Taking the Skill Bias out of Global Migration

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Goal of this paper

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Global welfare assessment

of the skill bias in migration

Skill bias from non-OECD countries

Emigrants often **positively selected on skills**

Skill bias from non-OECD countries

Emigrants often **positively selected on skills**

Skill-bias in emigration:

$$\frac{\%\text{ high-skilled among emigrants}}{\%\text{ high-skilled in total population}}$$

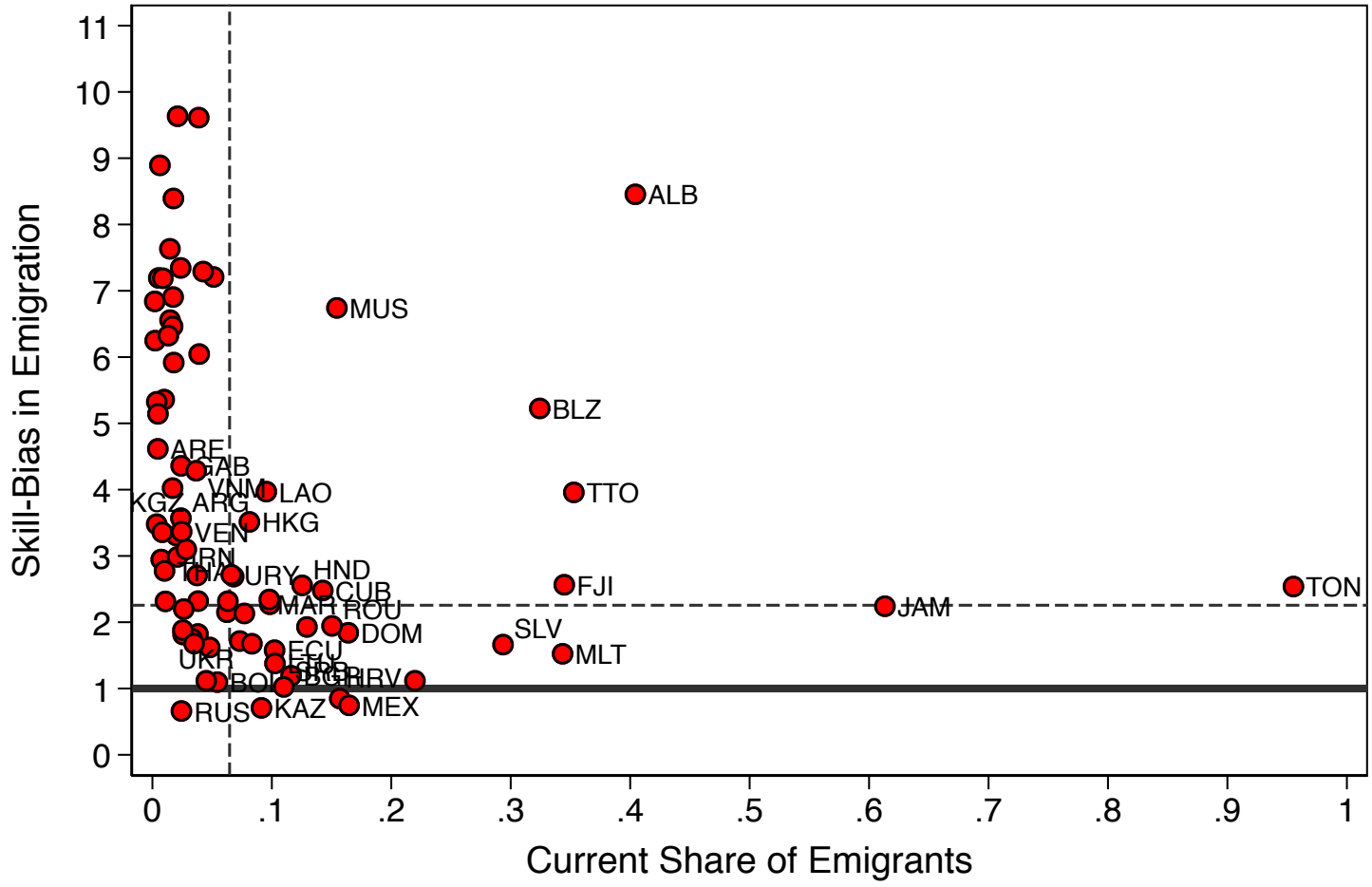
Skill bias from non-OECD countries

Emigrants often **positively selected on skills**

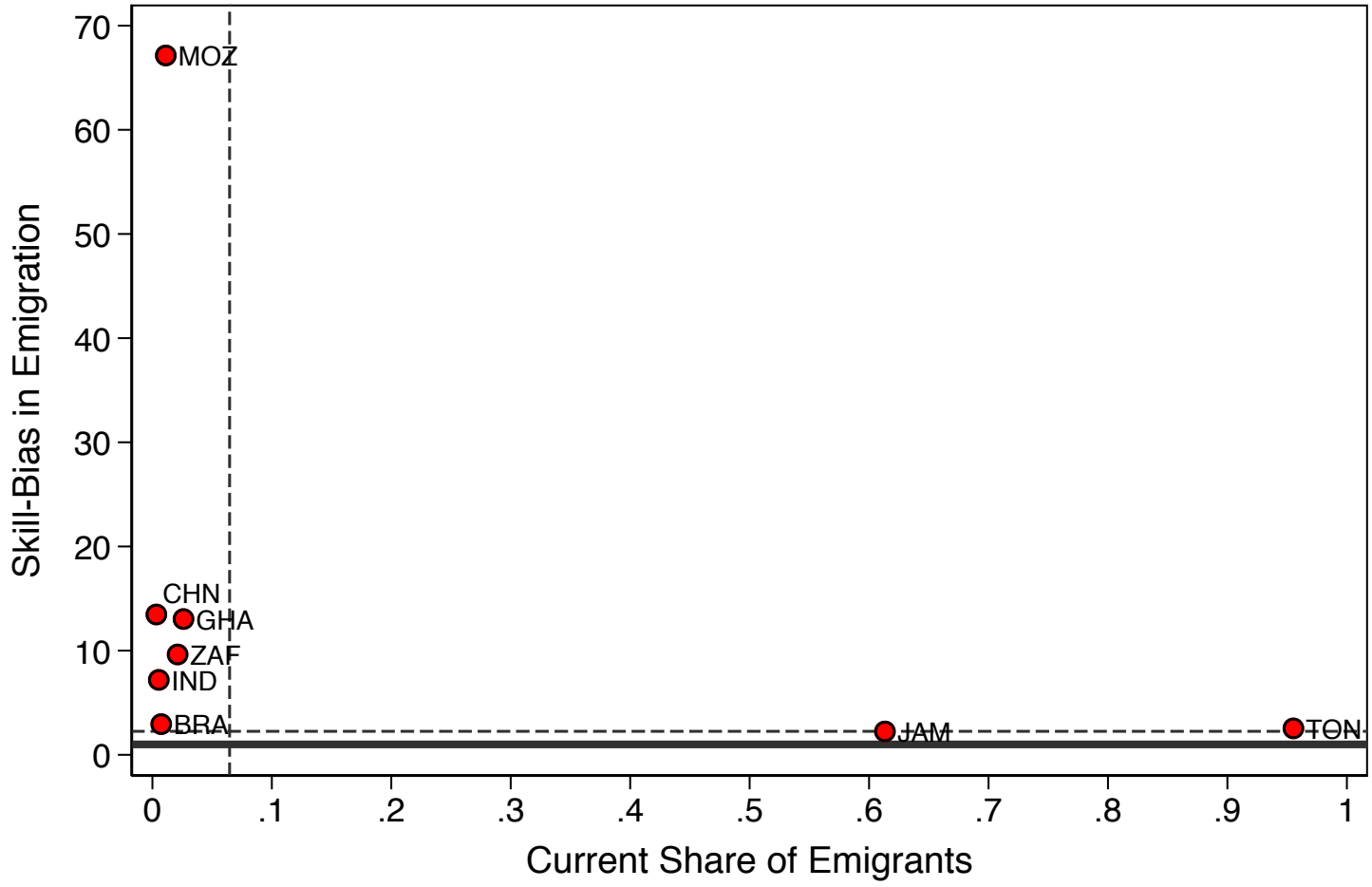
Skill-bias in emigration:

$$\frac{\%\text{ high-skilled among emigrants}}{\%\text{ high-skilled in total population}} > 1$$

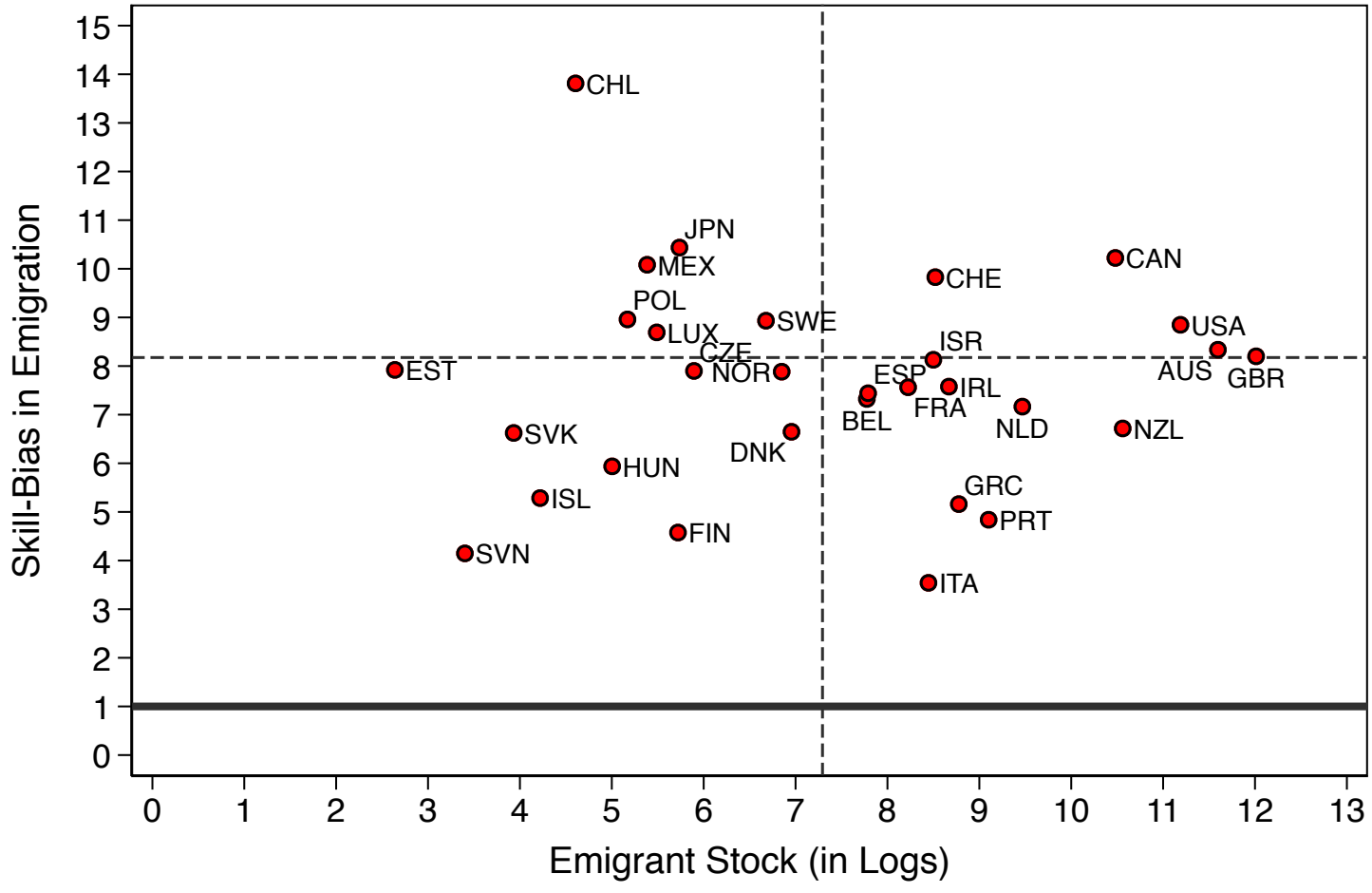
Skill bias from non-OECD countries



Skill bias from selected countries



Skill bias in South Africa: bilateral corridors



Welfare assessment of skill-biased migration

Popular opinion: **brain drain, detrimental for sending countries**

Supporting research:
Bhagwati & Hamada (1974), Collier (2013)

Drastic policy proposals: restrictions, taxes

Maybe not all that bad?

