The Macroeconomic Consequences of Family Policies

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- Effective in achieving stated policy goals?

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- Previous studies and policy recommendations: family policies as transfers to existing child $\rightarrow$ quality margin
- This paper: family policies change the "price" of child $\rightarrow$ **add quantity margin**

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  2. **Composition effects**: families that increase fertility more gain representation in future economies
  3. **GE effects**: changes in age structure affects pension and taxes
- **Fertility elasticities**, i.e. magnitude of fertility responses to financial incentives
  1. Disciplined by parameters that are calibrated within the model
  2. Validated externally using policy - Alaska Permanent Fund Dividend

Preview of Key Results

Consider a $31k baby bonus:

(1) $\approx 1.1\times$ expansion of CTC from 2010-2021 in NPV

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Compare policy counterfactuals: baby bonus, childcare subsidy, and education

- **Education expenditures** are more effective than family policies in improving child outcomes and social mobility with mild effects on fertility

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Related Literature

Education Policies, Income transfers, and Mobility

- Benabou (2002), **de la Croix and Doepke (2003)**, Heckman and Mosso (2014), Bastian and Michelmore (2018), **Daruich (2019)**, Abbott, Gallipoli, Meghir and Violante (2019), Mullins (2019), **Guner, Kaygusuz and Ventura (2020)**...
- **Contribution: Considering fertility responses could reverse policy effects on child human capital and social mobility**

Family Policies, Fertility and Child Outcomes

- **Empirical:** Milligan (2005), Laroque and Salanié (2008), Drago et al. (2011), Luci-Greulich and Thévenon (2013), González (2013), Raute (2019)...
- **Structural:** Fan and Stark (2008), Liao (2013), **Tertilt, Kim and Yum (2021)**
- **Contribution: Propose and calibrate a quantitative model that is suitable for analyzing large-scale policies beyond fertility effects**

Outline

1. **Model: Role of endogenous fertility**
2. **Calibration (2010 USA)**
3. **Validation**
4. **Counterfactual Results**
5. **Conclusion**

Model

Model: Timeline

- Model Period = 10 Years

Key Elements:

- Endogenous Fertility
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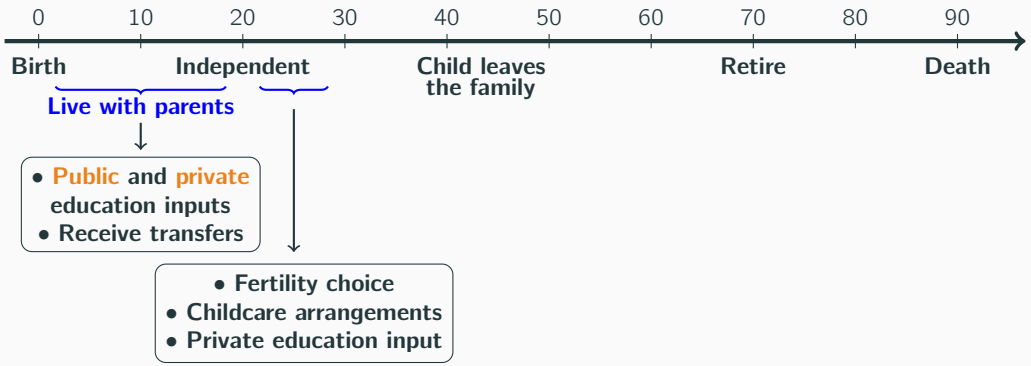

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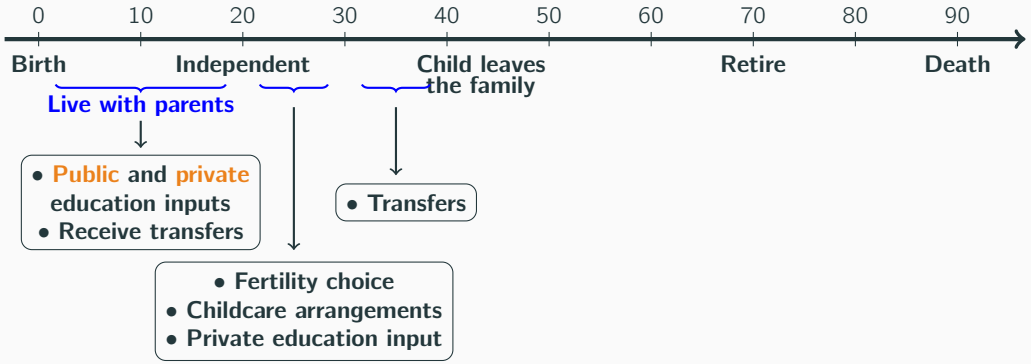

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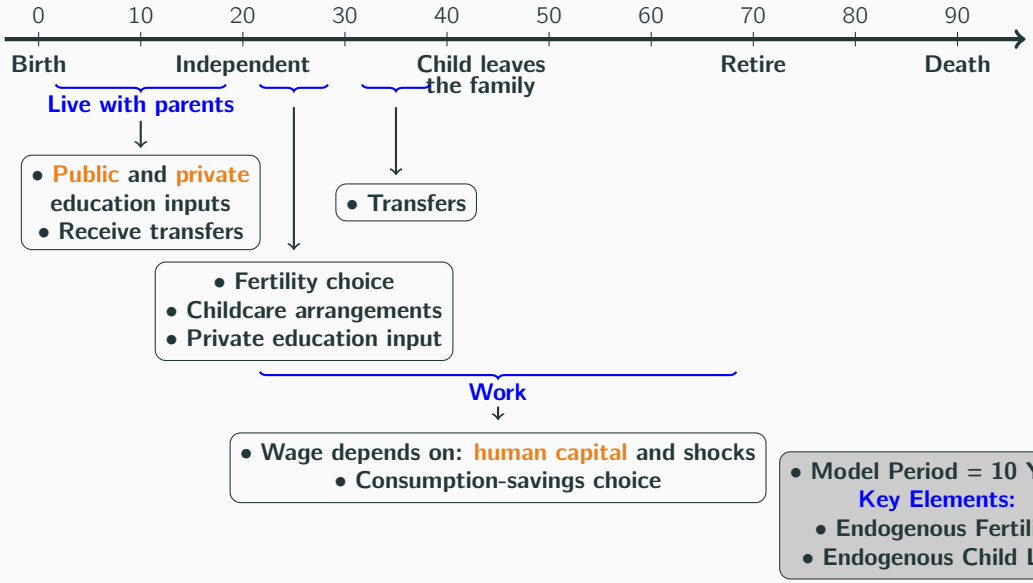

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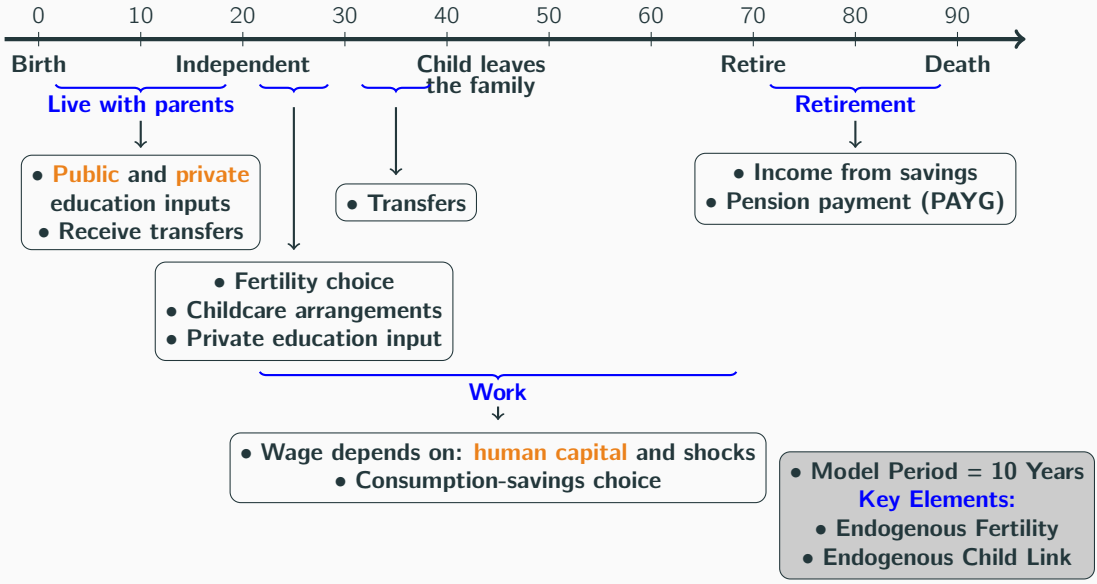
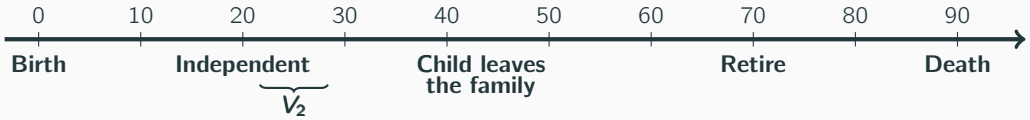


