Immigration Reform and Fiscal Policy

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Outline

- Motivation
- Background and Relation to Literature
- Motivating data
  - Educational attainment, earnings of immigrants and their children
- Model
- Policy Experiments

Motivation

- Skills of parents and children
- Taxes paid differ by skills
- Expanding skilled immigration improves public finances today
  - In the future through their children

Introduction

- Question
  - What are the welfare and fiscal effects of redesigning immigration policy?
- Contribution
  - Model intergenerational transmission of skills
  - Evaluate wage and fiscal effects of changing immigration policy

Overview of Findings

- Expanding skilled immigration can be welfare improving
- Intergenerational transmission of skills has policy implications

Background and Relation to Literature

Background

- Current U.S. Immigration policy
  - 700,000 adults and 300,000 children per year
  - 70% Family ties
  - 15% Because of skills
  - 15% Other reasons
- Other countries
  - Canada 65% Skills
  - U.K. and Australia similar

Relation to Literature

- Immigration policy and wage effects:
  - Ottaviano and Peri (2012), Borjas (2003), Card (1990, 1991)
- Fiscal impacts of Immigration
  - Storesletten (2000), Lee and Miller (2000), Borjas and Trejo (1991) Evans and Fitzgerald (2017), Orrenius (2017)

Data

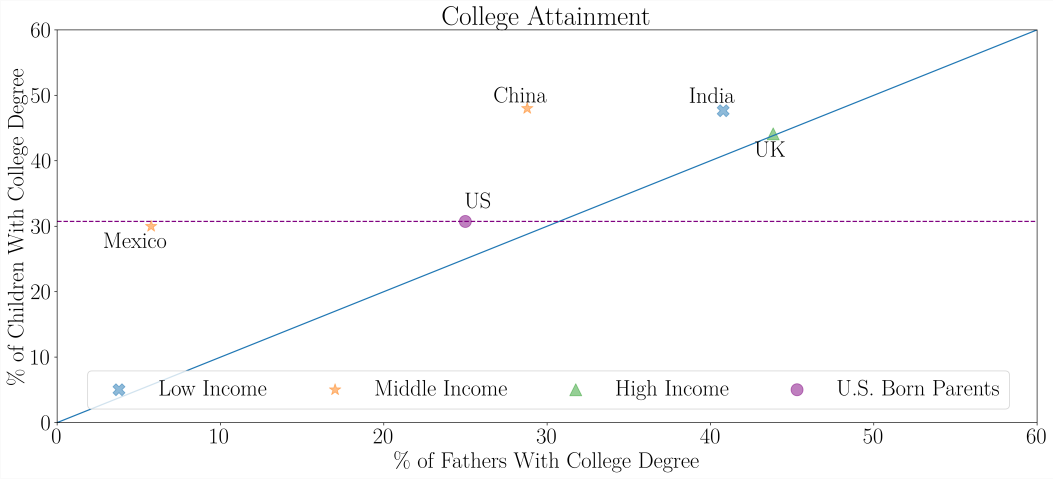
Source Countries of Immigrants

- Immigrants can be from low, middle or high income countries
- Use World Bank Definitions with cutoffs by GNI per capita (Gross National Income per capita 2016$)
  - Low income if GNI is below $4,035
  - High income if GNI is above $12,476
  - Middle income in between