Brain gain: **Remittances, education, technology diffusion,...**

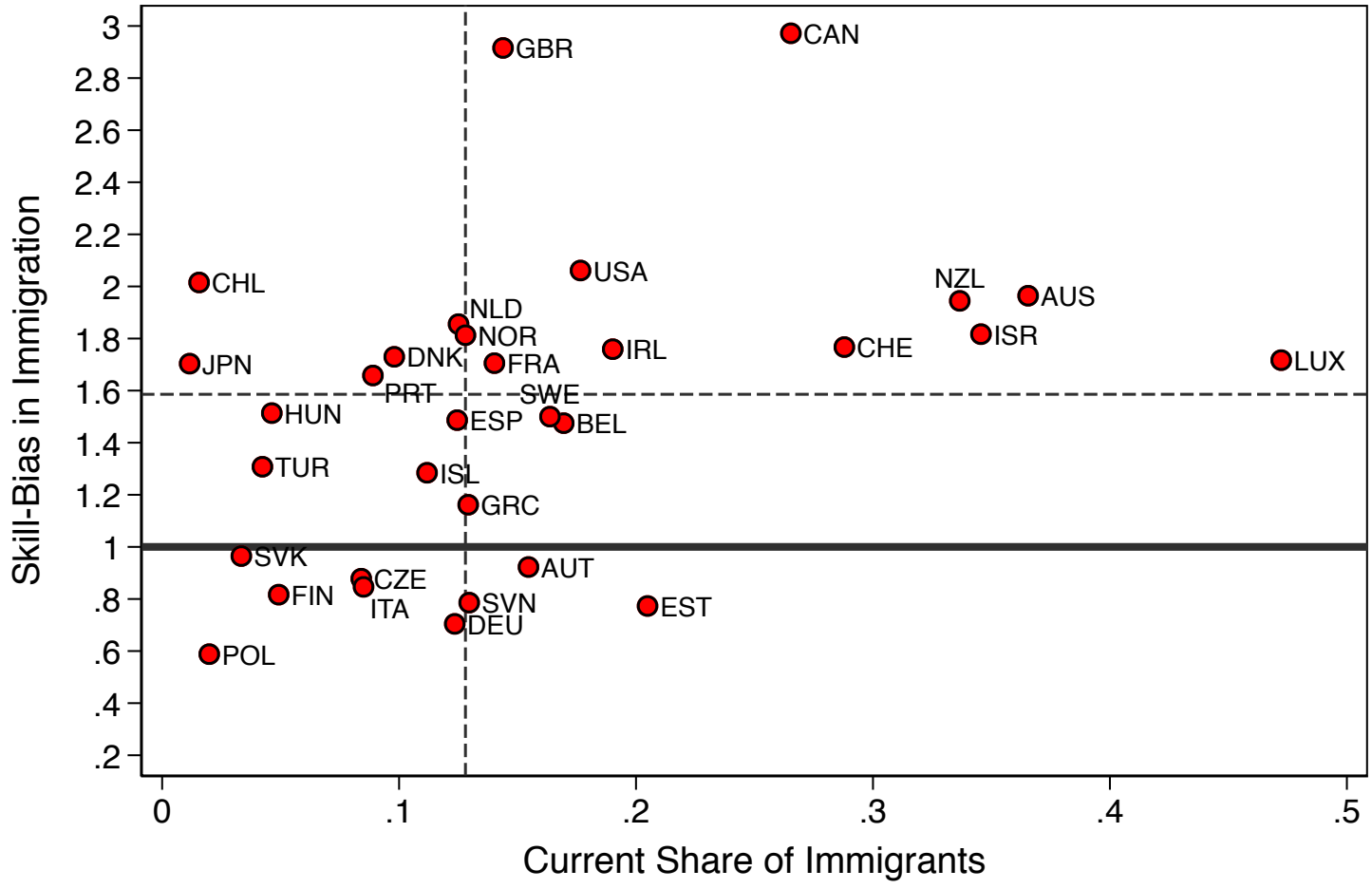
Mountford (1997), Vidal (1998), Beine et al (2001, 2008)
Batista et al (2012), Shrestha (2015), Chand & Clemens (2009)

And: what about the **receiving countries?**

"Inverse" brain drain in the OECD

$$\frac{\%\text{ high-skilled among immigrants in current world}}{\%\text{ high-skilled among immigrants, world without skill-bias}}$$

"Inverse" brain drain in the OECD



$$\frac{\text{\% high-skilled among immigrants in current world}}{\text{\% high-skilled among immigrants, world without skill-bias}}$$

This paper

A global welfare assessment of skill-biased migration

Impact on

- welfare in the **sending countries:**
- welfare in the **receiving countries:**

This paper

A global welfare assessment of skill-biased migration

Impact on

- welfare in the **sending countries:**
- welfare in the **receiving countries:**

Global welfare gains?

This paper

A global welfare assessment of skill-biased migration

Impact on

- welfare in the **sending countries: variable**
- welfare in the **receiving countries: GAINS**

Global welfare gains?

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A global welfare assessment of skill-biased migration

Impact on

- welfare in the **sending countries: variable**
- welfare in the **receiving countries: GAINS**

Global welfare gains? **YES!**

Global efficiency gains - really?

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Allocation of talent: productive **workers** - productive **countries**

Global efficiency gains - really?

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Additional mechanisms

- Trade
- Remittances
- ...

Global efficiency gains - really?

Allocation of talent: productive **workers** - productive **countries**

Additional mechanisms

- Trade
- Remittances
- ...

Depends on **counterfactual**!

Roadmap

Counterfactual

Sketch of the model

Baseline simulation results

The most plausible scenario: adding "migration-driven externalities"

Counterfactual: a world without skill bias

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Leave **bilateral migration stocks constant**

Counterfactual: a world without skill bias

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Migrants neutrally selected from their home countries

Counterfactual: a world without skill bias

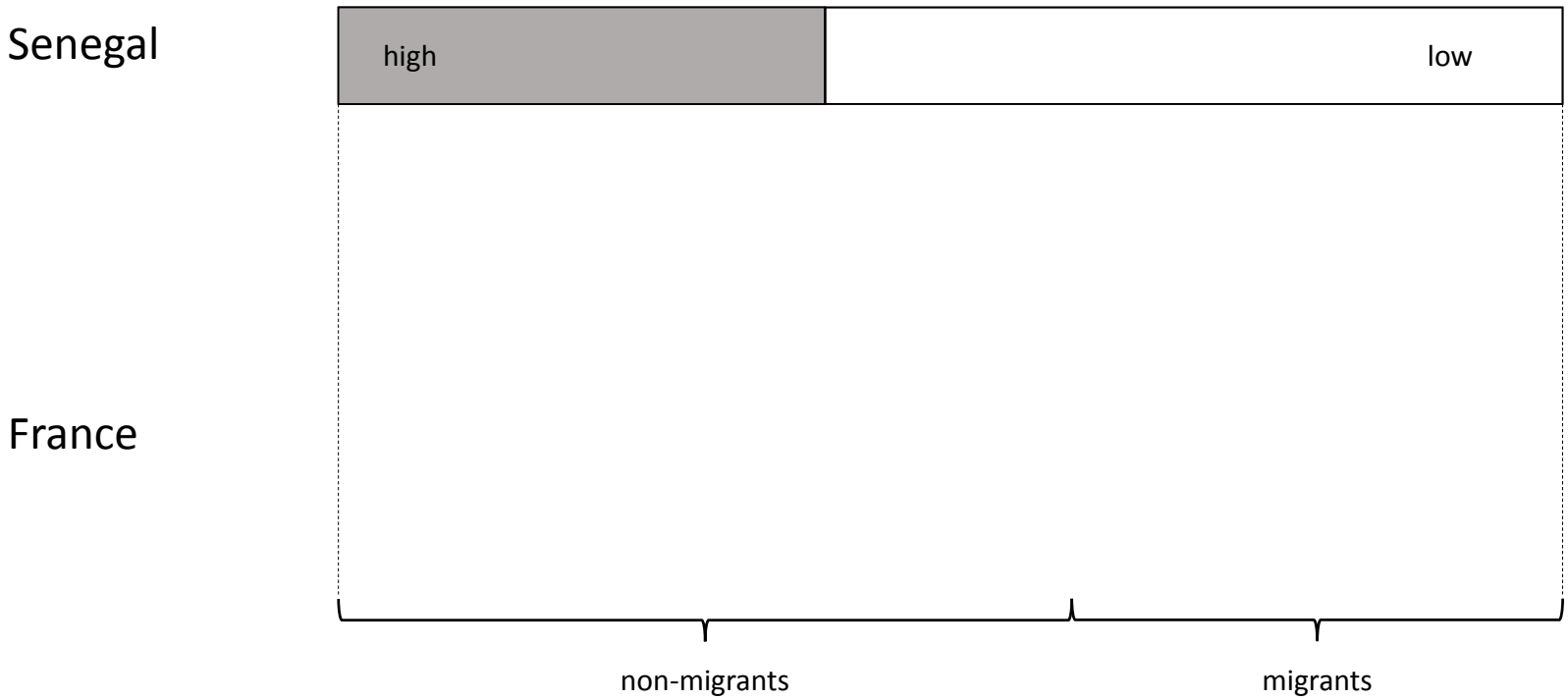
Leave **bilateral migration stocks constant**

Migrants neutrally selected from their home countries

Migrants: **same skill distribution** as the **total population**

No migration

Example: Senegalese migrants



Baseline: Skill-biased migration

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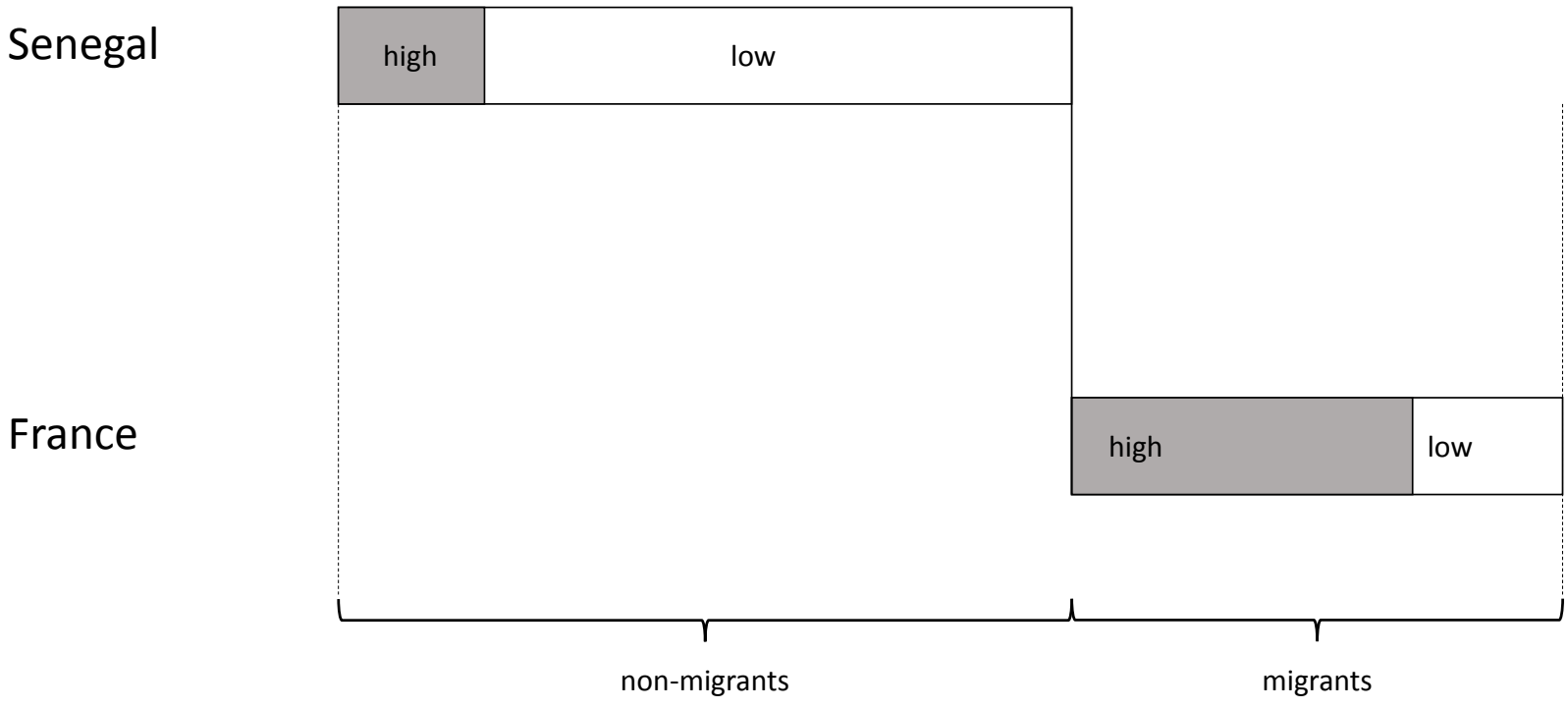

