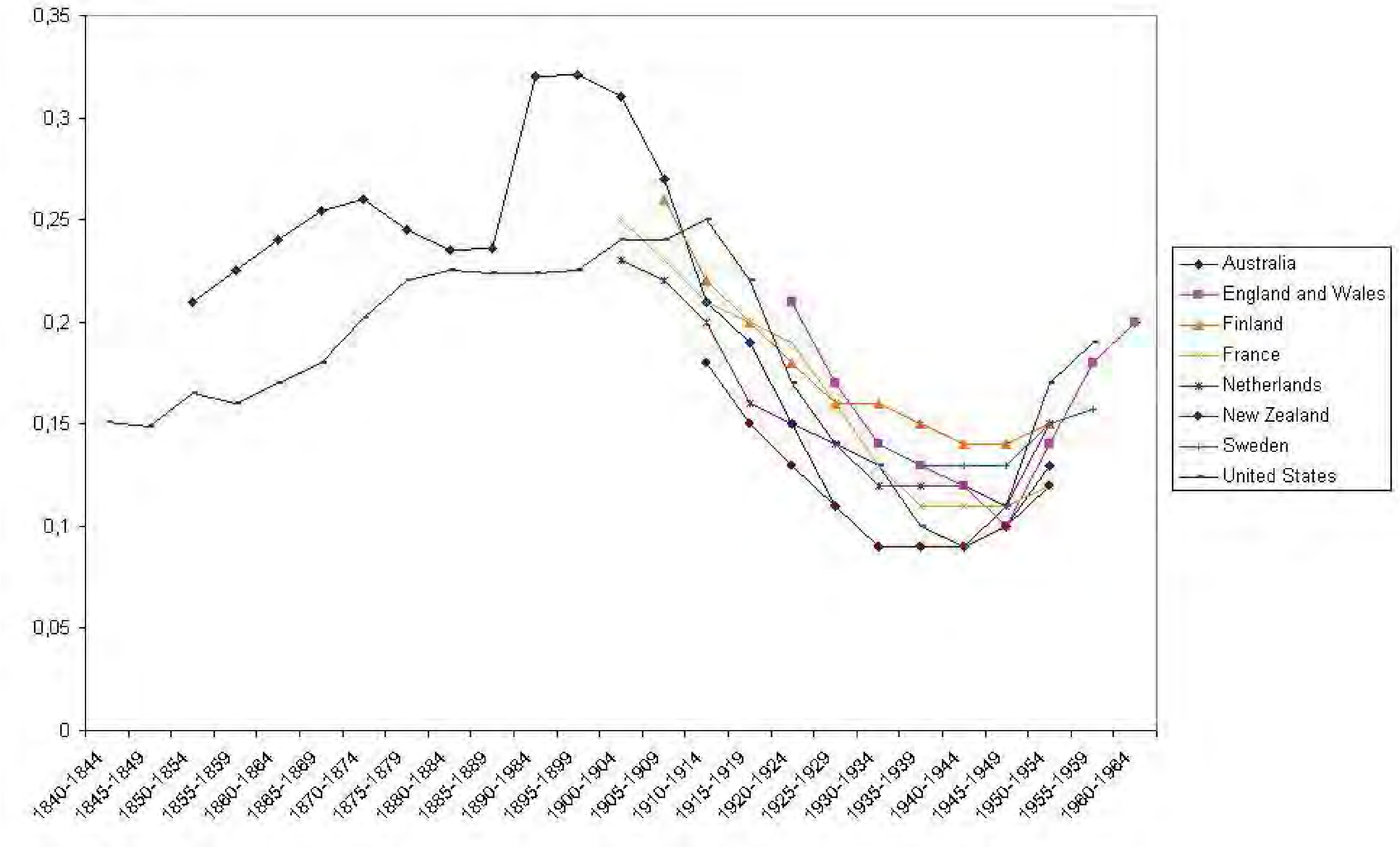
The most educated :



White women (non-Hispanic) have a higher percentage of childlessness (22.5%) than black women (16.3%). (2006)