Fertility, Childcare and Skill Formation



$$V_2(h,a) = \max_{c,a',n,e,t_h,m \geq 0} u(c/q(n)) + \beta \mathbb{E} V_3(h', a', n, \mathbb{E}h_k)$$

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h : parents' skills	a : assets	n : fertility
t_h : home care	m : market care	e : private educ. input
χ : childcare needs	p_m : market care price	$q(n)$: equivalence scale
$\mathcal{S}$: childcare subsidy	$\mathcal{B}$: baby bonus	$\mathcal{E}$: public education

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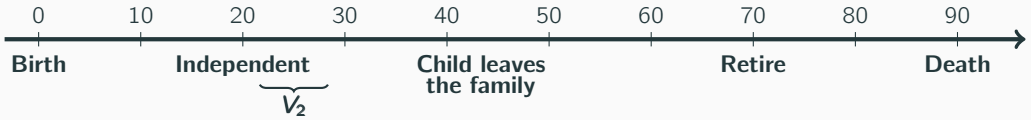

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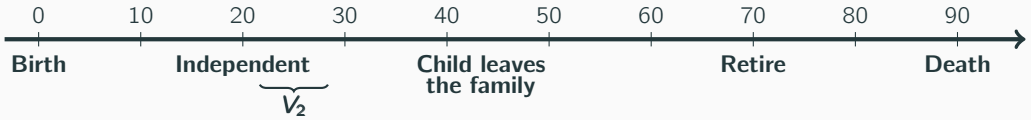

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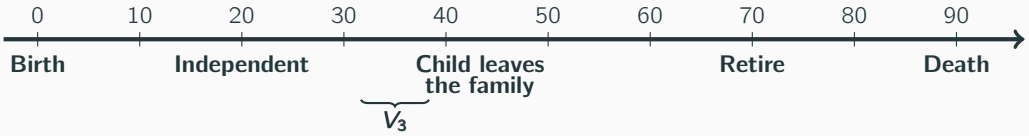
Two simplifying modeling assumptions:

1. $G(h, \mathcal{E}, e, \epsilon)$ captures the overall skill formation of children from age 0 to 20
2. Time cost χ is non-educational. High-quality public childcare can be implemented by raising $\mathcal{S}$ and $\mathcal{E}$ jointly in the model

Parent-to-Child Transfer



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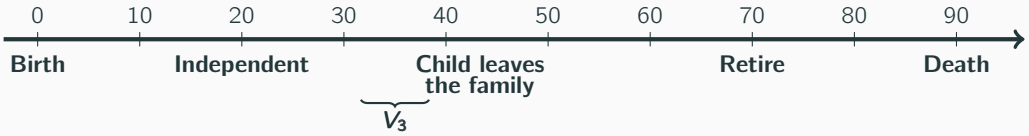

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- First-order conditions for child "quality" choices e and a_k:

$$\frac{\partial v(n, \mathbb{E}h_k, a_k)}{\partial \mathbb{E}h_k} \cdot \frac{\partial \mathbb{E}h_k}{\partial e} = \lambda_2 \cdot (1 + \tau_c) \cdot n \qquad \textbf{FOC } [e]$$

$$\frac{\partial v(n, \mathbb{E}h_k, a_k)}{\partial a_k} = \lambda_3 \cdot n \qquad \textbf{FOC } [a_k]$$

where marginal costs are proportional to n

► later periods

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- Increase in $\mathcal{B}$ is an income transfer, a_k **rises unambiguously**:

$$\underbrace{\lambda_3 \downarrow}_{\text{income effect on } MU_c} \cdot n \quad \Rightarrow \quad \frac{v(n, \mathbb{E}h_k, a_k \uparrow)}{\partial a_k} \qquad \textbf{FOC } [a_k]$$

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When fertility elasticity $\frac{dn^*}{d\mathcal{B}} \neq 0$, i.e. endogenous fertility

- Increase in $\mathcal{B}$ is a price change, n rises $\Longrightarrow$ **effects on a_k is ambiguous**:

$$\underbrace{\lambda_3?}_{\text{change in } MU_c \text{ as } n\uparrow} \cdot \underbrace{n \uparrow}_{\text{fertility response}} = \underbrace{\frac{\partial v(n \uparrow, \mathbb{E}h_k, a_k?)}{\partial a_k}}_{\text{interaction in preferences}} \qquad \textbf{FOC } [a_k]$$

- a_k could fall when child benefits are more generous - **quality/quantity trade-off**

Heterogeneous Fertility Elasticities - Composition Effects

- Heterogeneous fertility elasticities: size of transfer relative to income differs
- Families that increase fertility more gain representation
- Intergenerational persistence of $h \Longrightarrow$ **composition effects** on aggregate h.c.

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- Intergenerational persistence of $h \Longrightarrow$ **composition effects** on aggregate h.c.
- **Insight**: Even when policy effects on each child's human capital is positive, overall impact on aggregate human capital could still be negative

Firms and the Government

- Representative firm with Cobb-Douglas production function:

$$Y = AK^{\alpha}H^{1-\alpha}$$

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$$\underbrace{\left(\sum_{j=2}^{6}\omega_j \int \mathcal{T}(y_j^*, a_j^*, n_j^*)\, d\mu_j\right)}_{\text{labor and capital income taxes}} + \underbrace{\left(\sum_{j=2}^{8}\omega_j \int \tau_c c_j^*\, d\mu_j\right)}_{\text{consumption tax}} = \underbrace{\left(\sum_{j=7}^{8}\omega_j \int w\pi h\, d\mu_j\right)}_{\text{pension payments}}$$

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- **GE Effects: Fertility responses change $\{\omega_j\}_{j=0}^{8}$** and tax burden via τ_c. Key motivation for family policies, absent in models with exogenous fertility

► stationary equilibrium

Why may family policies improve welfare?

Long-run welfare[2]: **average value** of newborn under the veil of ignorance:

$$\mathcal{W} := \int V_2 \, d\mu_2$$

Welfare of current households $\longrightarrow$ transition path results (in progress)

[2] See Parfit (1984) - "repugnant conclusion", Golosov, Jones and Tertilt (2007) - "$\mathcal{A}, \mathcal{P}$-efficiency", and de la Croix and Doepke (2021) - "soul incarnation" for more discussions of welfare with endogenous fertility

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Externalities/incompleteness that government could address:

1. **Fiscal externalities of childbearing and childrearing**
   - Private returns $\neq$ social returns (i.e. $\{\omega_j\}_{j=0}^{8}$ and $\{\mu_j\}_{j=0}^{8}$)
2. **Borrowing constraints** (Daruich 2019, Abbott et al. 2019 ...)