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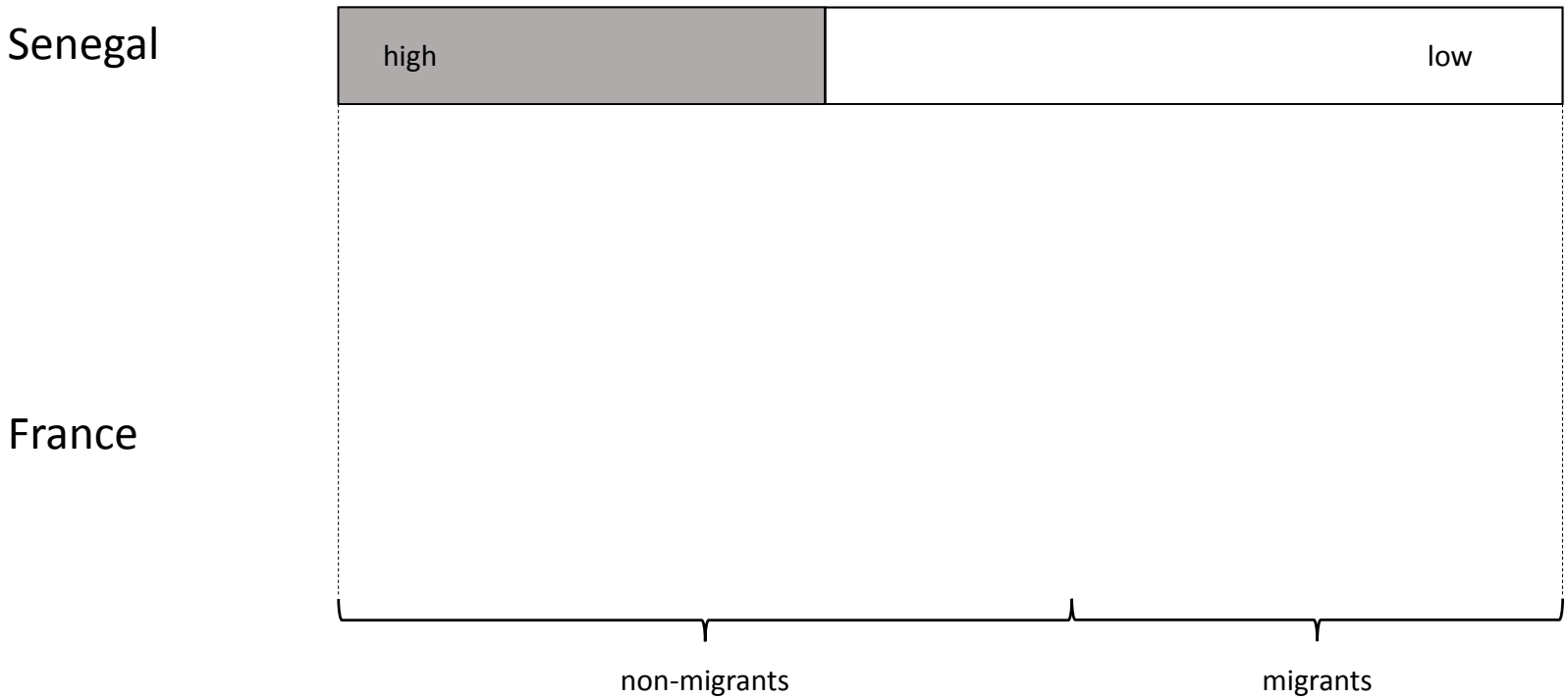
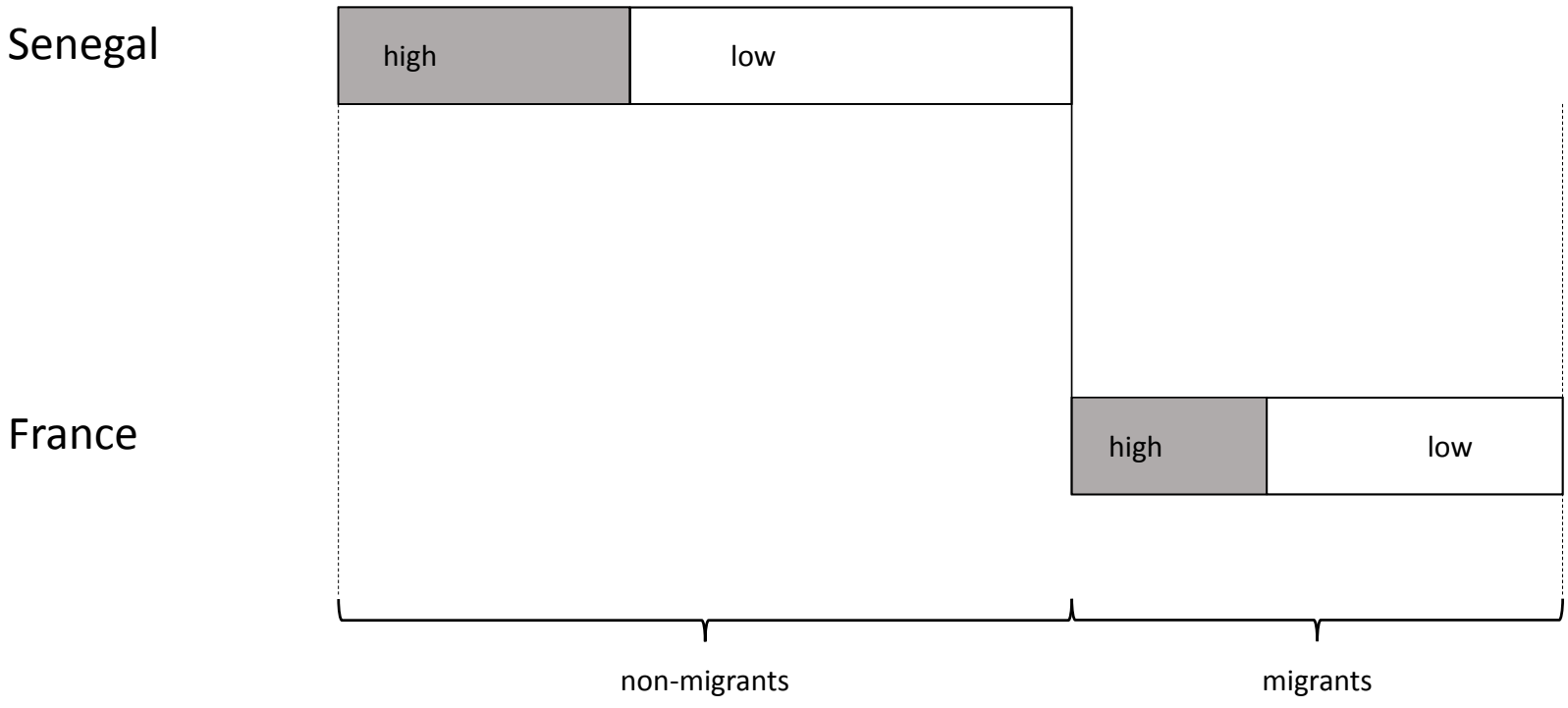


Counterfactual: no skill-bias

Example: Senegalese migrants



Baseline

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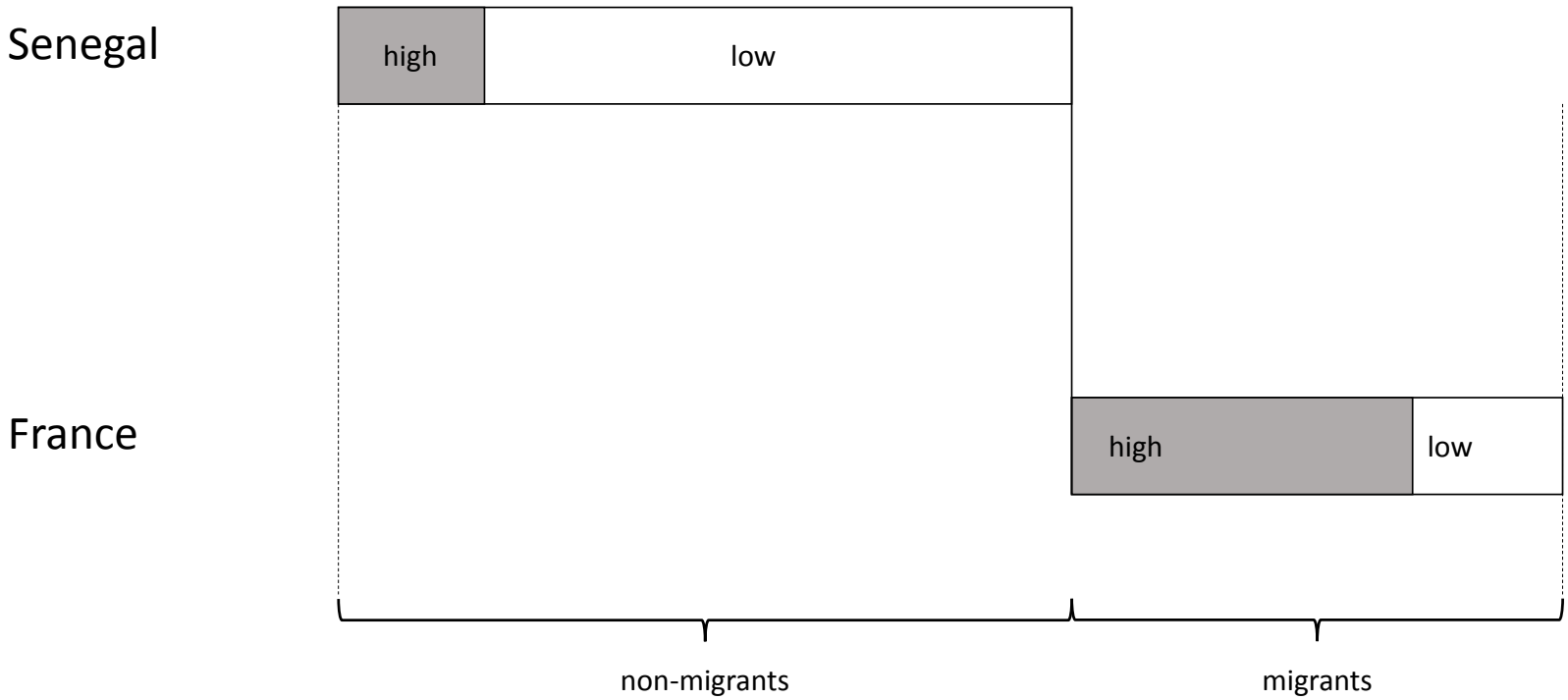
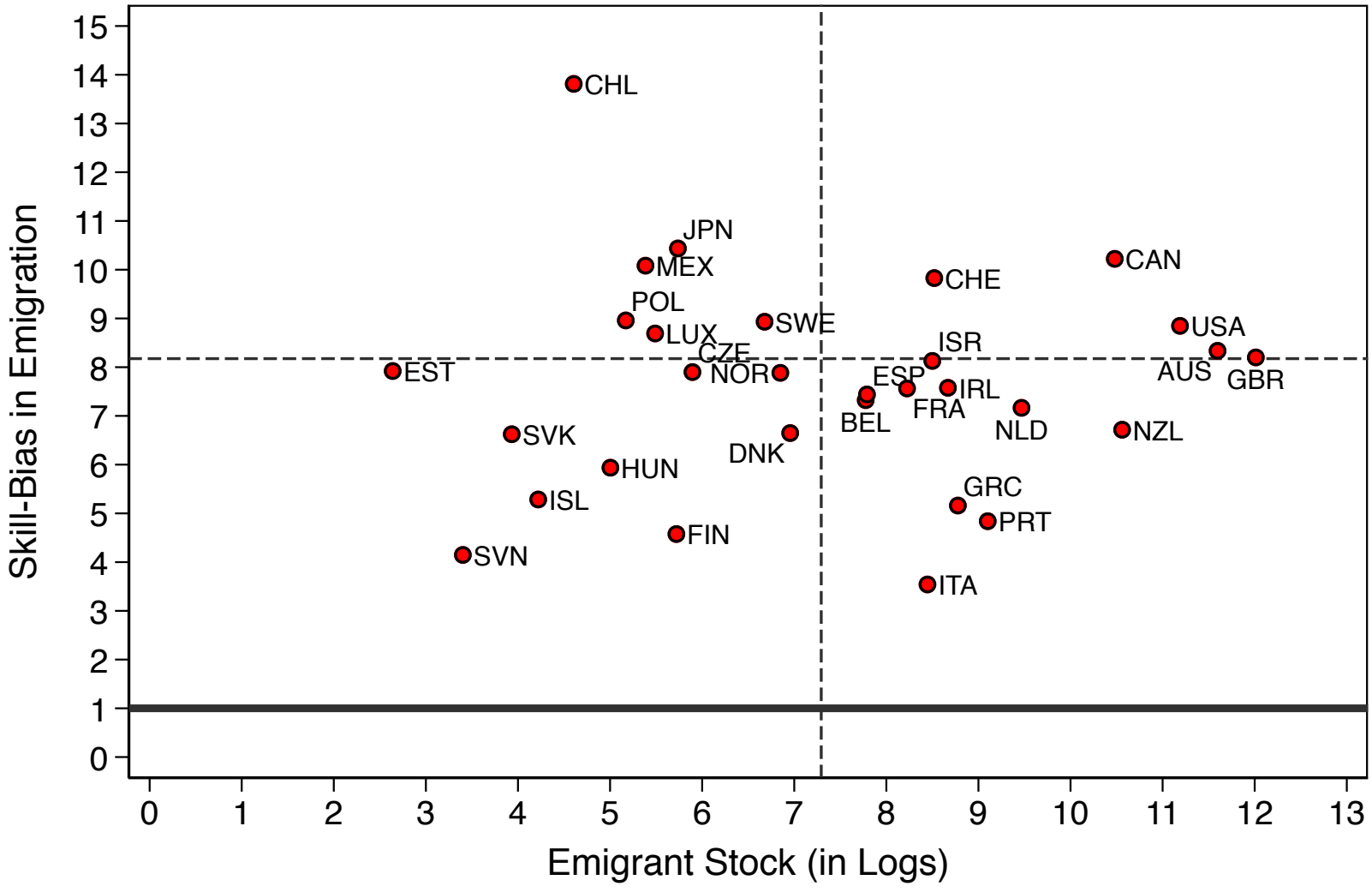