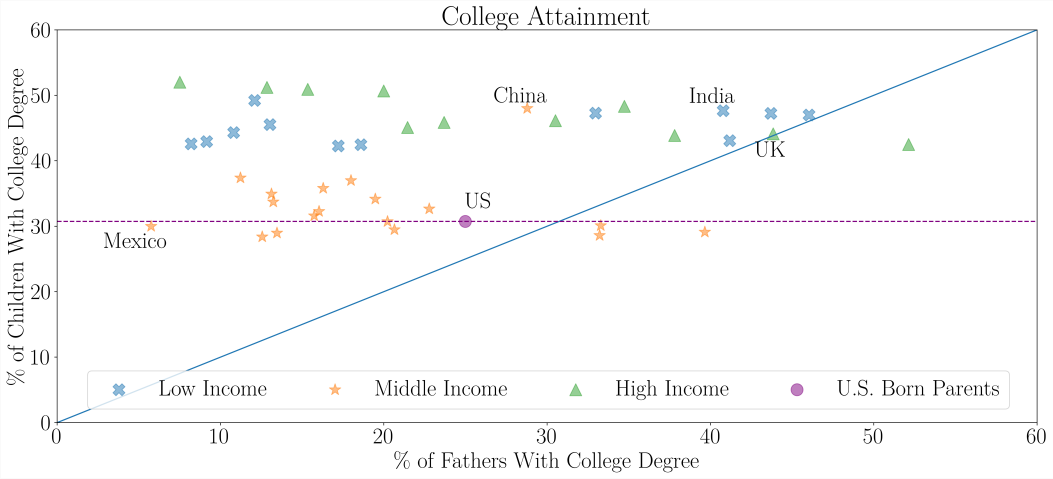
Educational Attainment and Earnings

- 1990 U.S. Census
  - Data on parents
- CPS March Supplement 2007-2017
  - Data on children
- 2000-2016 General Social Survey

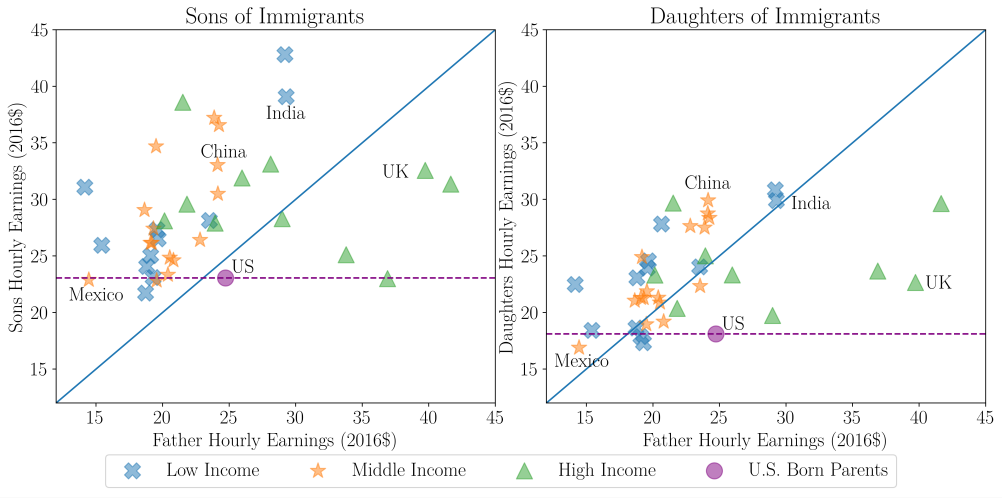
Better Educated



Better Educated



Higher Earning



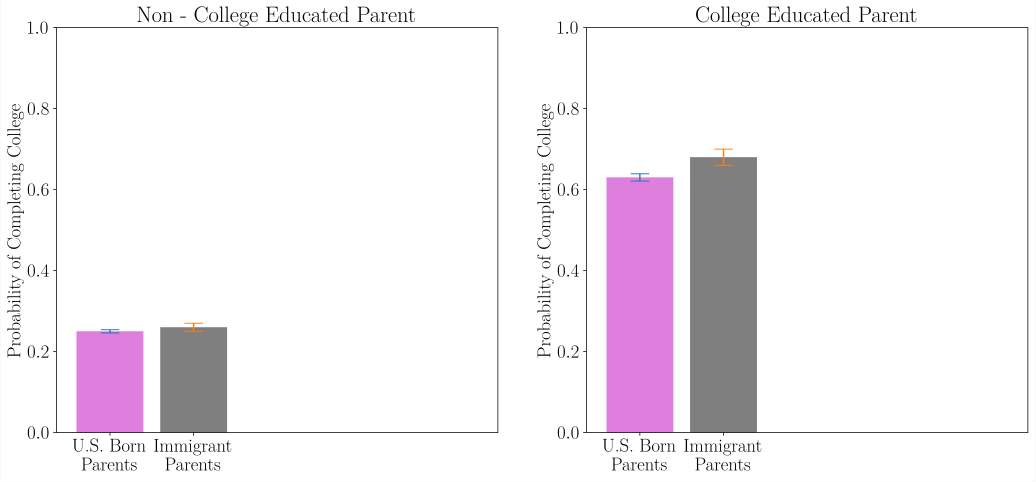
Estimating Intergenerational Skill transmission