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Calibration

Model Parameters

Table 1: Model Parameters

	Interpretation	Value	Source
	Preferences		
β	discount rate	0.98[10]	standard
γ	elasticity of substitution	0.61	CPS
ψ	fertility preference	1.92	CPS
θ	quality preference	2.02	PSID
ν	transfer preference	0.34	PSID
	Childcare arrangement		
χ	childcare cost	0.18	Folbre (2008)
ι	economies of scale at home	0.7	Folbre (2008)
υ	substitutability of care	0.5	SIPP
p_m	price of full-time care	0.13	NACCRRA
	Taxes and pension		
τ_y^n, λ_y^n	tax levels and progressivity	misc.	TAXSIM
τ_c	consumption tax	0.07	McDaniel (2007)
τ_a	capital income tax	0.27	McDaniel (2007)
π	pension replacement rate	0.40	OECD Database

	Interpretation	Value	Source
	Child human capital production		
Z	normalizing scalar	2.57	median income =1
σ_ϵ	ability shock dispersion	0.45	PSID
ρ	intergenerational spillover	0.28	Chetty et al. (2014)
ξ	substitution of education	0.9	ATUS
$\mathcal{E}$	public education	0.15	NCES
κ	input productivity	0.17	García et al. (2020)
	Adult human capital evolution		
η	learning curvature	0.61	PSID
ζ	learning level	0.72	PSID
μ_z	skill depreciation	-0.23	PSID
σ_z	shock dispersion	0.42	PSID
	Firm production function		
A	total factor productivity	1	normalization
α	capital share	0.33	standard
δ_k	capital depreciation	0.04[10]	standard

- 13 parameters are calibrated within the model using SMM
- Model matches salient features of fertility, childcare, parental investment, transfers, child skill formation, and lifecycle earnings profile

► child costs ► skill formation ► adult skill ► firm and gov.

Utility from child quantity and quality[3]

$$v(n, \mathbb{E}h_k, a_k) = \underbrace{\Psi(n)}_{\text{child discounting}} \cdot \underbrace{(\theta \cdot u(\mathbb{E}h_k) + \nu \cdot u(a_k))}_{\text{utility from child quality}}$$

$$\Psi(n) = 1 - \exp(-\psi n) \qquad u(x) = \frac{x^{1-\gamma}}{1-\gamma} \qquad \gamma \in (0,1) \quad x \in \{\mathbb{E}h_k, a_k, c\}$$

[3] Results robust to separable preferences and dynastic altruism

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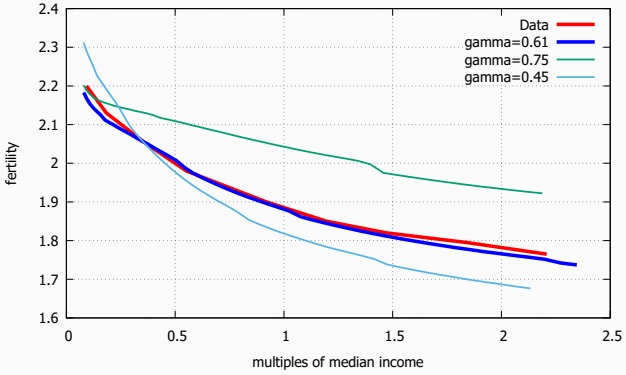
- γ - elasticity of intergenerational substitution (EGS) (Córdoba and Ripoll 2019)
- Conditional on other parameters, **γ determines fertility elasticity**. Higher $\gamma \Longrightarrow$ smaller fertility responses

► intuition

[3] Results robust to separable preferences and dynastic altruism

Identification of γ

- γ identified by **fertility-income profile** (Córdoba, Ripoll and Liu 2016). Higher $\gamma \Longrightarrow$ Higher MRS of quantity for quality $\Longrightarrow$ flatter profile



Validation

Does the model generate responses that match empirical estimates?

External validation using **Alaska Permanent Fund Dividends (APFD)**

Does the model generate responses that match empirical estimates?

External validation using **Alaska Permanent Fund Dividends (APFD)**

- Established in 1982 after discovery of the petroleum. Equal transfer to **all residents** regardless of income, employment or age
- **Pronatal effects**: allows parent to claim dividend on behalf of a child with no requirements on how parents use a child's dividend.

Does the model generate responses that match empirical estimates?

External validation using **Alaska Permanent Fund Dividends (APFD)**

- Ideal policy variation to test fertility responses:
  1. Similar institution and cultural background
  2. Large in scale ($\approx$ \$1.5k per year) relative to other family policies

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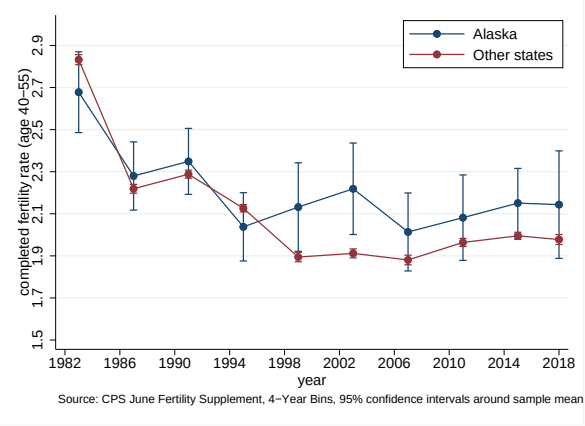
  2. Large in scale ($\approx$ \$1.5k per year) relative to other family policies

- Apply same policy in the model: universal basic income (UBI) to parents and children by \$1.5k. Model predictions are consistent with empirical evidence:
  1. Completed fertility rises by **4.2%** ($\approx$ Kelly, Timilsina and Yonzan 2020)
  2. Larger responses from households with lower human capital (Cowan and Douds 2020)
  3. Positive but small effects on education investments

Evidence from Completed Fertility Rates



- Changes in completed fertility rate alleviates worries about effects on birth timing
- Model-predicted 4.2% (0.1) increase is consistent with average differences between Alaska and the other states

► by education ► Australia

Counterfactual Results

Baby Bonus Counterfactuals

Evaluate baby bonus $\mathcal{B}$ of different scale

- **Budget balance**: consumption tax adjusts to balance budget each period
- **General equilibrium**: wage, interest rates, and population distributions adjust

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- Aggregate fertility, average human capital, per capita income, consumption taxes and intergenerational income mobility $\left(\frac{1}{IGE}\right)$
- Social welfare in consumption equivalence (changes)

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Outline

- **Long-run effects** - comparing new steady-state economy to baseline economy
- **Transition, alternative funding methods** (in progress)

Fertility Effects

Figure 1: Effects on aggregate fertility

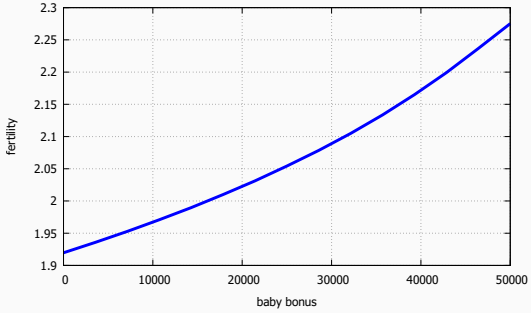
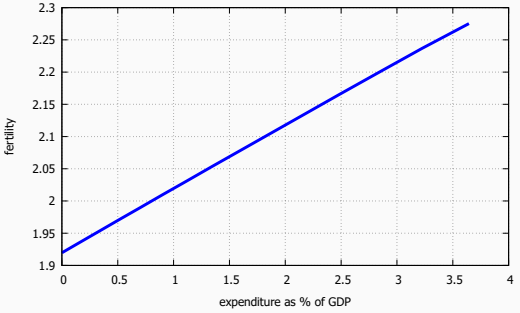