Counterfactual: South Africa



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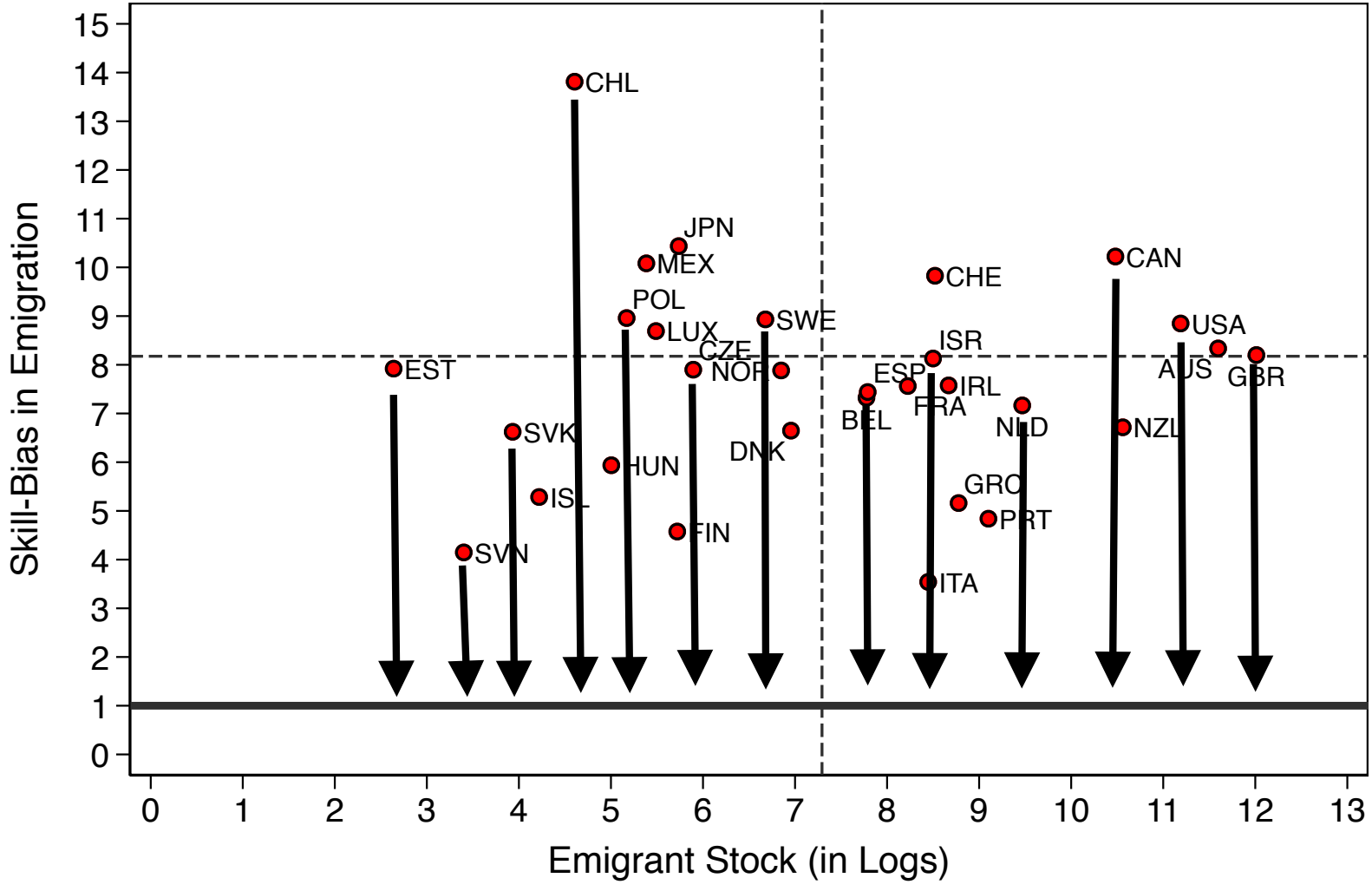

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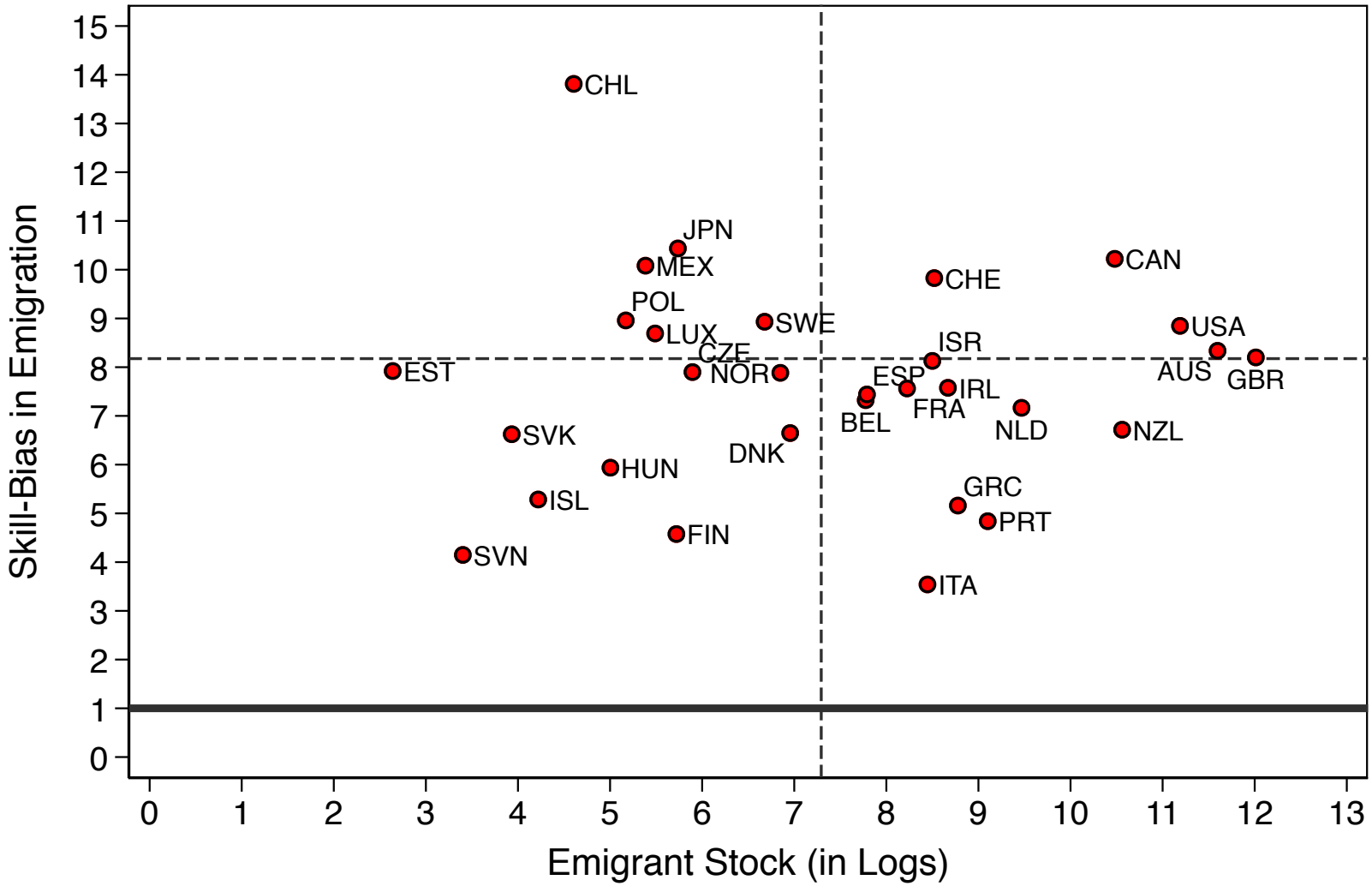

Research design

146 countries (34 OECD, 111 non-OECD, ROW) - only South-North, North-North migration

Multi-country general equilibrium **model** (Krugman, 1980)

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Multi-country general equilibrium **model** (Krugman, 1980)

Calibrate to the world in 2010

Simulate counterfactual **world without skill-bias** in migration

The model - basic features

Labor markets:

Production:

Consumers:

Trade:

The model - basic features

Labor markets:

- competitive (3 skill groups)
- migrants and non-migrants imperfect substitutes

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Production: occurs in 2 sectors

- Traditional T:
- Manufacturing: tradables X, non-tradables Y

Consumers:

Trade:

The model - basic features

Labor markets:

- competitive (3 skill groups)
- migrants and non-migrants imperfect substitutes

Production: occurs in 2 sectors

- Traditional T: perfect competition
- Manufacturing: tradables X, non-tradables Y
  - Monopolistic competition (Krugman 1980)
  - Homogeneous firms
  - Free entry subject to sunk cost f_y, f_x

Consumers:

Trade:

The model - basic features

Labor markets:

- competitive (3 skill groups)
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Production: occurs in 2 sectors

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Production: occurs in 2 sectors

- Traditional T: perfect competition
- Manufacturing: tradables X, non-tradables Y

Consumers: have non-homothetic preferences over T,(X,Y)

Trade: Iceberg trade costs $\tau_{ij} > 1$

Impact on welfare (receiving country)

Replace **low-skilled** with **high-skilled migrants**: $\Delta H^M = -\Delta L^M$

Market size effect

Trade

Nominal wages

Impact on welfare (receiving country)

Replace **low-skilled** with **high-skilled migrants**: $\Delta H^M = -\Delta L^M$

Market size effect

- Workforce becomes more efficient
- More varieties are being produced
- Aggregate prices decrease, real income increases

Trade

Nominal wages

Impact on welfare (receiving country)

Replace **low-skilled** with **high-skilled migrants**: $\Delta H^M = -\Delta L^M$

Market size effect

Trade

- "dilutes" the market size effect

Nominal wages

Impact on welfare (receiving country)

Replace **low-skilled** with **high-skilled migrants**: $\Delta H^M = -\Delta L^M$