- Probit model

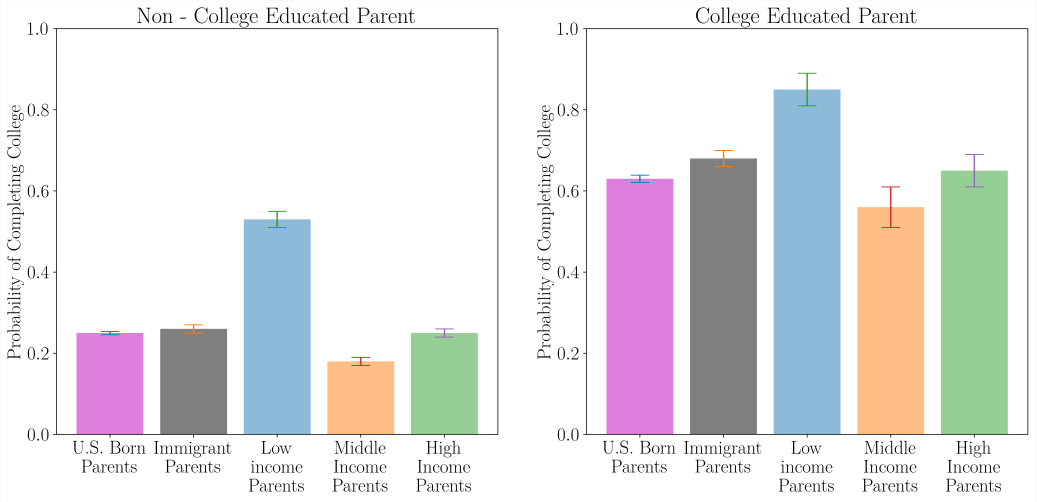
$$Pr(\text{College}_i = 1 | \beta \times \text{Parents College}_i + \gamma X_i + \epsilon_i)$$

- College is dummy for child's education
- Parents college is dummy for parent s education
- X_i contains information on
  - Immigration status of parents
  - Family income growing up
  - Location of family growing up

Intergenerational Education Transmission



Intergenerational Education Transmission



Lower Fiscal Burden

- Pool CPS 2011-2015
- Respondent groups
  - Age, education, nativity
- Compute average taxes and benefits

$$\text{Lifetime Tax to benefit Ratio} = \frac{\sum_j \left(\frac{1}{1+r}\right)^j Taxes_j}{\sum_j \left(\frac{1}{1+r}\right)^j Benefits_j}$$

Lifetime Tax to Benefit Ratio

	Lifetime tax to benefit ratio	
	Less than College	College
Two U.S. born parents	0.40	1.22
Second Generation Immigrants		
Low Income	0.40	1.67
Middle Income	0.33	1.33
High Income	0.47	1.44
First Generation Immigrants		
Low Income	0.45	2.19
Middle Income	0.40	1.83
High Income	0.55	2.57

Model

Model - Overview

- Neo-classical growth model with overlapping generations and agents heterogeneous in skills
- Agents choose hours, consumption, saving and retirement age
- Aggregate state $\Lambda = (K, \psi)$
- Production function
  - Capital
  - Unskilled labor
  - Skilled labor