Figure 2: Expenditure share



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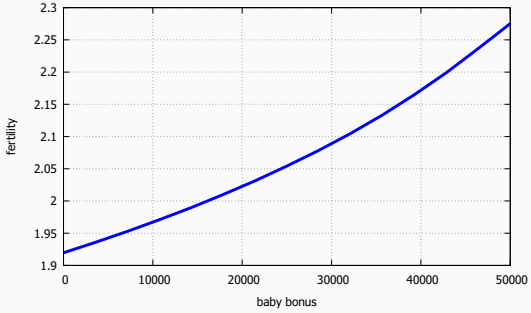

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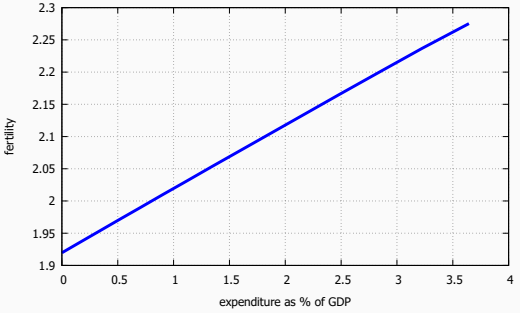


- Baby bonus needs to be at least **$31k** to raise aggregate fertility rate to **replacement level** (2.1, commonly stated long-run policy goal). The policy costs around **1.6%** of GDP in the new equilibrium
- From now on, consider $\mathcal{B} = \$31\text{k}$ as the benchmark policy ($\approx 1.1\times$ expansion of CTC from 2010-2021 in NPV)

Model Channels

Figure 3: Average private investment

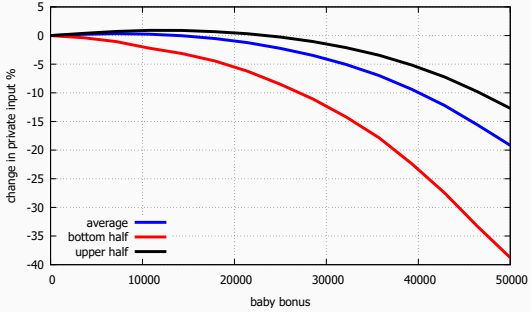
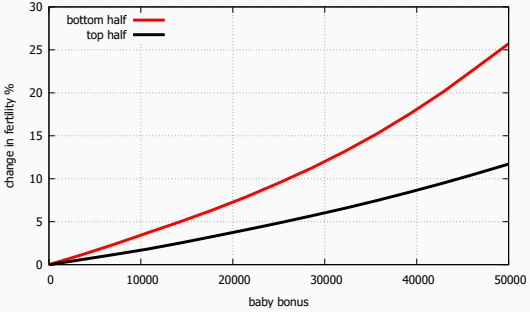


Figure 4: Heterogeneous fertility response



- **Quality/quantity trade-off**: Parents **reduce** private investments by 5%

Model Channels

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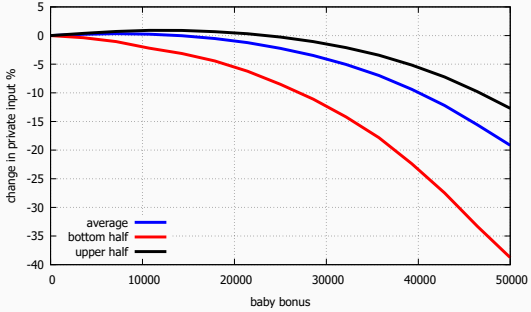

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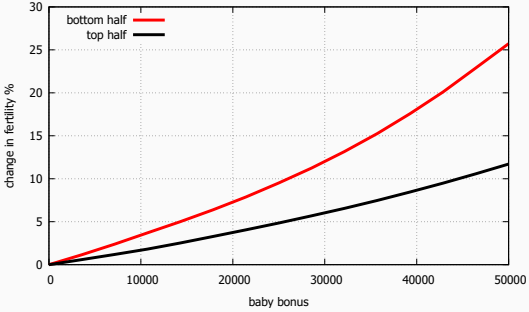


- **Quality/quantity trade-off**: Parents **reduce** private investments by 5%
- **Composition effects**: Parents with lower human capital respond more in fertility

Average Human Capital and Social Mobility

Figure 5: Average human capital

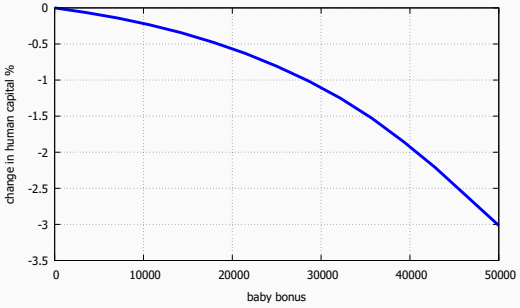
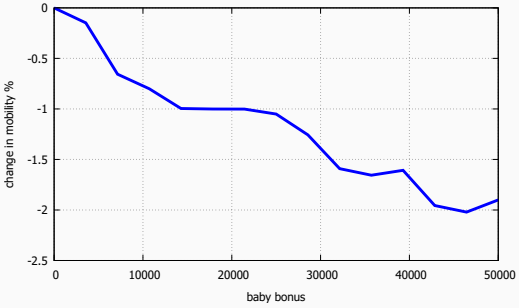


Figure 6: Intergenerational mobility



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► Australia

Average Human Capital and Social Mobility

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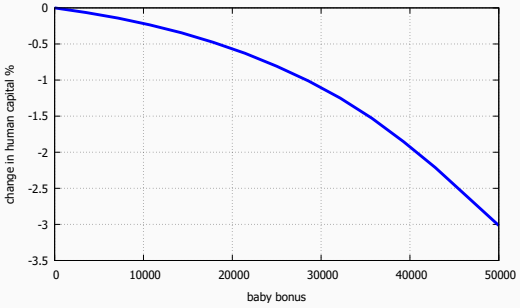

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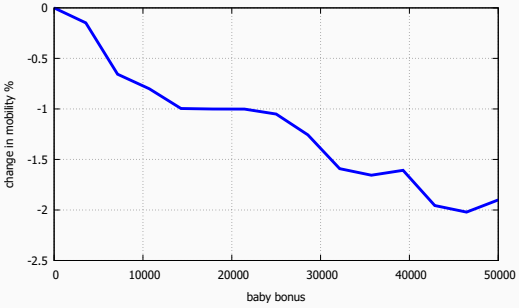

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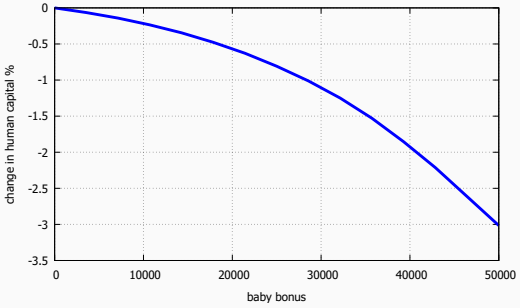

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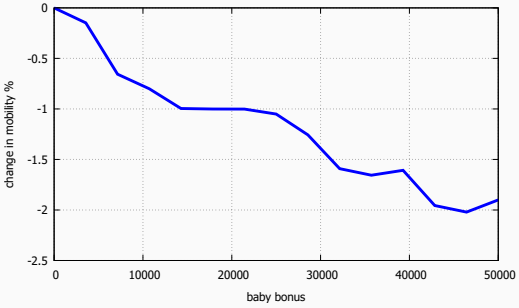


- Average human capital falls by **1.25%** with $\mathcal{B} = \$31,000$
- Intergenerational mobility **decreases by 1.6%** due to heterogeneous responses
- Results are **stronger** when baby bonus is targeted at low-income households