Market size effect

Trade

Nominal wages

- Some workers gain, some lose

Data Sources

Migration and population: 2010 DIOC database

GDP, trade, fixed costs: WDI , UN Comtrade database, OECD TiVA, World Bank Ease-of-Doing-Business

Wage ratio: Education at Glance report 2010, Wageindicator Foundation

Calibration

1) & 2) Values from previous lit + match moments

Parameter	Value	Source
Preference parameters		
β	0.5	exogenous
β^T	0.135	calibrated (match consumption to production)
θ	3	exogenous
μ	0.5	exogenous
ε	4	Simonovska (2014)
σ_s	5	Docquier, Özden & Peri (2013)
σ_n	20	Ottaviano & Peri (2013)
Worker efficiency parameters		
a_i^F	0.478	calibrated to match OECD average
a_i^L	0.12-0.40	calibrated from FOC of cost minimization
a_i^H	0.24-0.60	calibrated from FOC of cost minimization

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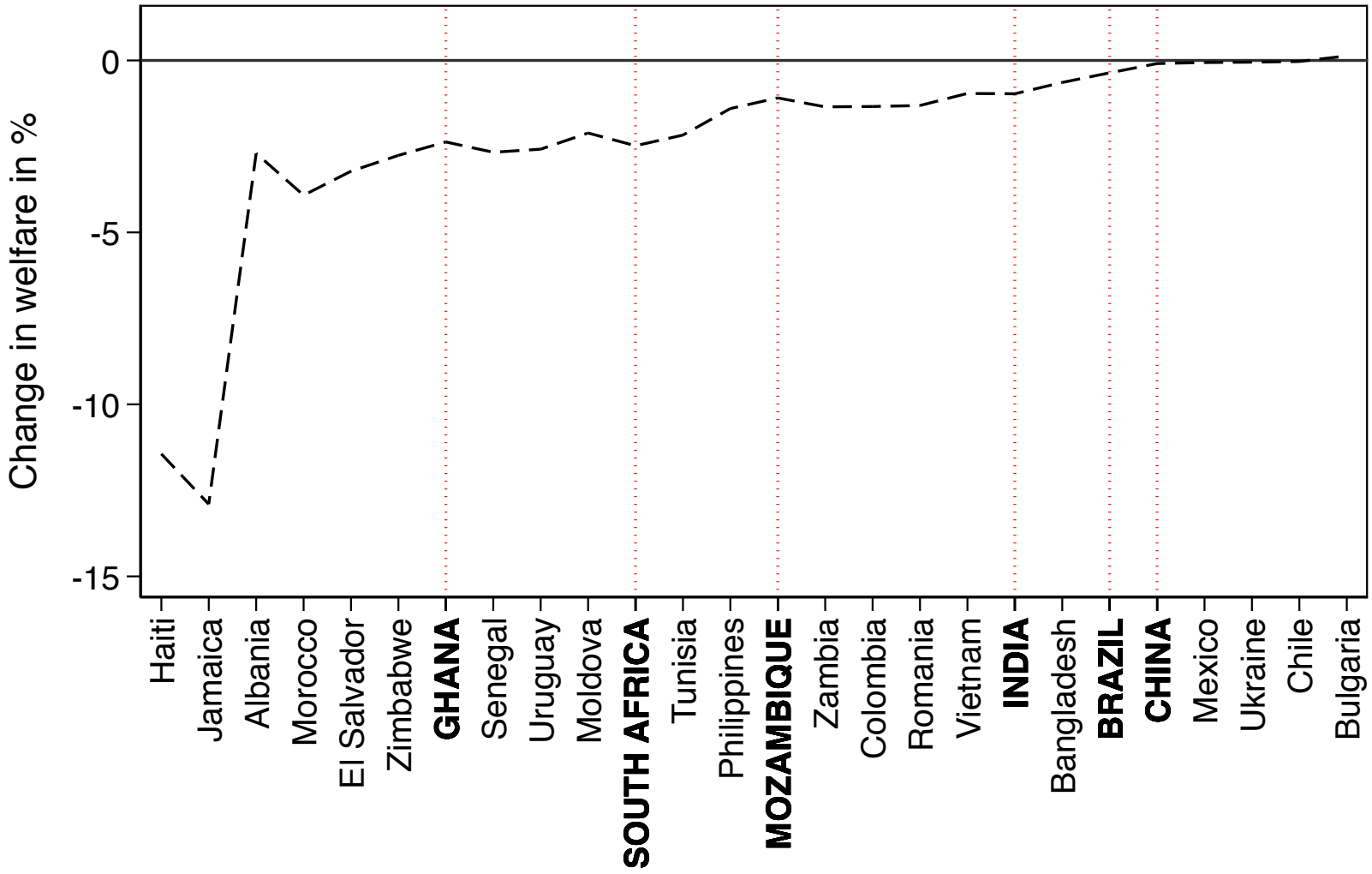
3) Find **GDP pc** and **trade costs**: **iterative procedure**

Appendix: extensive sensitivity checks

Welfare gains/losses from skill-bias

$$\frac{\Delta U}{U} = \frac{U_{\text{baseline}} - U_{\text{counterfactual}}}{U_{\text{counterfactual}}}$$

Welfare effects - non-OECD countries



Welfare, whose welfare?

Problem: base population changes!

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Effect a mixture of **"treatment"** and **"composition" effect**

- Treatment effect: on **non-migrants**
- Composition effect: on **migrants**

Welfare, whose welfare?

Problem: base population changes!

Effect a mixture of **"treatment"** and **"composition" effect**

- Treatment effect: on **non-migrants**
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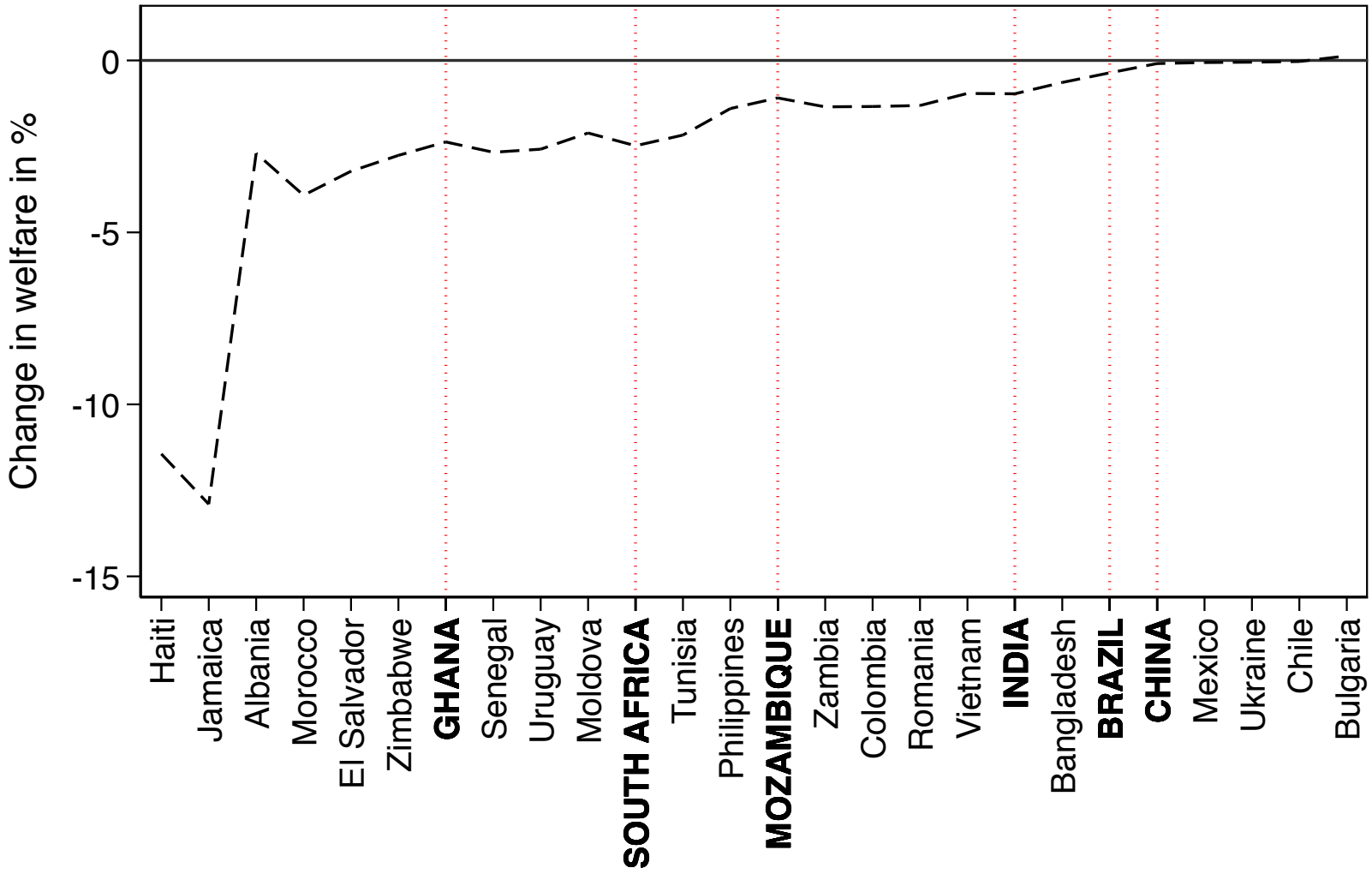
Solution: welfare per never-migrant