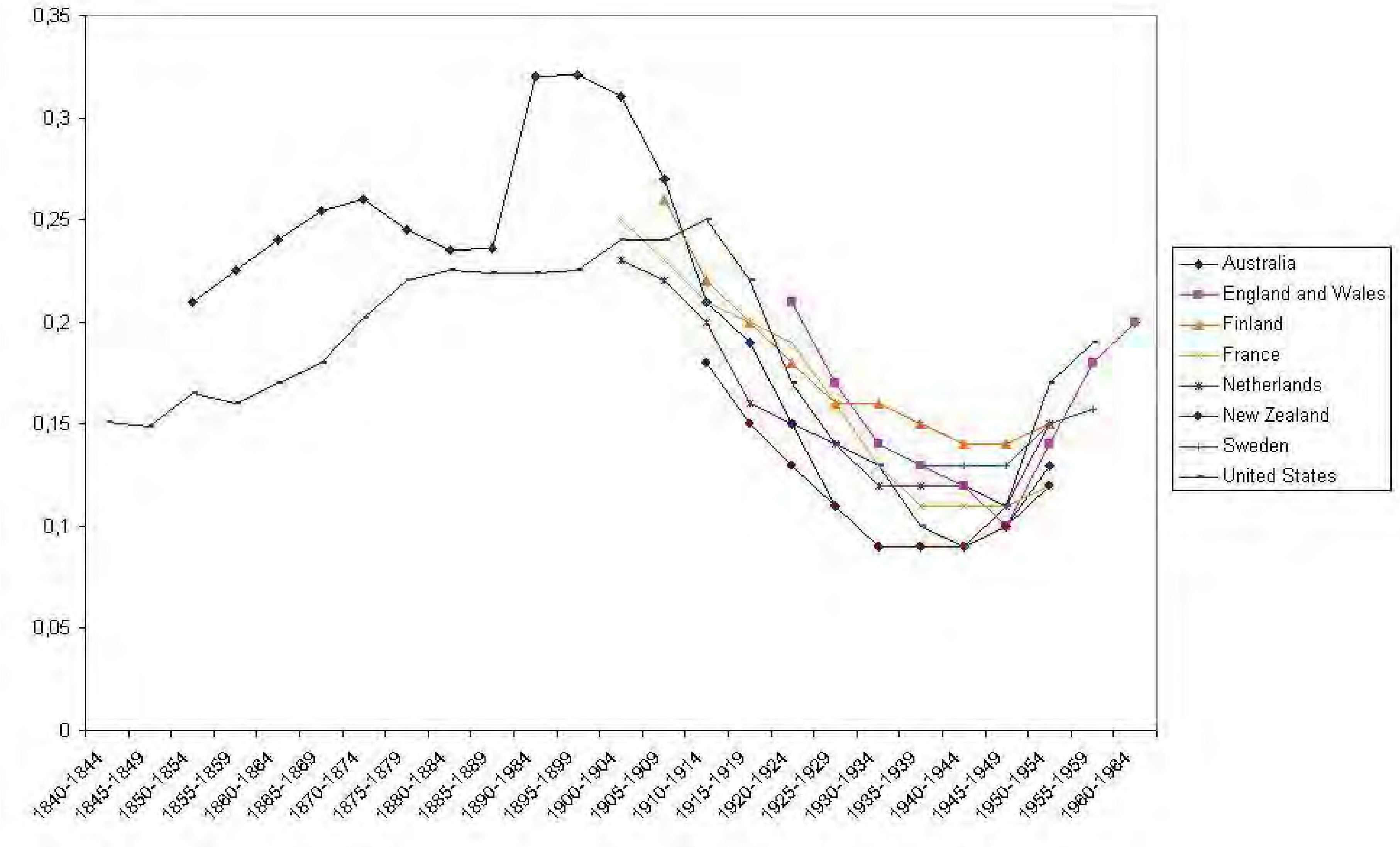
Women in the labor force have a higher percentage of childlessness (21.7%) than women who are not in the labor force (16.0%). (2006)

Childlessness over time : women cohorts (1840-1965)



Source : Rowland (2007) and Merlo and Rowland (2000)

Childlessness over time : women cohorts (1840-1965)



Source : Rowland (2007) and Merlo and Rowland (2000)

Aim of this paper : understanding the mechanisms that can be responsible for the dynamics of voluntary childlessness.

Overview of the literature

Definitions : Involuntary childlessness vs. voluntary childlessness

Demographers : Gabrill and Glick (1959), Poston and Trent (1982), Toulemon (1996), Rowland (2007).

Factors influencing voluntary childlessness :

- Houseknecht (1982) : Female education, female labor employment (career involvement) and culture (social support).
- Hoem et al. (2006) : field of education
- *Second demographic transition* : postponement of marriage, increase in median age of motherhood...