► Australia

Output and Tax: GE Effects

Figure 7: Per capita output

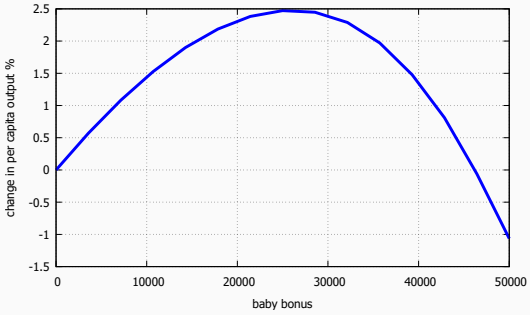
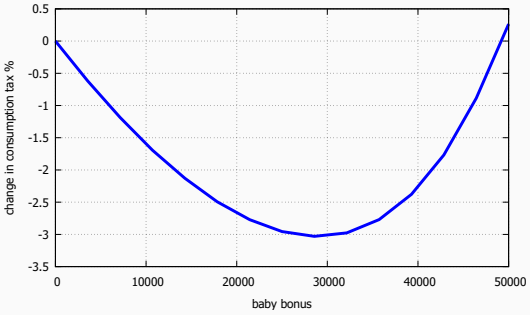


Figure 8: Change in consumption tax



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- **GE effects**: government can reduce consumption tax by 3%

Output and Tax: GE Effects

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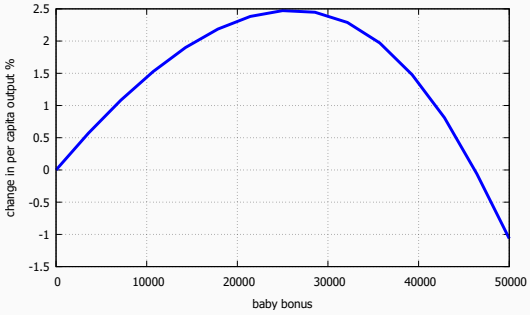

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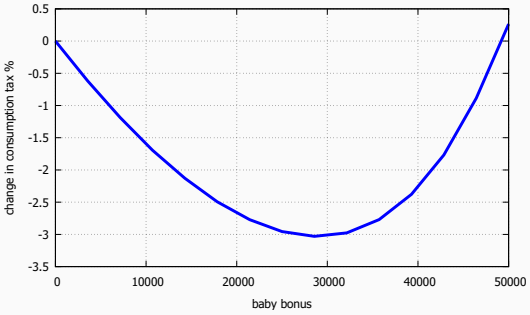


- Per capita output rises initially due to changes in **age structure**
- **GE effects**: government can reduce consumption tax by 3%
- Larger baby bonus is **not always beneficial** as (1) average human capital worsens, and (2) public education expenditure rises

► budget ► age structure

Welfare Effects

Figure 9: Welfare-Fertility Expansion Path

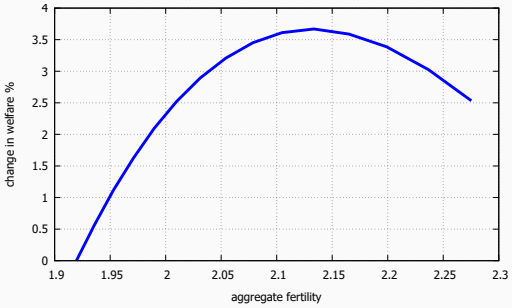
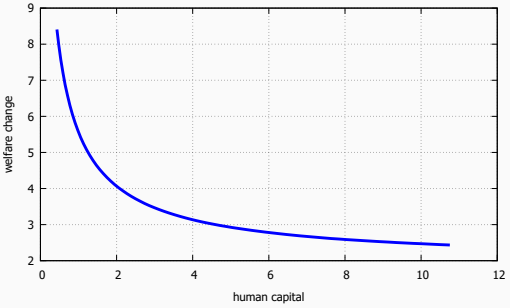


Figure 10: Change in welfare

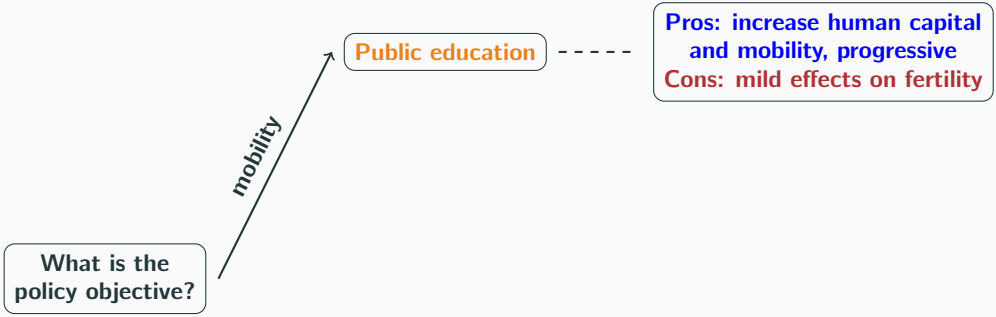


- Welfare maximized around replacement fertility, **3.6%↑** in the long-run
- **Progressive**: large welfare improvement for parents with low human capital

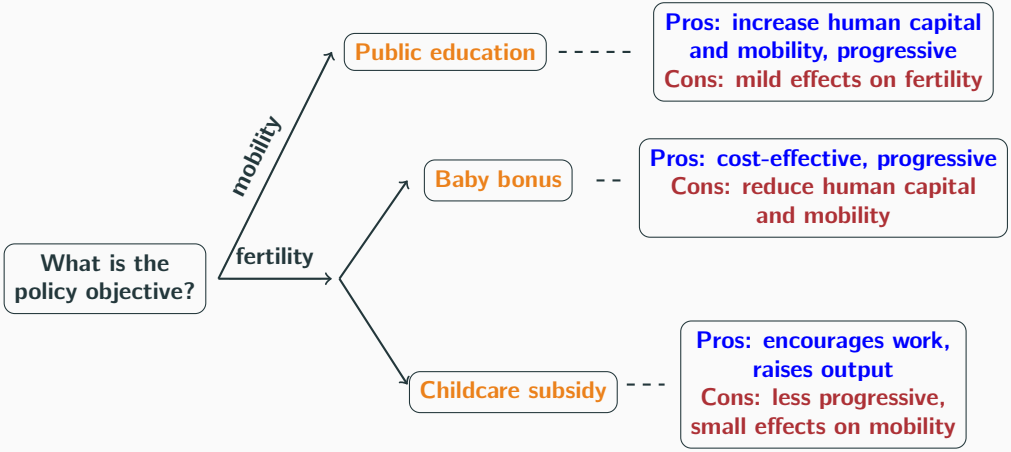
Summary of Policy Comparisons

What is the policy objective?