Agents

- Agents
  - Age j
  - Origin $g = (\text{Agent country of birth}, \text{Parent country of birth})$
    - $g \in \{L, M, H, A\}$
  - Skill $h \in \{U, S\}$
- For each j, g and h
  - Probability of survival γ_j^g
  - Productivity $\epsilon_j^{h,g}$
  - Fertility $\eta_j^{h,g}$

Population Evolution

- Population evolution for each skill type h is a function of
  - Fertility $\eta^{h,g}$
  - Survival rates γ^{g}
  - Skill transmission from parents to children $\pi^{h,g}$
  - Immigration policy ς
- For each type h different evolution for
  - First generation immigrants - I
  - Second Generation - E
  - U.S. born parents - N

Population Evolution - Immigrants

- For any age j for an immigrant from country g of skill h

$$I_{j,t}^{h,g} = \underbrace{I_{j-1,t-1}^{h,g}\gamma_{j-1}^{g}}_{\text{Surviving population}} + \underbrace{\varsigma_{j,t}^{h,g}}_{\text{New immigrant arrivals}}$$

Population Evolution - Children of Immigrants

- Population of age 0 of skill h who have immigrant parents from country g

$$E_{0,t}^{h,g} = \underbrace{\Big(\sum_{g,j} I_{j,t}^{U,g}\eta_j^{U,g}\Big) \times \pi^{U,g}(h|parent = U)}_{\text{Children of skill h born to unskilled parents}} + \underbrace{\Big(\sum_{g,j} I_{j,t}^{S,g}\eta_j^{S,g}\Big) \times \pi^{S,g}(h|parent = S)}_{\text{Children of skill h born to skilled parents}}$$

- For $j > 0$

$$E_{j,t}^{h,g} = E_{j-1,t-1}^{h,g}\gamma_{j-1}^{g} + \varsigma_{j,t}^{h,g}$$

Population Evolution - U.S. Born Parents

- Population of age 0

$$N^h_{0,t} = \underbrace{\Big(\sum_j \Big(\sum_g E^{U,g}_{j,t} + N^U_{j,t}\Big)\eta^{U,A}_j\Big) \times \pi^{U,A}(h|parent = U)}_{\text{Children of skill h born to unskilled parents}} + \underbrace{\Big(\sum_j \Big(\sum_g E^{S,g}_{j,t} + N^S_{j,t}\Big)\eta^{S,A}_j\Big) \times \pi^{S,A}(h|parent = S)}_{\text{Children of skill h born to skilled parents}}$$

- For $j > 0$

$$N^h_{j,t} = N^h_{j-1,t-1}\gamma^g_{j-1}$$

Decisions

- Each period agents of skill h with origin g at age j choose hours (l), consumption (c), saving (a') and retirement (χ)

$$V_j^{h,g}(a,\chi,\Lambda) = \max_{c,l,a',\chi'} u(c,l) + \beta(\gamma^g)V_{j+1}^{h,g}(a,\chi',\Lambda')$$

$$s.t$$

$$c(1+\tau_c) + (1-\gamma_j^g)a' \leq wl\epsilon^{h,g}(1-\tau_l) + T_j^h(\chi) + (1+R(1-\tau_k))a$$

$$u(c,l) = \log(c) + \alpha\log(1-l)$$

$$\Lambda' = F(\Lambda)$$

Firms

$$\max_{K,L^U,L^S} Y - w^U L^U - w^S L^S - rK$$

$$Y = AK^\theta \left(\lambda \left(L^U \right)^\rho + (1-\lambda) \left(L^S \right)^\rho \right)^{\frac{1-\theta}{\rho}}$$

Government

$$G + (1+R)B + \Omega = B' + \tau_k RA + \tau_l \left(w^U L^U + w^S L^S \right) + \tau_c C$$
$$\Omega = \sum_{g,j} T_j^h + E + P$$