Welfare effects - selected sending countries



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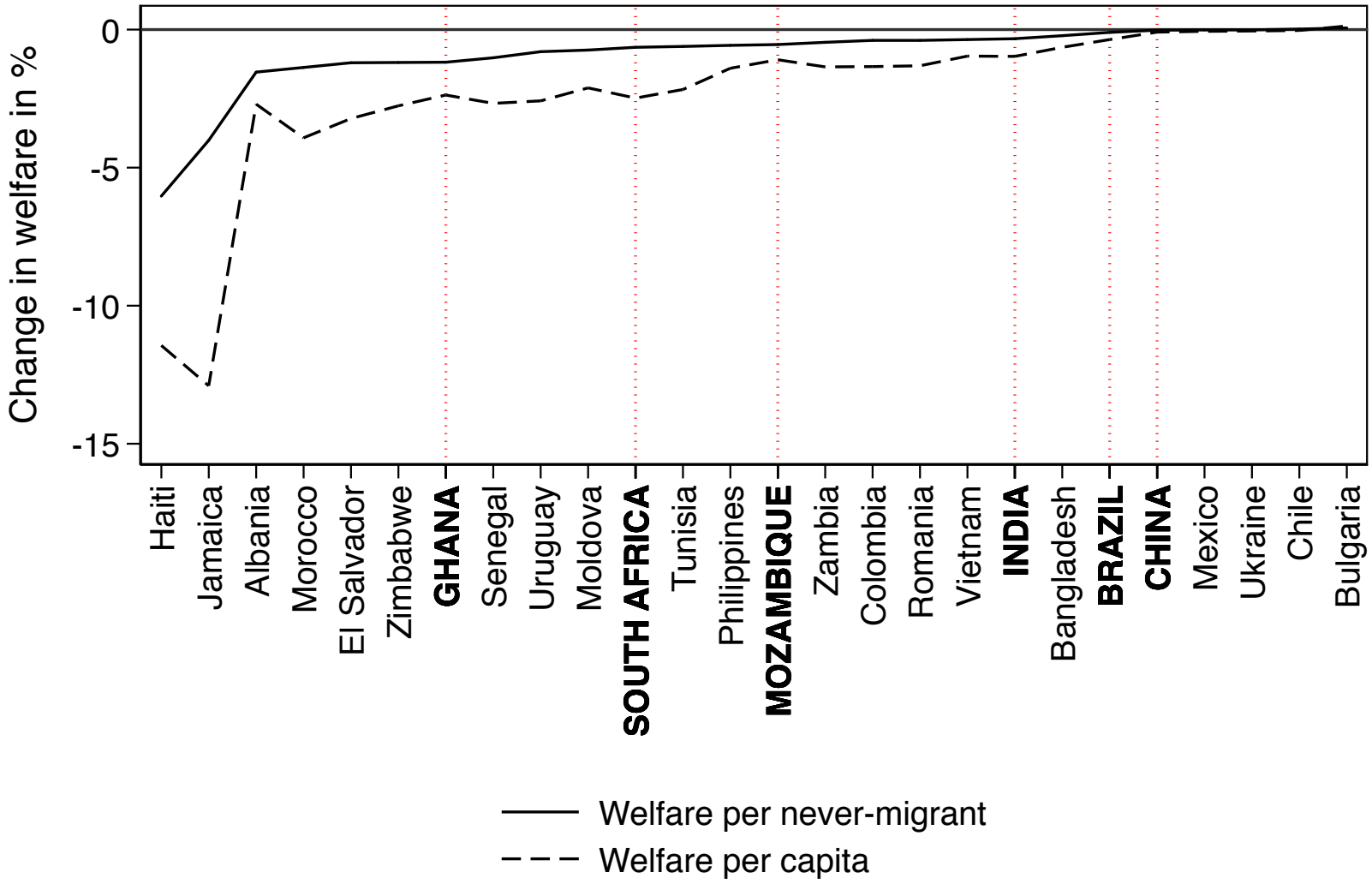
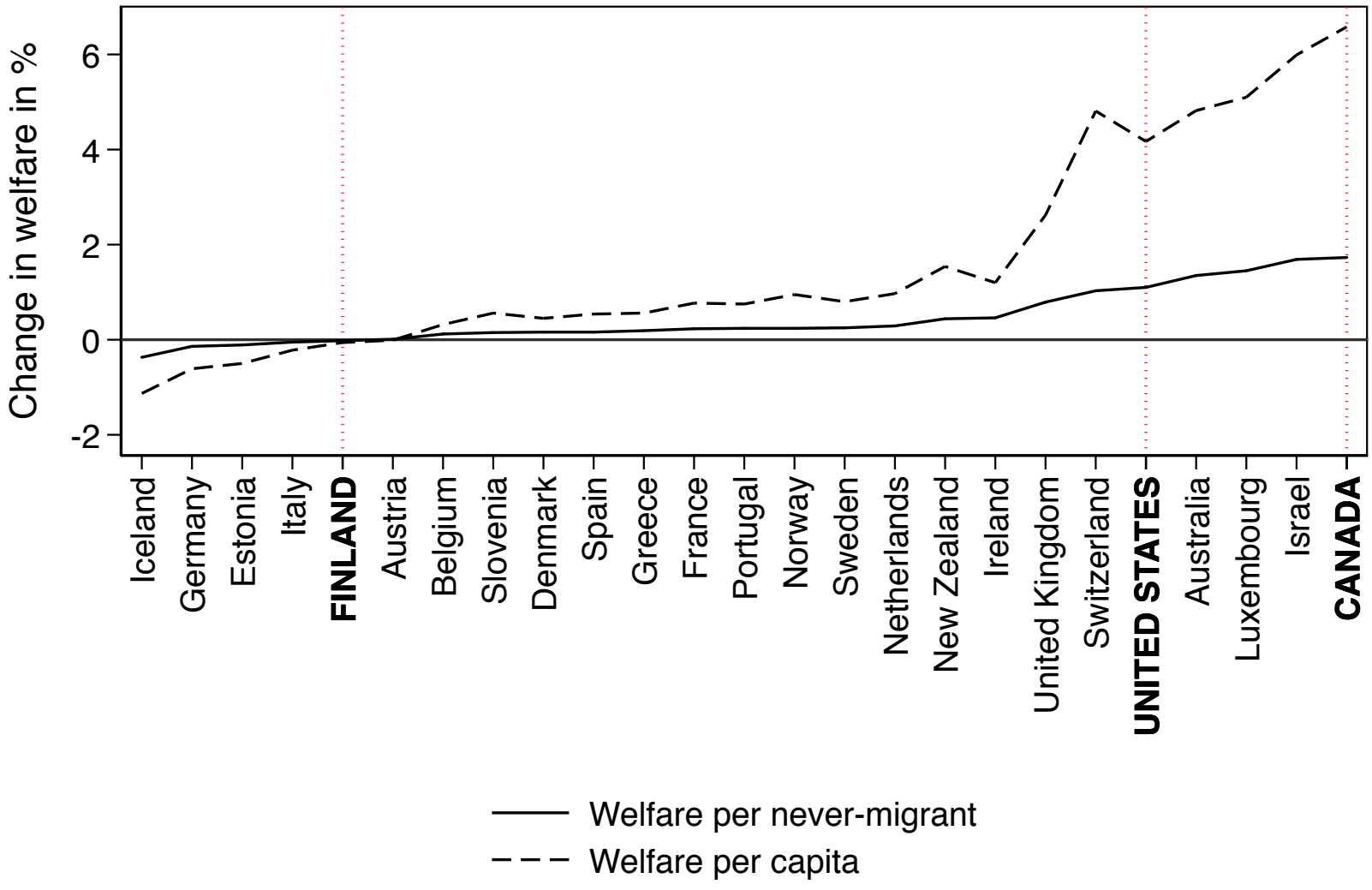
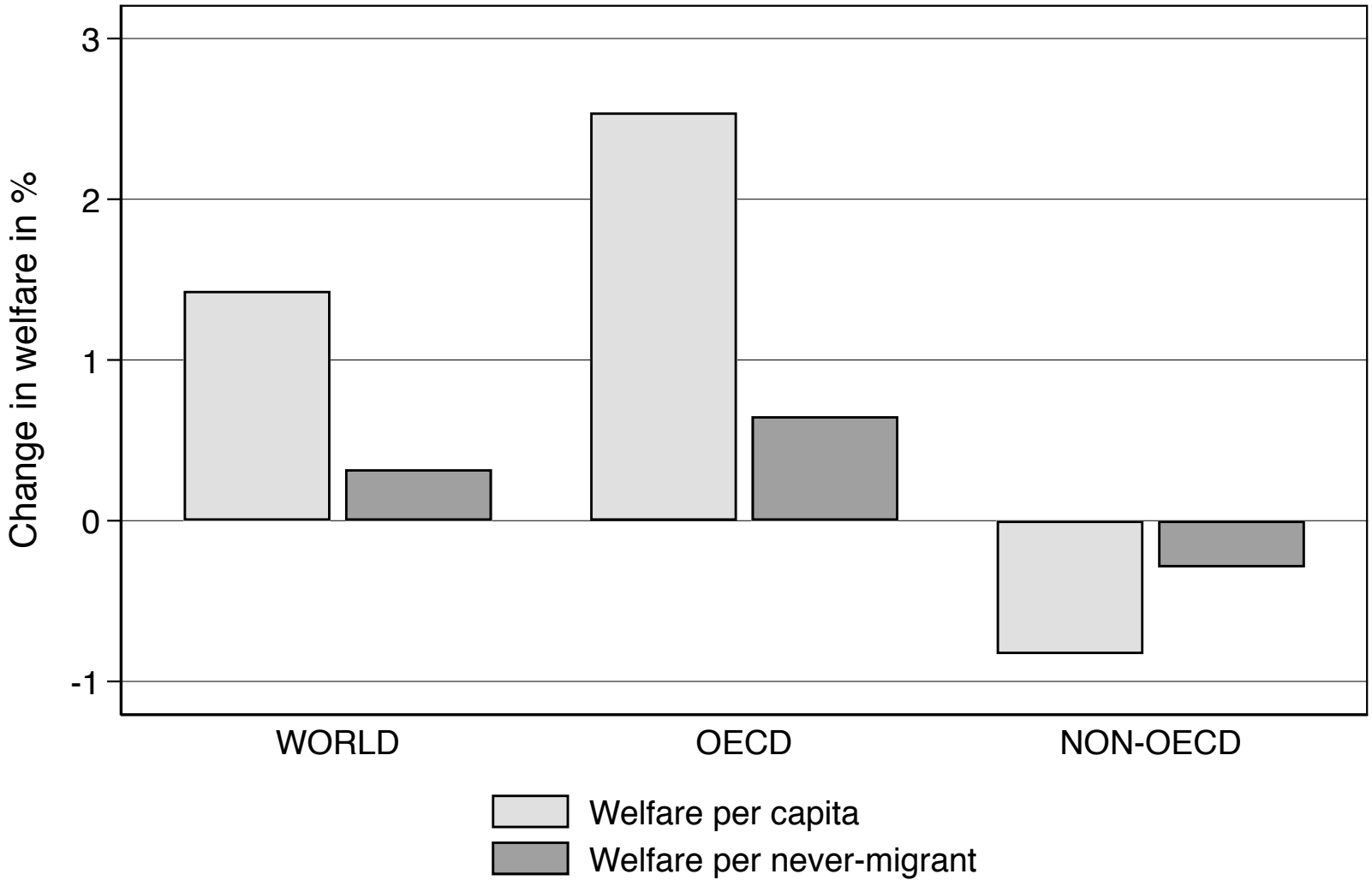


Welfare effects - OECD countries



Global effects



How important in sending countries?