Normative theory : Meier (1958)

Basic Model

2 periods OLG model : childhood and adulthood

Main assumptions :

- men and women : $w^m \neq w^f$
- only women raise children $\Rightarrow$ opportunity cost for women
- everybody gets married when adult
- marriage is random

Households' maximization problem

Problem of couples :

$$\max_{c_t^j, n_t^j} \quad \ln\left(c_t^j\right) + \gamma^j n_t^j$$

$$s.t. \qquad c_t^j = w^m + \left(1 - \theta n_t^j\right) w^f - kI\left(n_t^j\right)$$

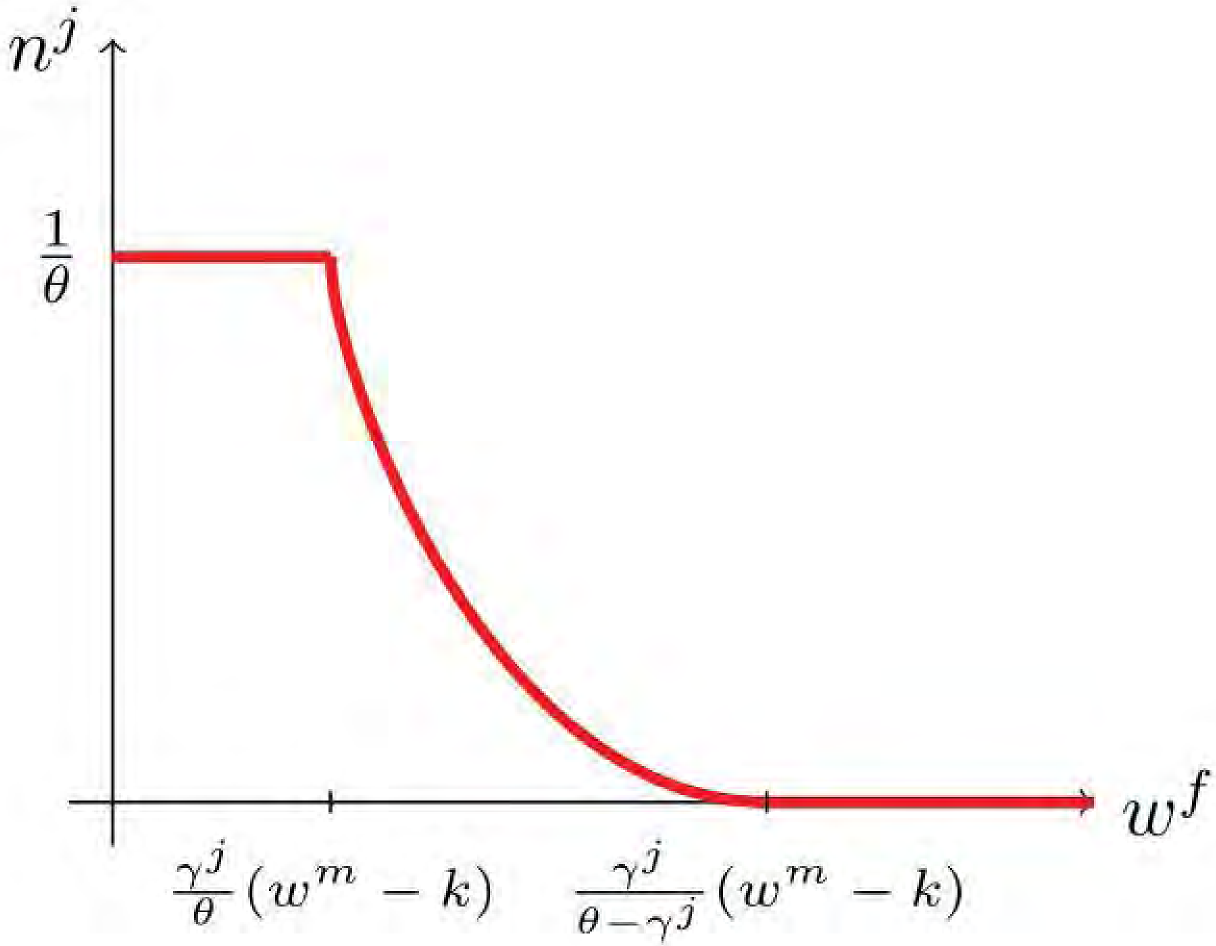
$$\text{and} \qquad 0 \leq n_t^j \leq \frac{1}{\theta}$$

Solution :

$$n^* = \begin{cases} 0 \\ \frac{w^m + w^f - k}{\theta w^f} - \frac{1}{\gamma^j} \\ \frac{1}{\theta} \end{cases}$$

Optimality allows to show that there is a γ^* for which couples are indifferent between being childless or parents.