- B is aggregate government debt
- G is government consumption excluding education and public goods
- C is aggregate agents consumption
- A is aggregate agents saving
- Ω is total transfers

Market Clearing

- Labor Supply $=$ Labor Demand
- Total Capital $=$ Total Savings - Government Debt
- Output $=$ Consumption $+$ Investment

▸ Market Clearing Detailed

Parameterization

Population Data

- Skilled if college degree or more
  - Unskilled otherwise
- Start work aged 18 die with certainty by age 90
  - Survival probabilities calculated using lifetables methodology
- Fertility and population distribution
  - ACS 2015 5 year sample

▸ Fertility Estimates

Production and Utility

- Set parameters in model to match
  - Average hours worked
  - Capital-output ratio
  - College education wage premium
  - Differences in wages between different nativity groups

▸ Detailed Parameters ▸ Efficiency Units

Calibration Fiscal Policy

- Parameters set to match aggregate spending
  - Retirement transfers
  - Other transfers
  - Government consumption
- Transfers distributed
  - Data from CPS 2011-2015

▸ Detailed Fiscal Calibration ▸ Construction of Transfer Function

Policy Experiments

Policy - Overview

- Allow for more skilled immigration
  - Test different fiscal instruments
  - Turn off correlation between parents and children

Baseline and Analysis

- For each policy experiment
  - Debt to GDP ratio constant
  - Value of per-capita transfers constant
  - Baseline is current U.S. policy
    - 700,00 immigrant adults per year
- Welfare changes are from the perspective of U.S. born with U.S. born parents

▸ Consumption Equivalence Definition

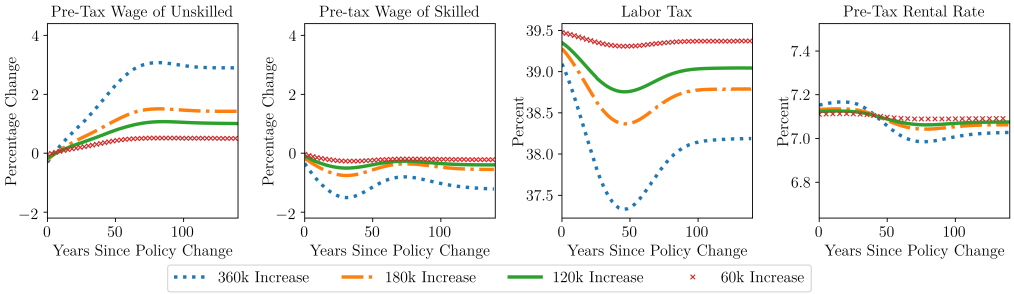
Expanding Skilled Worker Programs

- Increase the amount of workers:
  - With a college education or higher
  - Aged between 30 and 50
- Increase is between additional 60,000 and 360,000 immigrants admitted per year
  - Restrict increase to skilled immigrants only
  - Total immigration 760,000 to 1,060,000 per year

Mechanics

- More skilled workers $\Longrightarrow$ $w^S \downarrow$
  - Complimentarity of labor inputs $\Longrightarrow$ $w^U \uparrow$
- More taxes collected
- To make government budget constraint bind
  - Tax rates $\downarrow$