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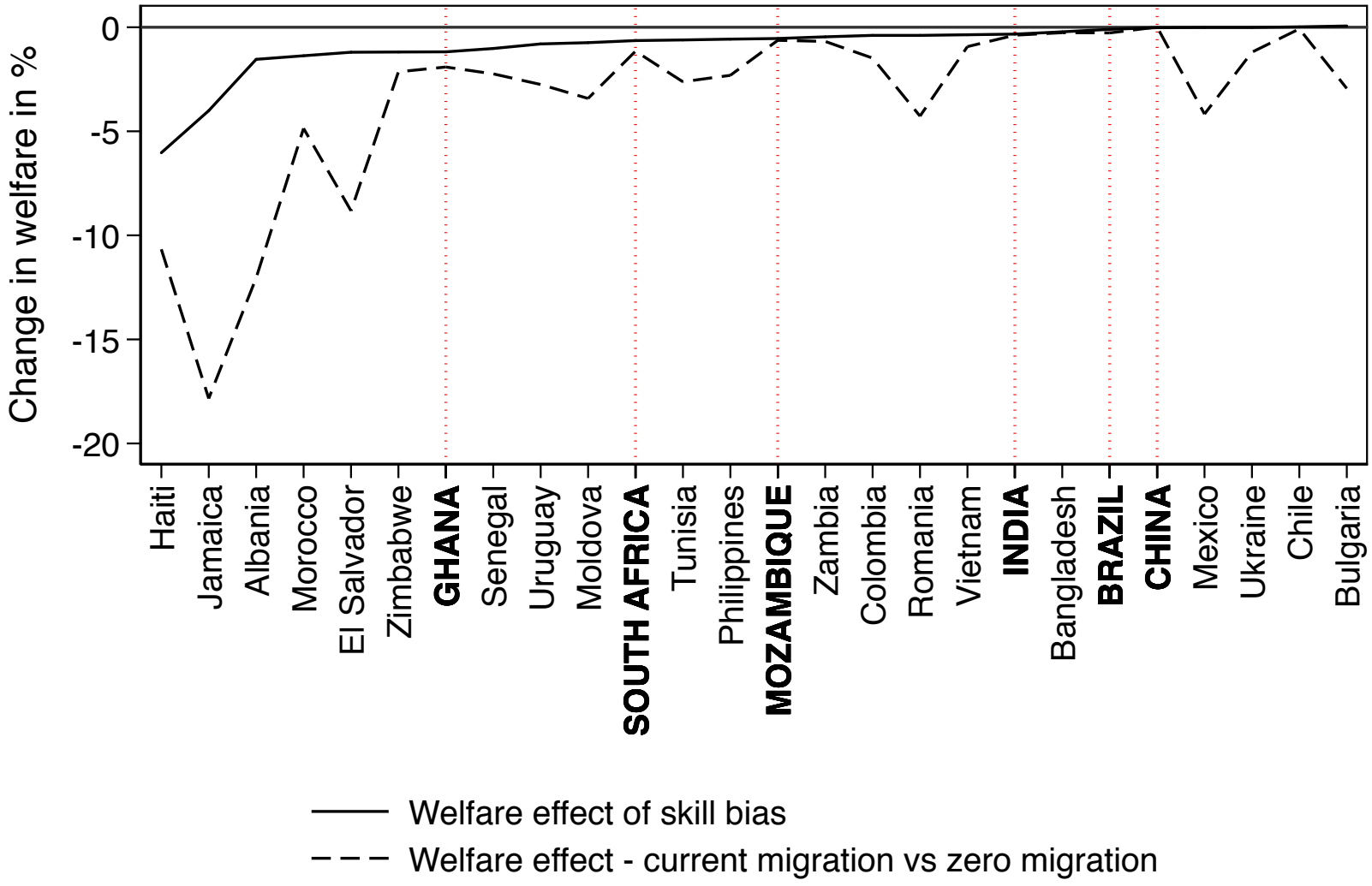
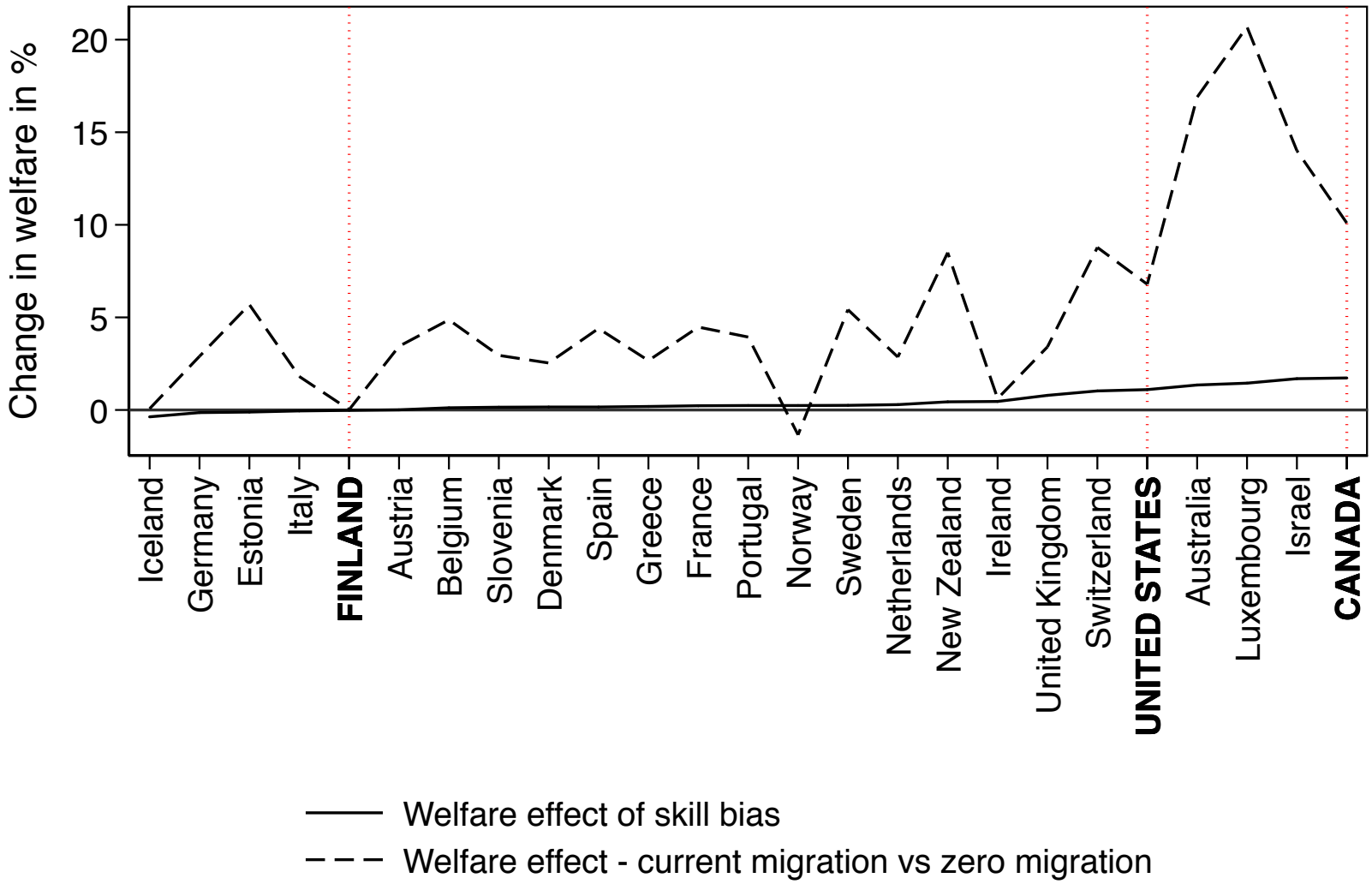
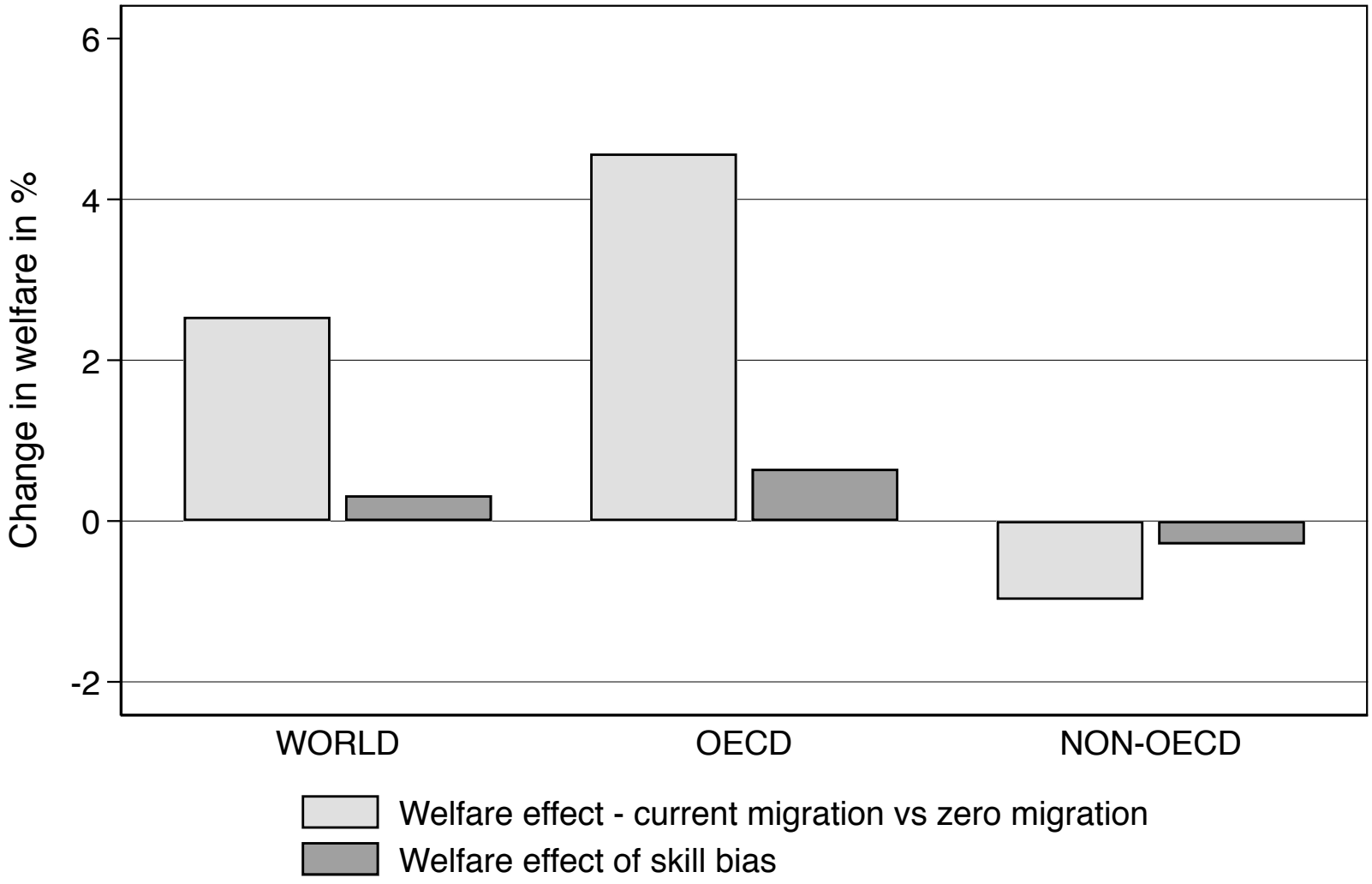


How important in receiving countries?

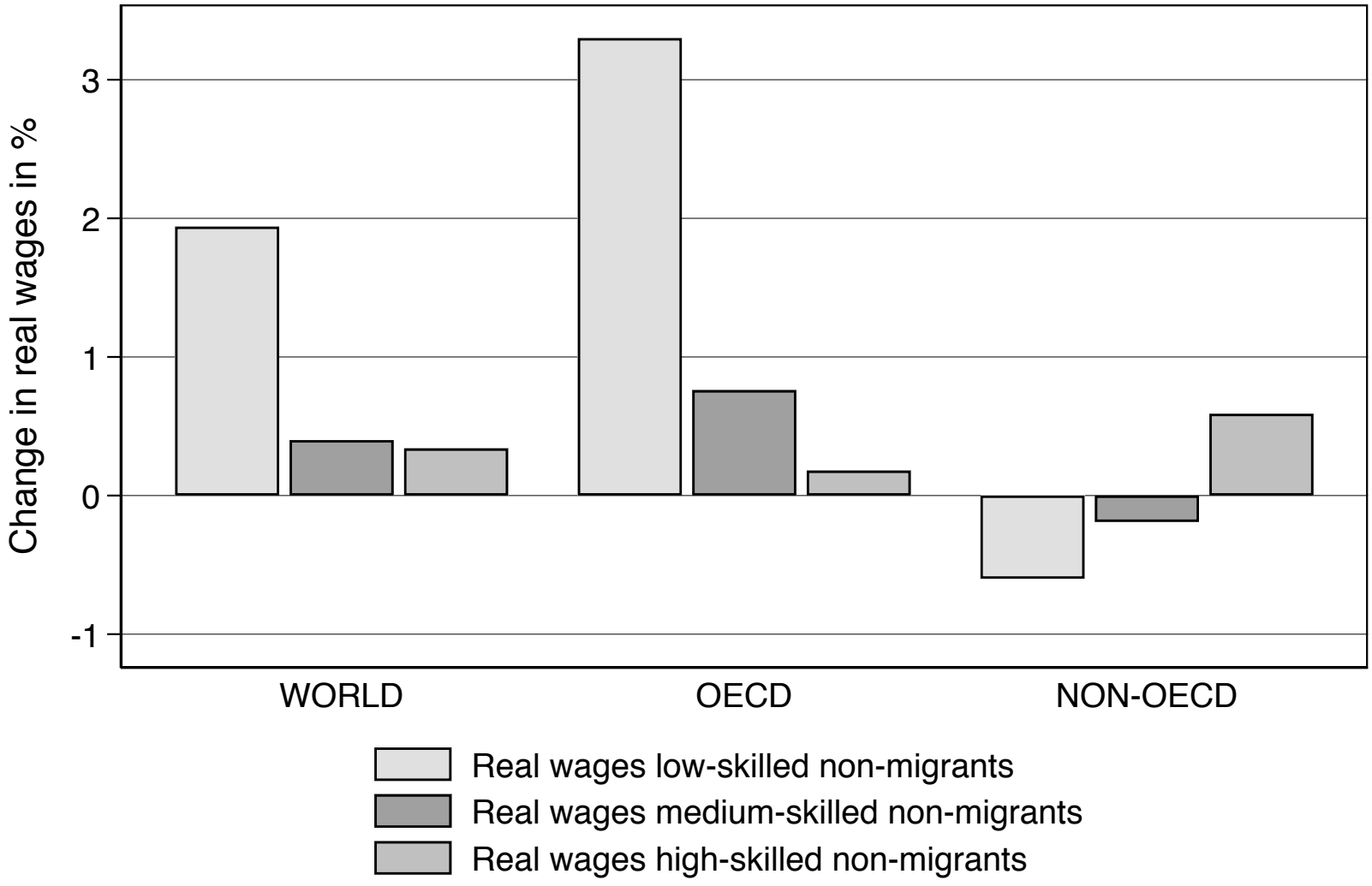


How important globally?