Summary of Policy Comparisons

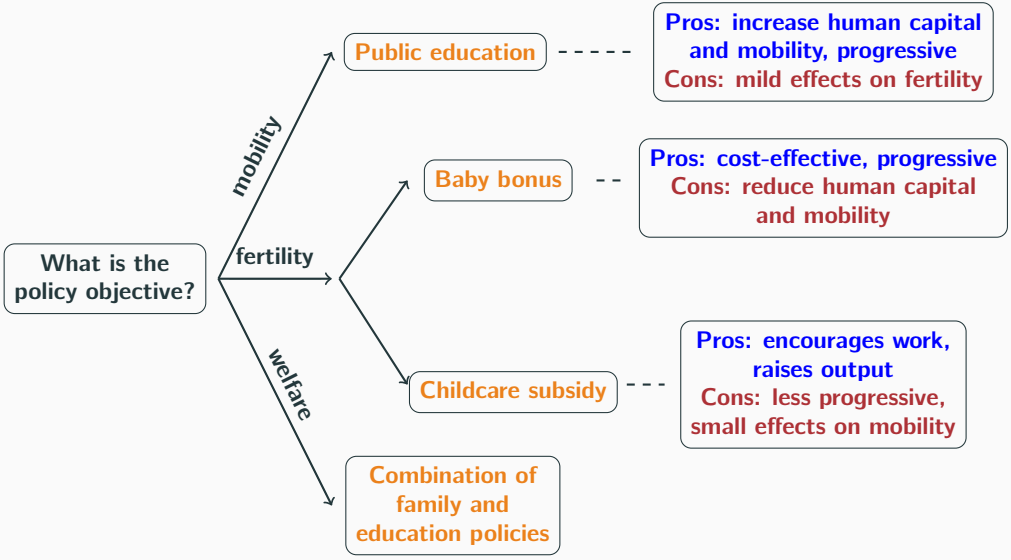


Summary of Policy Comparisons



► public education ► childcare subsidy ► next steps

Summary of Policy Comparisons



► public education ► childcare subsidy ► next steps

Conclusion

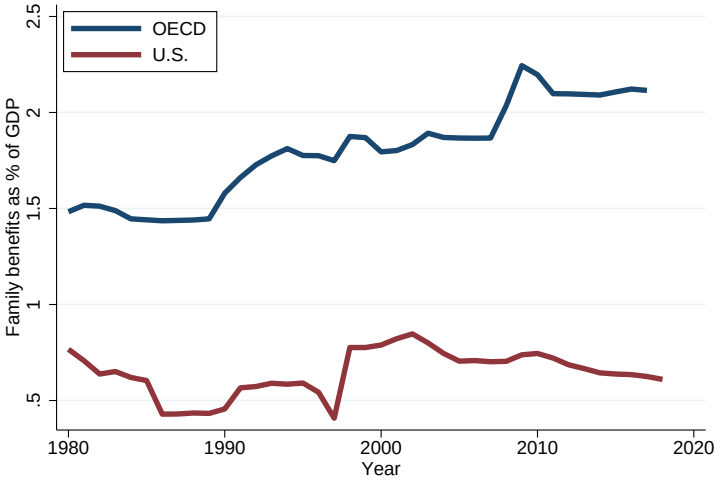
Study macroeconomic consequences of large-scale family policies

- Model **endogenous child quantity and quality** in a GE-OLG model
- Discipline **fertility elasticity** using data moments and validate using policy

Results:

1. Compared with previous studies where fertility is fixed, introducing endogenous fertility reverses policy implications on child outcome and social mobility
2. A \$31k baby bonus raises fertility to replacement level and improves welfare by **3.6%** via effects on age structure and taxes in the general equilibrium
3. Public education is effective in improving child outcome, social mobility and welfare despite having mild effects on fertility

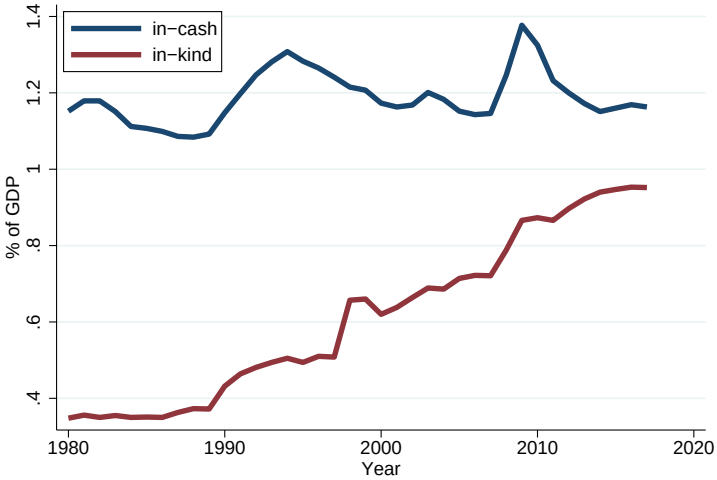
Time Trend of Public Expenditures on Child Benefits



Source: OECD database

► back to intro

Expenditure Breakdown



Source: OECD database

► back to intro

Working Without Children and Retirement

- For households working without children:

$$V_j(h,a) = \max_{c,a' \geq 0} \quad u(c) + \beta \mathbb{E} V_{j+1}(h', a')$$

$$(1+\tau_c)c + a' = (1+r)a + y - \mathcal{T}(y, a, 0)$$

$$h' = L(h, 1, z)$$

- For retired households:

$$V_j(h,a) = \max_{c,a' \geq 0} u(c) + \beta V_{j+1}(h, a')$$

$$(1+\tau_c)c + a' = (1+r-r\tau_a)a + \pi \cdot wh$$

$$V_9(\cdot) \equiv 0$$

where π is pension replacement rate

► back to transfer

Stationary Equilibrium

- **Distributions:**
  - Demographic structure $\{\omega_j\}_{j=0}^{8}$ and distribution of agents over states $\{\mu_j\}_{j=0}^{8}$ are invariant over time periods
  - Distribution of initial states is determined by older generations and shock processes
- **Households Optimize**: Households choose consumption, savings, fertility, childcare arrangements, child investments and inter-vivos transfers such that utility is maximized
- **Firms maximize profits**
- **Prices clear markets**
- **Government balances budget in period to period**

► back to firm and gov.

Child's Skill Production Function

- **Children's skill production function**:

$$h_k = \underbrace{Z}_{\text{scalar}} \cdot \underbrace{\epsilon}_{\text{shock}} \cdot \underbrace{h^{\rho}}_{\text{spillover}} \cdot \left(\underbrace{\mathcal{E}^{\xi}}_{\text{public education}} + \underbrace{e^{\xi}}_{\text{private input}} \right)^{\kappa/\xi}$$

$$\log(\epsilon) \sim \mathcal{N}\left(-\frac{\sigma_\epsilon^2}{2}, \sigma_\epsilon^2 \right)$$

- $\rho = 0.28$ - rank-rank mobility (Chetty, Hendren, Kline and Saez 2014)
- $\mathcal{E} = 0.15$ - \$12k per pupil per year (NCES)
- $\kappa = 0.17$ - **RCT evidence** from García, Heckman, Leaf and Prados (2020)

► mobiltiy fit ► RCT ► back

Child's Skill Production Function Cont'd

Use **RCT evidence** to discipline the productivity of inputs κ:

$$h_k = Z \cdot \epsilon \cdot h^{\rho} \left(\mathcal{E}^{\xi} + e^{\xi} \right)^{\kappa/\xi}$$

- **García, Heckman, Leaf and Prados (2020)**
  - Two US early childhood development programs (ABC, CARE) in 1970s
  - Cost $\approx$ \$13.5k per year for five years - total \$67.5k per child
  - Followed up into adulthood and observe education/income
  - For every dollar invested, children's lifetime labor income increases by **\$1.3**
- **Apply similar policy in the model: expand existing $\mathcal{E}$ by \$67.5k**
  - **Small scale**: prices and taxes remain unchanged
  - **Target**: children of parents at 10th percentile of earnings
- **Comparing labor income changes with program costs gives $\kappa = 0.17$**

► back

Costs of Child and Childcare

- OECD equivalence scale:

$$q(n) = 1.7 + 0.5 \cdot n$$

- **Childcare arrangements**:

$$n \cdot \chi = \left(t_h^{\upsilon/\iota} + (n \cdot m)^{\upsilon} \right)^{1/\upsilon}$$

  Set $\chi = 0.18$. Returns to scale within family $\iota = 0.7$ (Folbre 2008)

- Elasticity of substitution: $\upsilon = 0.5$ - average share of income spent on childcare by education (SIPP) (Malik 2019)

- **Price of full-time childcare**: $p_m = \$6,860$ per year for child aged 0-10 (The National Association of Child Care Resource & Referral Agencies 2011)

► back

Fertility Response

- Consider simplified problem for low-h parents, i.e. quality margin not operative

$$\max_{c,n} \quad u(c) + \Psi(n)u(\mathcal{E})$$

$$c + n \cdot \chi = 1$$

- First-order condition for n:

$$\underbrace{\Psi'(n) \cdot u(\mathcal{E})}_{\text{MB of } n} = \underbrace{\lambda \cdot \chi}_{\text{MC of } n}$$

- Plug in $u(c) = \frac{c^{1-\gamma}}{1-\gamma}$, we have

$$\Psi'(n) = (1-\gamma) \cdot \chi \cdot \frac{\lambda}{\mathcal{E}^{1-\gamma}} \Longrightarrow \boldsymbol{\Delta\Psi'(n) \propto (1-\gamma) \cdot \Delta\chi}$$