Welfare Changes From Expanding Skilled Worker Programs



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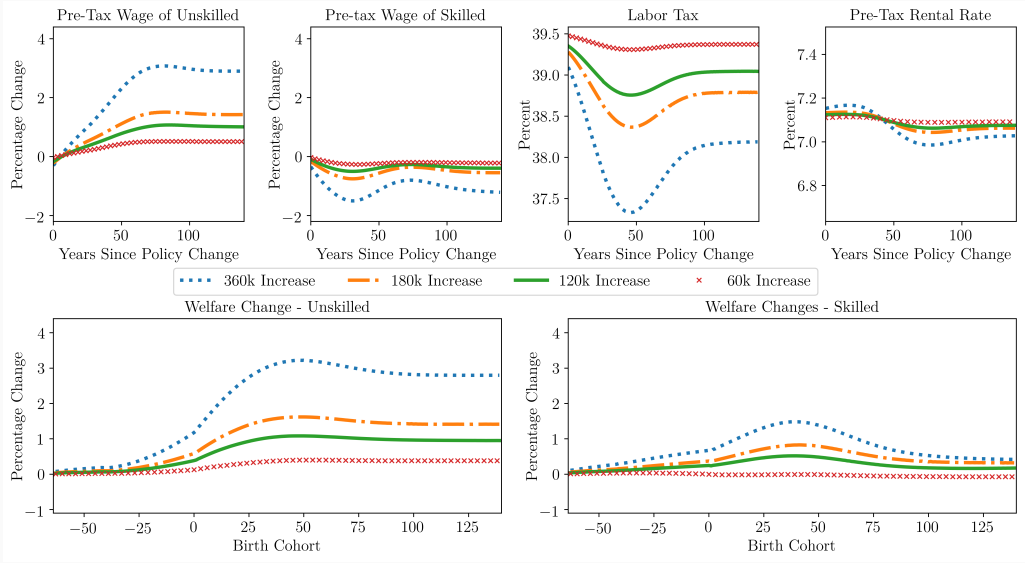
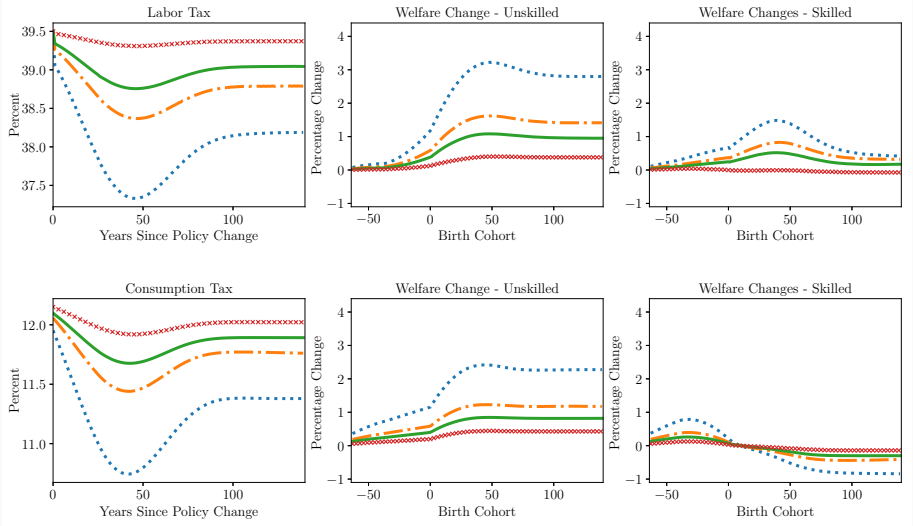


Welfare Changes From Expanding Skilled Worker Program Changing τ_c



Removing Correlation Between Skills of Parents and Children

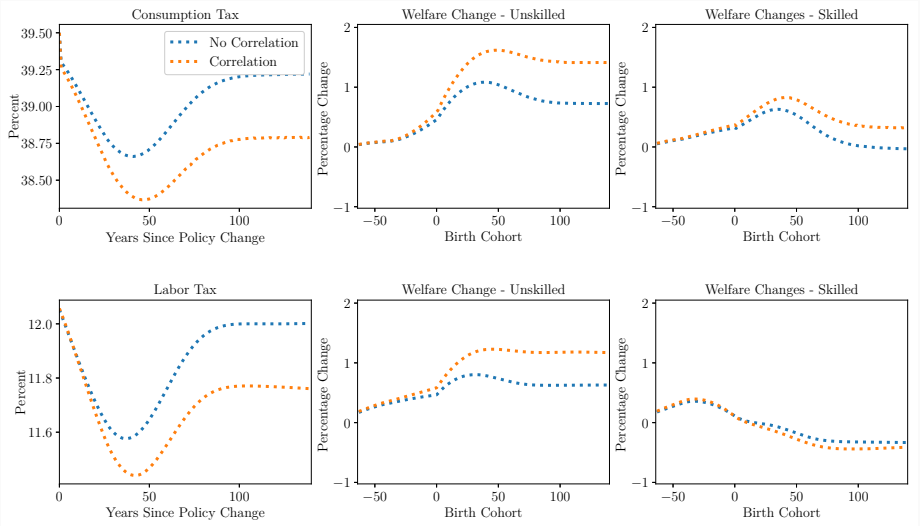
- Set intergenerational education transmission π to unconditional probability of U.S. born child with U.S. born parents going completing college