Fertility and women's wage



Marriages

2 types of individuals $\Rightarrow$ 2 groups : people with high taste for children, $\overline{P}$, and people with low taste for children, $\underline{P}$.

Total Population $= \overline{P_t} + \underline{P_t}$.

Random matching $\Rightarrow$ 3 types of marriages :

- $(\underline{\gamma}\ \underline{\gamma})$: $\left(\frac{\underline{P_t}}{\overline{P_t}+\underline{P_t}}\right)^2 \rightarrow 0$
- $(\underline{\gamma}\ \overline{\gamma})$: $\frac{2\overline{P_t}\underline{P_t}}{(\overline{P_t}+\underline{P_t})^2} \rightarrow \overline{n} = \frac{w^m+w^f-k}{\theta w^f} - \frac{2}{\overline{\gamma}+\underline{\gamma}}$
- $(\overline{\gamma}\ \overline{\gamma})$: $\left(\frac{\overline{P_t}}{\overline{P_t}+\underline{P_t}}\right)^2 \rightarrow \overline{\overline{n}} = \frac{w^m+w^f-k}{\theta w^f} - \frac{1}{\overline{\gamma}}$

Dynamics of groups with exogenous probabilities :

Transmition of tastes :

- a : probability of having a child $\overline{\gamma}$ in a marriage $(\overline{\gamma}\ \overline{\gamma})$
- b : probability of having a child $\overline{\gamma}$ in a marriage $(\underline{\gamma}\ \overline{\gamma})$

Dynamics for the two groups :

$$\overline{P_{t+1}} = f\left(\overline{P_t}, \underline{P_t}\right)$$

$$\underline{P_{t+1}} = g\left(\overline{P_t}, \underline{P_t}\right)$$

$\Rightarrow$ given the initial $\left(\overline{P_0}, \underline{P_0}\right)$, we are able to reconstruct the story of the groups at each time and, in particular, the childlessness rate.

Exogenous probabilities

Steady State Definition :

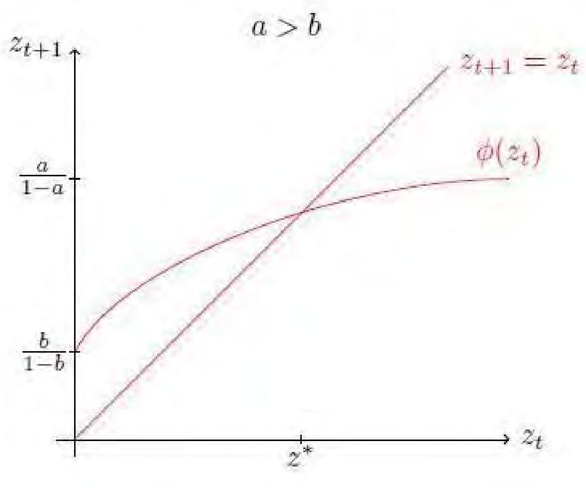
We define a steady state, a state where the relative group of individuals with high taste for children, $z_t = \frac{\overline{P_t}}{\underline{P_t}}$ is constant overtime, so that $z_{t+1} = z_t$.

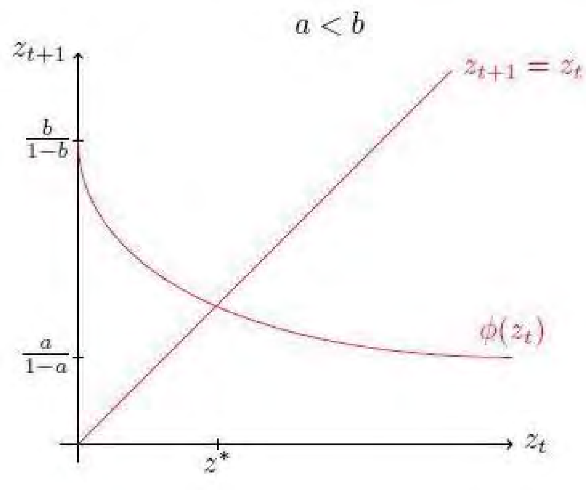
Dynamics : $z_{t+1} = \phi(z_t)$

Proposition :