Conditional on other parameters, higher $\gamma \Longrightarrow$ smaller n response

► back

Skill Evolution for Adults

- **Human capital of working adults** evolves:

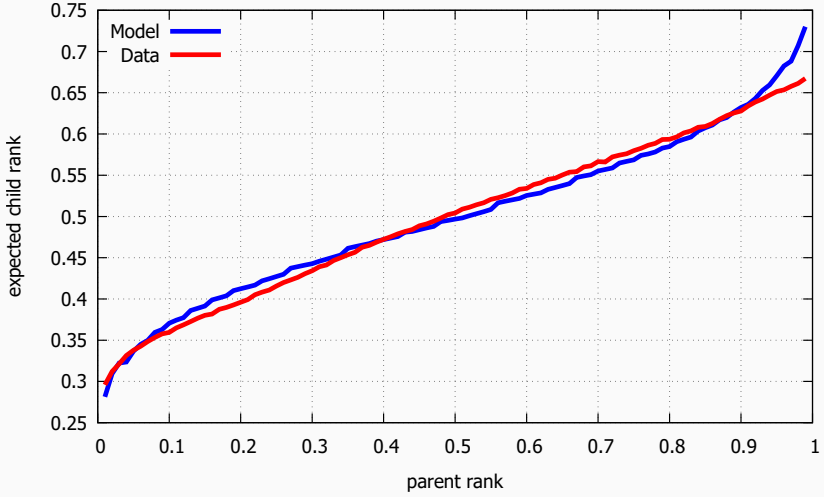
$$h_{j+1} = \exp(z)\left(h_j + \zeta(h_j t)\right)^{\eta}$$

$$\log(z) \sim \mathcal{N}(\mu_z, \sigma_z)$$

- $\eta = 0.61$, $\zeta = 0.72$ - lifecycle earnings (PSID) (Huggett, Ventura and Yaron 2011)
- $\mu_z = -0.23, \sigma_z = 0.42$ - 2% skill depreciation and lifecycle Gini coefficient of earnings (Huggett, Ventura and Yaron 2011)

► back

Intergenerational Mobility: Model vs Data



- Rank-rank slope = 0.34 (Chetty, Hendren, Kline and Saez 2014)

► back

Other Parameters

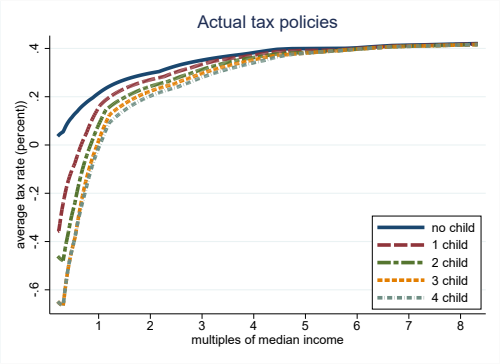
- **Firms' production function**: capital share $\alpha = 0.33$ and 4% capital depreciation
- **Government taxes**
  - **Income taxes**:

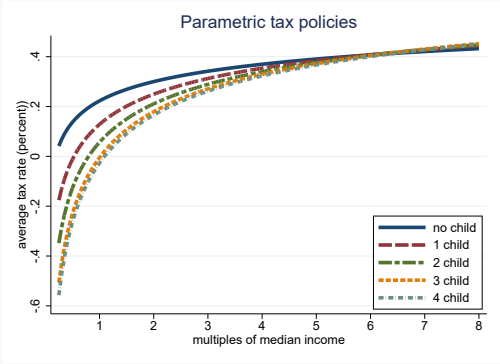
$$\mathcal{T}(y, a, n) = y \cdot (1 - \tau_y^n y^{-\lambda_y^n}) + \tau_a r a$$

    where $\{\tau_y^n, \lambda_y^n\}_{n=0}^6$ estimated using TAXSIM
  - **Tax rates** from McDaniel (2014): $\tau_c = 0.07$ and $\tau_a = 0.27$
  - **Pension replacement rate**: $\pi = 40\%$

► back

Income Taxes: Model vs Data





- Child tax benefits (reduction in tax rates) are larger for low-income households

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Baby Bonus in Australia

- **A$3,000 baby bonus**[4] to every child born on or after July 1st 2004
- Peter Costello (Treasurer of Australia): “One (baby) for the Mum, one for the Dad, and one for the country"
- $\text{tfr}_{\text{AUS},2004} = 1.77 > 1.73 = \text{tfr}_{\text{USA},2018}$ before the Covid Baby Bust ► other
- Drago et al. (2011) finds:
  - Significant fertility responses and evidence for long-term/quantum effects
  - Cost for an additional birth to be at least A$126,000[5]
  - Larger fertility responses from low-income households
- Gaitz and Schurer (2017) finds that the baby bonus was **ineffective** in boosting learning, socio-emotional or physical health outcomes of pre-school children

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[5] More details: (1) Announced on Mar.12th 2004, (2) universal coverage, lump-sum payment, (3) Equivalent to 4 times average weekly earnings, (4) Equivalent to $2,800 in 2010 USD.

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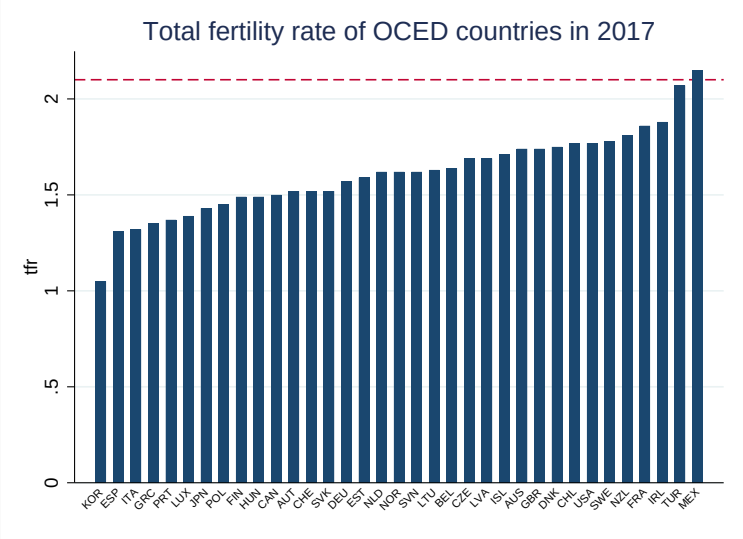
[5]Equivalent to $117,600 in 2010 USD. Quantitative model predicts $130,000 is needed for an additional birth (for the U.S.).

Total Fertility Rate Across Countries



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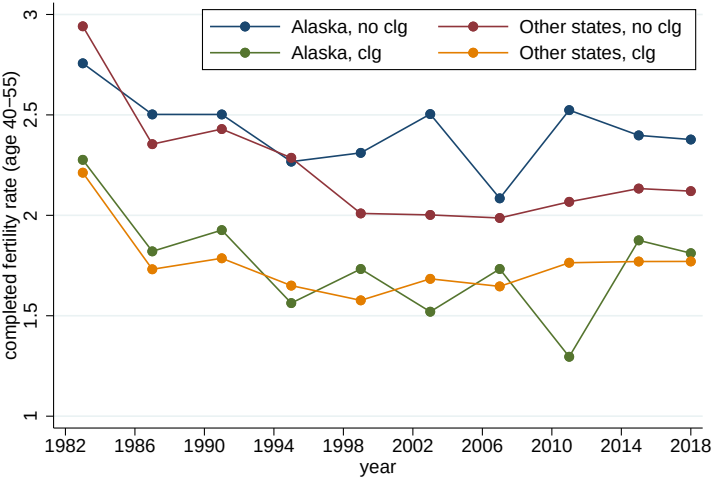
Evidence from Completed Fertility Rates