		Children	
		LC	C
Parents	LC	0.70	0.30
	C	0.70	0.30

- Allow for 180,000 skilled immigrants each year
- Use τ_c and τ_l to make government budget constraint bind

Welfare and Fiscal Changes After Removing Correlation between Parents and Children

▸ Long term Social Security



Conclusion

Conclusion

- In this paper
  - Data of success' of second generation immigrants
  - Construct a lifecycle model incorporating observations
- Findings
  - Expanding skilled immigration can be welfare improving
  - Fiscal instrument important
  - Correlation between parents and children has policy implications

Appendix

Efficiency Units

	Less than College	
College		
U.S. Born Parents	1.00	1.00
Immigrant Adults		
Low Income	0.78	1.01
Middle Income	0.76	0.95
High Income	1.11	1.24
Immigrant Children		
Low Income	1.00	1.05
Middle Income	1.00	1.00
High Income	1.00	1.05

Back

Data

- Fertility data
  - Data from 2015 5 year ACS calculate TFR (Total Fertility Rate) by country of origin and education level
  - Compute average for countries of different income levels

Fertility

Country of Origin	Less than College	College
U.S. Born	1.80	1.91
Low income	2.43**	2.37**
	(0.15)	(0.10)
Middle income	3.04**	1.72*
	(0.1)	(0.09)
High income	1.79	1.69
	(0.26)	(0.14)

Note : * Significant at 5% level, ** at 1% level

Back - Population

Calibration - Production and Utility

Parameter	Parameter Value	Moment	Value	Data	Source
β	0.964	K/Y	3.8	3.8	BEA 2010-2016
α	1.76	Average hours	0.247	0.247	CPS 2011, 2013, 2015
δ	0.053	X/Y	0.21	0.21	BEA 2010-2016
$1-\theta$	0.54	Labor share of income	0.54	0.54	BEA 2010-2016
λ	0.39	w^S/w^U	2.00	2.00	CPS 2011, 2013, 2015
ρ	0.28	-	-	-	Katz and Murphy (1992)
$\epsilon^{i,g,p}$	-	$w^i\epsilon^{i,g,p}/w^i\epsilon^{i,A,A}$	-	-	CPS 2011, 2013, 2015

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Calibration Fiscal Policy

Moment	Value	Source
Government debt	97.0%	Flow of funds
Defense spending	4.6%	NIPA : Federal defense expenditures
Non-defense spending (excluding education)	11.4%	NIPA : Government consumption expenditures
Education spending	4.6%	National Transfer Accounts
Social Security and Medicare transfers	8.1%	NIPA
Other transfers	6.3%	NIPA : Total transfers - Social security - medicare
τ_l	39.5%	CPS 2011, 2013, 2015
τ_k	30.1%	Flow of Funds - Taxes on Domestic Corporate Profits

Back

Transfer Function

- Non-defense spending divided pro-rata among all agents
  - Education transfers to ages 4-18
- Equal retirement transfers for skilled and unskilled agents
  - Differ in initial retirement age
- All other transfers
  - 78% to unskilled workers
  - 12% to skilled workers
  - 6% to retired unskilled agents
  - 4% to retired skilled agents
- Same transfer function regardless of nativity