- If $a > b$, the dynamics are monotonic and converge to a unique stable steady state
- If $a = b$, the steady state is reached in one period
- If $a < b$, the dynamics are oscillatory and the steady state is stable

Exogenous probabilities





Case $a > b$ (no oscillations) :

$$\Delta w^m > 0 \Rightarrow z^* \searrow \quad ; \quad \chi^* \nearrow \quad \text{and} \quad n^* \nearrow$$

$$\Delta w^f > 0 \Rightarrow z^* \nearrow \quad ; \quad \chi^* \searrow \quad \text{and} \quad n^* \searrow$$

Case $a < b$ (oscillations) :

$$\Delta w^m > 0 \Rightarrow z^* \nearrow \quad ; \quad \chi^* \searrow \quad \text{and} \quad n^* \nearrow$$

$$\Delta w^f > 0 \Rightarrow z^* \searrow \quad ; \quad \chi^* \nearrow \quad \text{and} \quad n^* \searrow$$

Dynamics with endogenous probabilities

Probability functions :

$$a_t = (\overline{\gamma})^{\tau} (n_t)^{\eta}$$

$$b_t = \left(\frac{\overline{\gamma} + \underline{\gamma}}{2} \right)^{\tau} (n_t)^{\eta}$$

Intuitions from simulations :

- If $1 > \tau > 0$ and $1 > \eta > 0$: monotonic dynamics with a stable steady state
- If $1 > \tau > 0$ and $\eta < 0$: oscillatory dynamics with a stable steady state
- If $\tau < 0$: only the trivial steady state and unstable ($\eta > 0$), no steady state ($\eta < 0$ close to zero), or a stable steady state with oscillatory dynamics ($\eta < 0$ and τ not too small)

Endogenous wages

Production function :

$$F(L_t^m, L_t^f) = \left(\alpha (L_t^m)^{-\rho} + (1-\alpha)(L_t^f)^{-\rho}\right)^{-1/\rho}$$

with

$$L_t^f = L_t^{f1} + \delta L_t^{f2} + \delta L_t^{f3}$$

Calibration for the United States

I fix 3 parameters : $\rho = -0.75$, $b = 0.8a$ and $k = 0.00316$ (Turchi 1975). The others are set to match 6 moments :

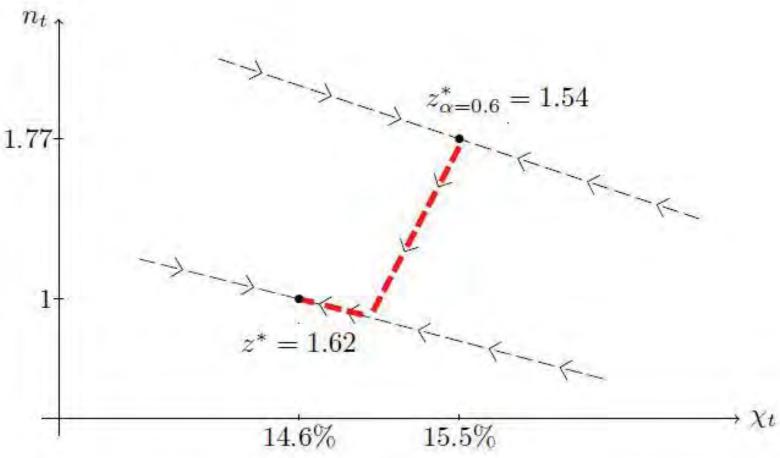
Parameters	Moments	Source
$\alpha = 0.549$	$n = 1$	Constant population
$\delta = 0.833$	$\chi = 0.146$	U.S. Census Bureau 2008
$\overline{\gamma} = 0.117$	$\overline{\overline{n}} = 1.97\overline{n}$	U.S. Census Bureau 2008
$\theta = 0.228$	$\bar{w} = 0.78w^m$	Erosa, Fuster and Restuccia 2005
$\underline{\gamma} = 0.097$	$w^{f1} = 0.91w^m$	Erosa, Fuster and Restuccia 2005
$a = 0.670$	$l = 0.667$	Erosa, Fuster and Restuccia 2005

the rest of the variables will take the following values :