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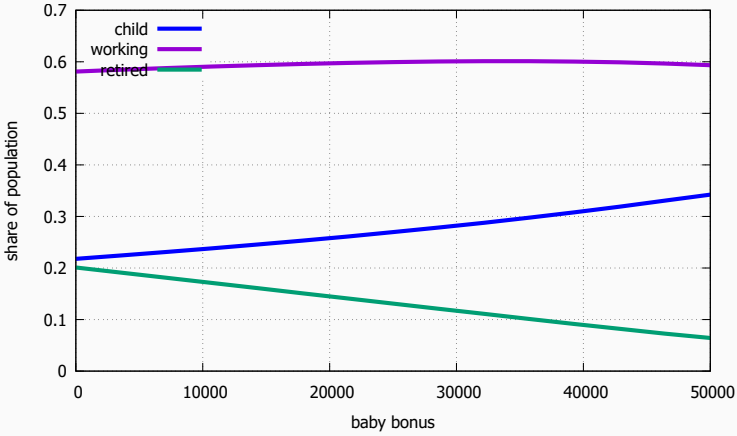
Change in Demographic Structure



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Highlights for Subsidized Childcare $\mathcal{S}$

Figure 11: Fertility

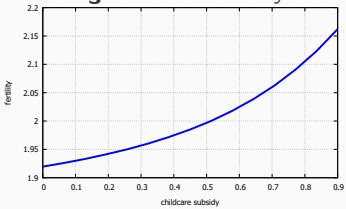


Figure 12: $\Delta\overline{h}$

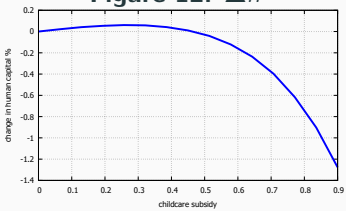


Figure 13: Per capita output

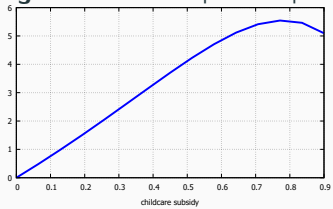


Figure 14: $\Delta\tau_c$

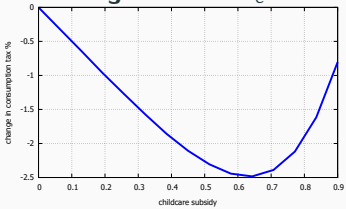


Figure 15: Mobility

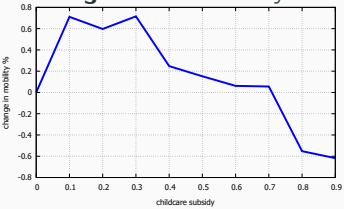
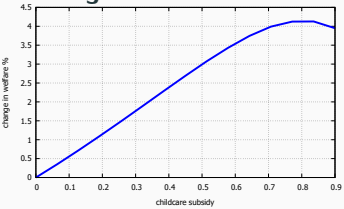


Figure 16: Welfare



- Need **80%** refund to reach 2.1 fertility, **50%** less cost-effective than baby bonus
- Impacts of subsidized childcare are qualitatively similar to baby bonus except that **it encourages work** (Guner, Kaygusuz and Ventura 2020) and **mobility effect is small**
- **Less progressive** because subsidy amount depends on childcare expenditures

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Highlights for Public Education Expansion $\mathcal{E}$

Figure 17: Fertility

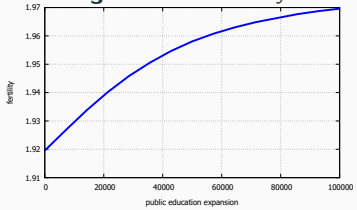


Figure 18: $\Delta\overline{h}$

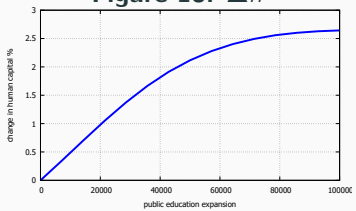


Figure 19: Per capita output

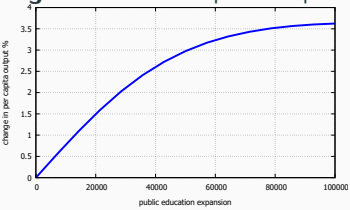


Figure 20: $\Delta\tau_c$

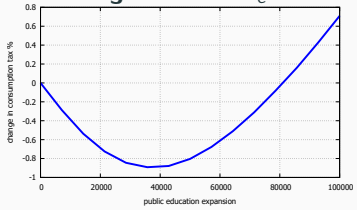


Figure 21: Mobility

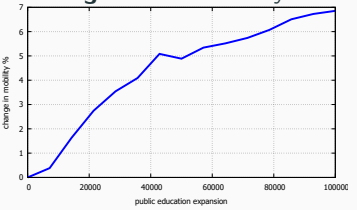
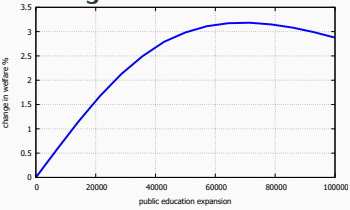


Figure 22: Welfare



- **Mildest fertility effects** (0.035 boost vs 0.23 boost using \$40k baby bonus)
- **Most effective in improving mobility** (5.5% increase using \$65k)
- **Progressive** policy with large welfare improvement for low-income households

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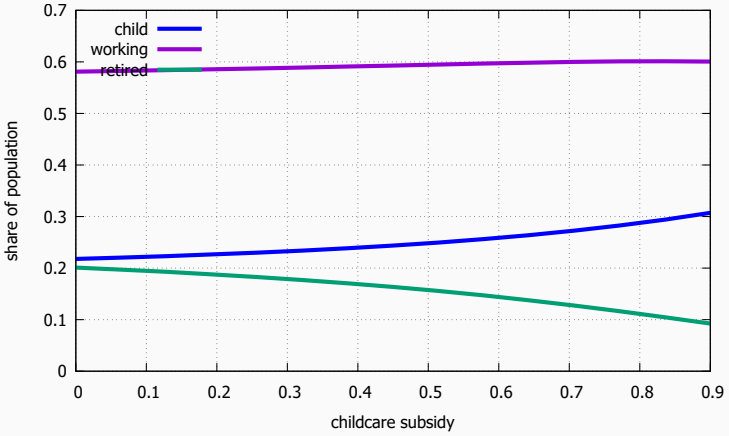
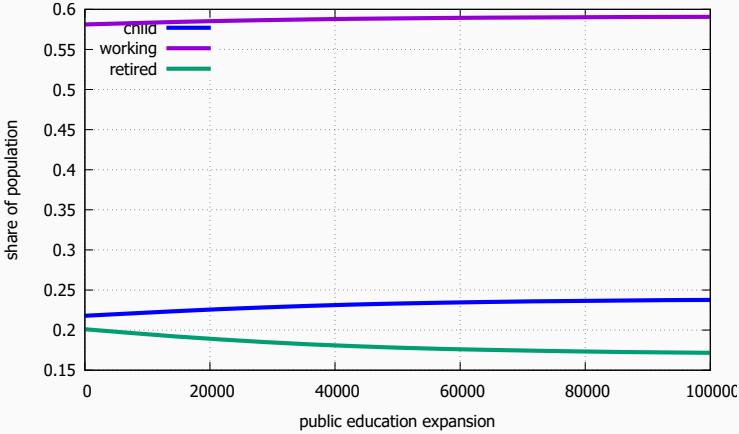
Change in Demographic Structure



Change in Demographic Structure



Next Steps

Transition path

- **Question**: How long do we need to wait for aggregate effects to take place? What are the distributional consequences for households in the original steady-state? Majority support for policy reform?
- **Conjecture**: Majority support may requires transfers **within cohorts**

Alternative ways of financing

- **Question**: How will things change if the policy could be funded via government deficits or labor/capital taxes?

Optimal policies

- **Question**: What is the optimal policy to maximize welfare however defined?

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