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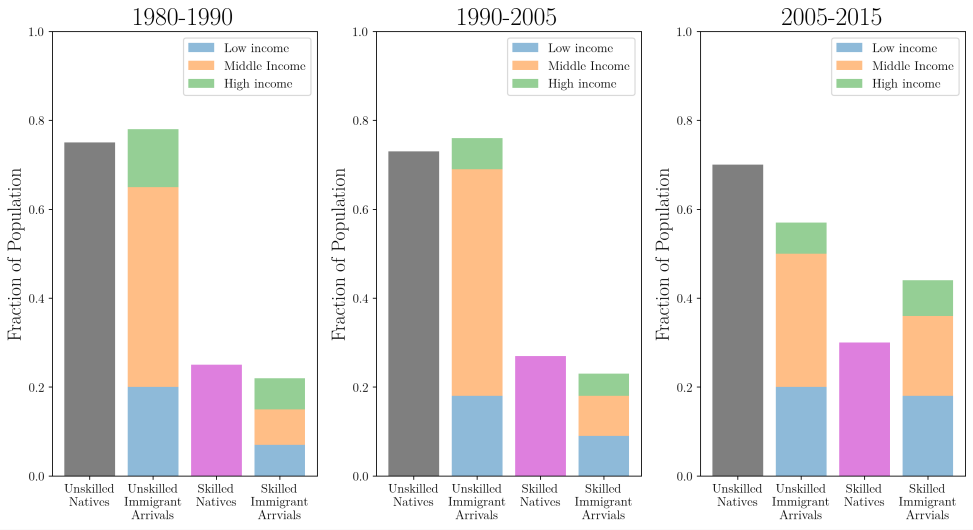
Changes in Composition of Immigrant Arrivals



Exercise

- Calculate changes needed in consumption tax, retirement transfers needed to make government budget balance given
  - Worker-retiree ratio falls from 3.9 to 2.6
  - 700,000 immigrants continue to arrive each year
- Compare changes when assuming immigrants that arrive
  - Are same composition as 2005-2015 arrivals
  - Are same composition as 1990-2005 arrivals
  - Are same composition as 2005-2015 arrivals with no correlation between skills of parents and children

Changes from initial steady state

	Immigrant arrivals based on 2005-2015	Immigrant arrivals based on 1990-2000	Immigrant arrivals based on 2005-2015 with no intergenerational correlation
Consumption Tax Change	3.1%	4.3%	3.8%
Using retirement transfer to balance government budget	-14.0%	-19.0%	-16.0%
Output per capita	-3.9%	-5.6%	- 4.5%

Back

Consumption Equivalence

$$\sum_{h=1}^{H} \beta^{h-1} \prod_{h} \gamma^{h-1} u((1+\Delta)c^{np}, l^{np}) = \sum_{h=1}^{H} \beta^{h-1} \prod_{h} \gamma^{h-1} u(c^{ss}, l^{ss})$$

- Δ calculated for each birth cohort and skill level

Back

Market Clearing

- Markets clear

$$L^U = \sum_{j,g} \psi^U_{j,g} l^{U,j,g} \epsilon^U_g$$

$$L^S = \sum_{j,g} \psi^S_{j,g} l^{S,j,g} \epsilon^S_g$$

$$K = \sum_{h,j,g} \psi^h_{j,g} a^h_{j,g} - B$$

$$C + X + G = Y$$

$$r = MP_K$$

$$R = r - \delta$$

$$w_u = MPL_u$$

$$w_s = MPL_s$$

Equilibrium

- A stationary equilibrium is
  - Prices $\{w^i\}$ and R,
  - Policy functions $f_c^{h,i,g,p}$, $f_l^{h,i,g,p}$, $f_a^{h,i,g,p}$, $f_\chi^{h,i,g,p}$
  - Value functions $V_{h,i,g,p}$
- That solve the household's problem, ensure the government budget constraint binds and markets clear.

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