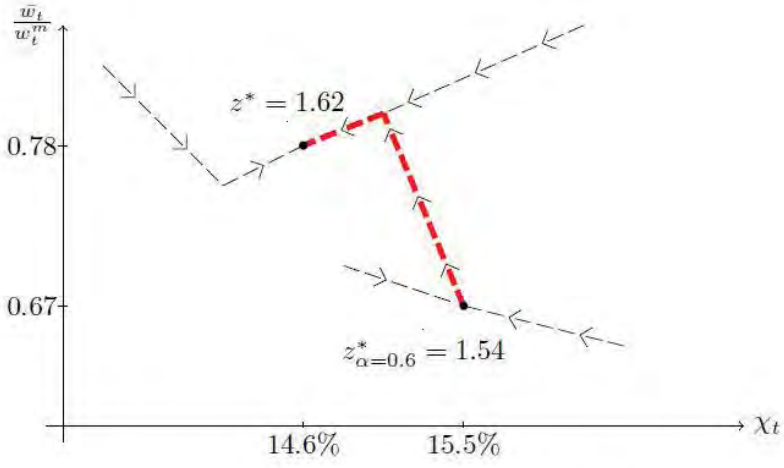
$z = 1.62$	$w^m = 0.526$	$\overline{n} = 0.82$	$w^{f2} = 0.399$

Simulations for the United States

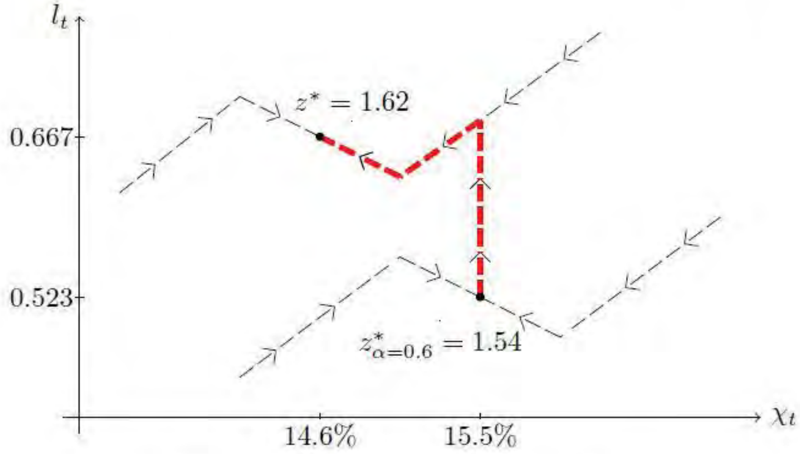
More gender parity in the labor market : $\alpha \searrow$



Effect of a decrease in α on n_t and χ_t.



Effect of a decrease in α on $\frac{\bar{w}_t}{w_t^m}$ and χ_t.



Effect of a decrease in α on l_t and χ_t.

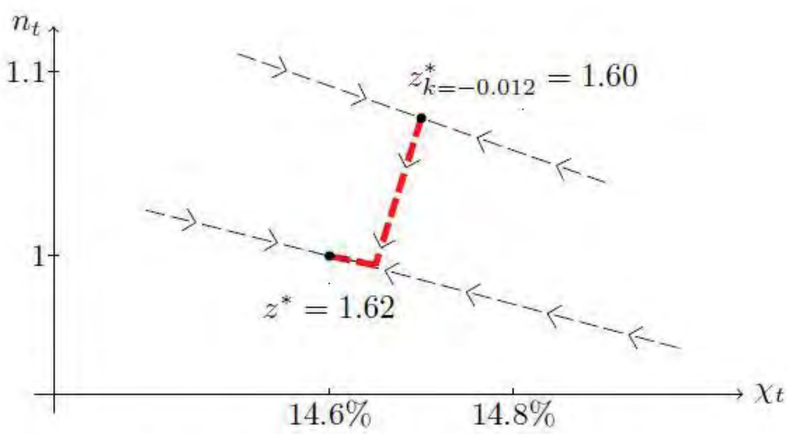
Simulations for the United States

Decrease in mommy discrimination : $\delta \nearrow$

- same effect on average fertility, fertility of mothers and childlessness
- same effect on relative labor
- different : wage of childless women decreases and wage of men increase

Increase in the fixed cost of children : $k \nearrow$

- Can replicate the dynamics of average fertility and childlessness for cohorts born between 1930-1944
- relative labor increases



Effect of an increase of k on n_t and χ_t.

Conclusion

Two shocks are able to explain the dynamics of childlessness since the early nineteenth century :

- An increase in the labor opportunities of women
- An increase in the fixed cost of becoming parents