Distributional effects

Global



Further extensions

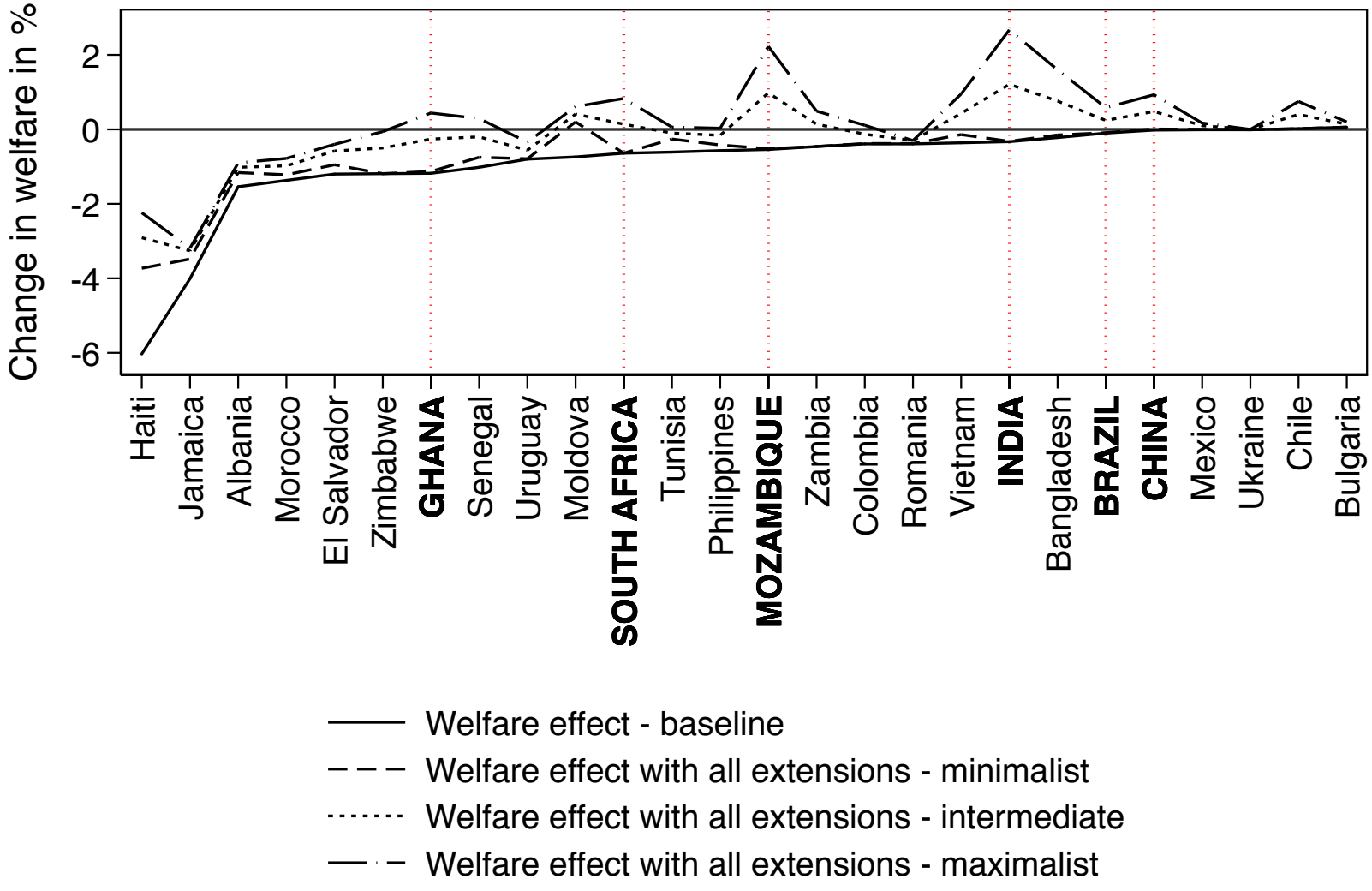
- Why positive for low-skilled?
- Remittances
- Brain gain effect
- TFP externality (Lucas, 1988)
- Migrant networks and trade
- Downskilling

Most plausible scenario

Externality	Parameter	Minimalist	Intermediate	Maximalist
Remittances	γ	0	0.5	1
Brain gain	σ_b	0.01	0.02	0.05
TFP	σ_a	0.1	0.3	0.5
Network effects	σ_t	0	-0.02	-0.04
Downskilling	-	yes	no	no

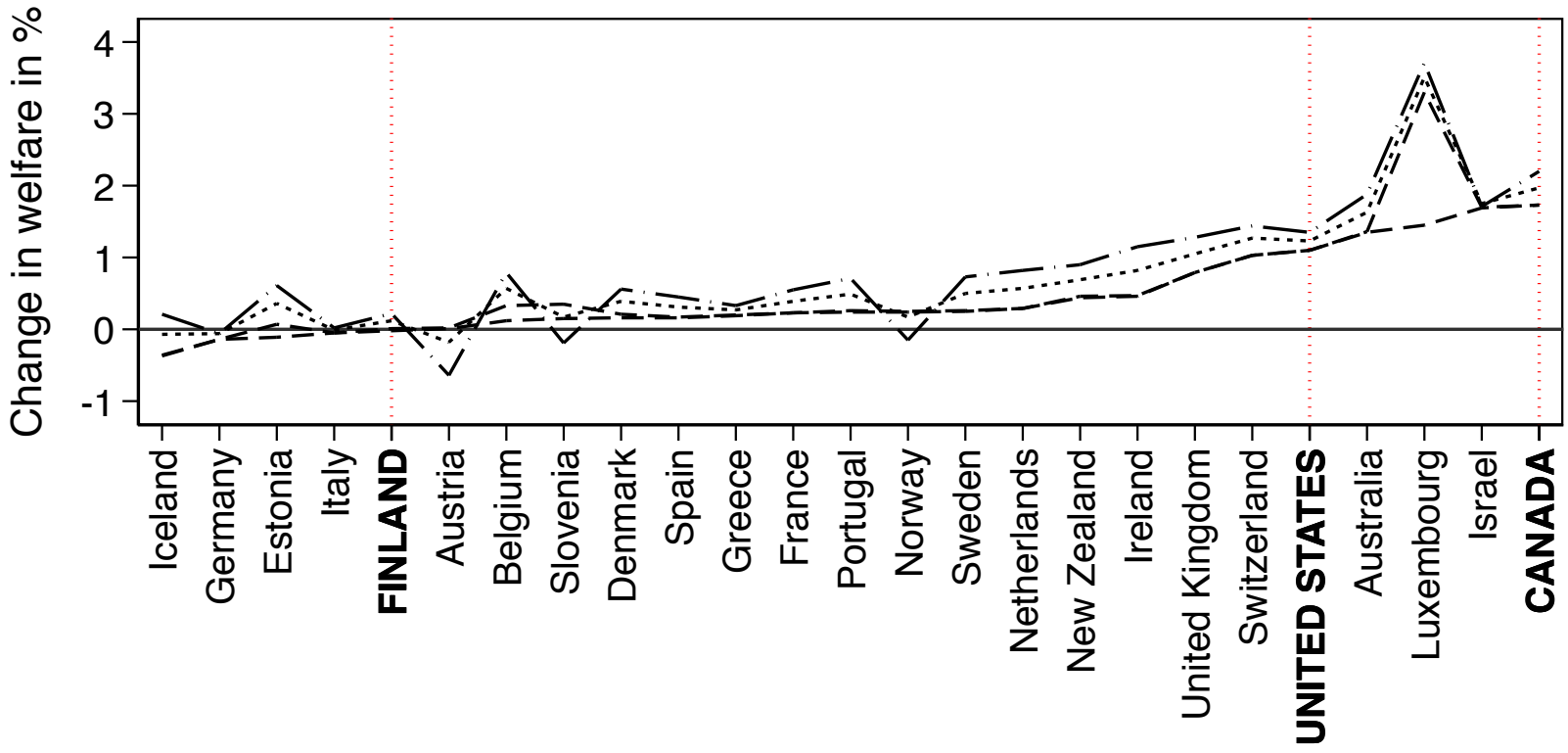
Most plausible scenario

Sending countries



Most plausible scenario

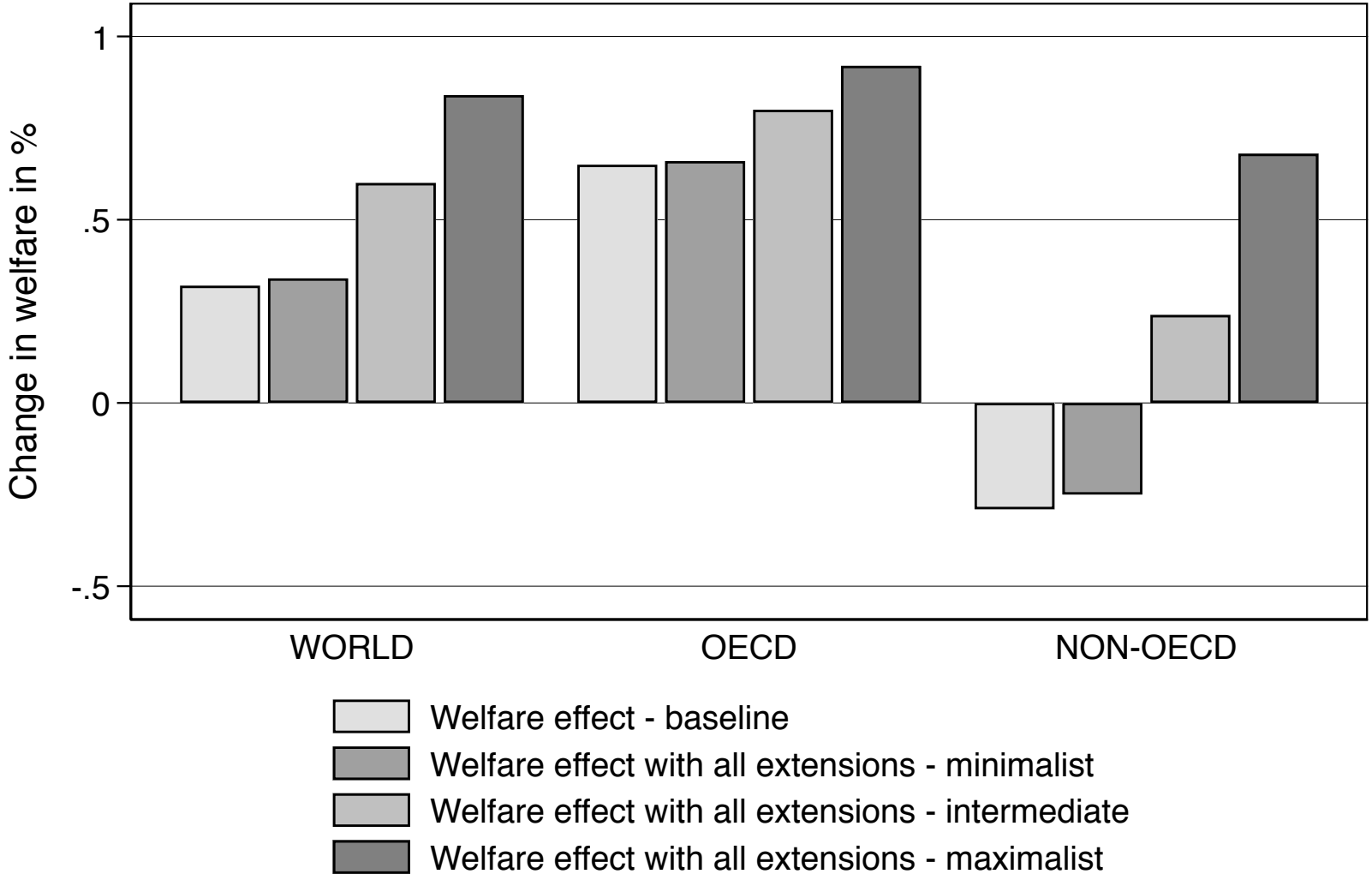
Receiving countries



Welfare effect - baseline
Welfare effect with all extensions - minimalist
Welfare effect with all extensions - intermediate
Welfare effect with all extensions - maximalist

Most plausible scenario

Global



Sensitivity and other checks

To all parameters
To nested CES technology
Selection as Canada

Conclusion

Skill-biased migration brings **global efficiency gains**

But important distributional consequences:

- **Positive** effects in the **receiving countries**
- **Losses** in many **sending countries**

Thank you!

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APPENDIX

The model - (links to) equations

Labor market

Consumer's problem

Firms

Trade

Remittances

Competitive labor markets

Traditional sector: low-skilled only

$$Q_i^T = A_i^T L_i^T$$

Tradables/non-tradables

3 skill levels: low-, medium, and high-skilled

$$Q_i^M = A_i^M \left[\alpha_i^L \left(L_i \right)^{\frac{\sigma_s - 1}{\sigma_s}} + \left(1 - \alpha_i^L - \alpha_i^H \right) \left(M_i \right)^{\frac{\sigma_s - 1}{\sigma_s}} + \alpha_i^H \left(H_i \right)^{\frac{\sigma_s - 1}{\sigma_s}} \right]^{\frac{\sigma_s}{\sigma_s - 1}}$$

Competitive labor markets

Traditional sector: low-skilled only

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3 skill levels: low-, medium, and high-skilled

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Immigrants and **natives imperfect substitutes**. Example for high skilled:

$$H_i = \left[(1 - \alpha_i^F)(H_i^N)^{\frac{\sigma_n - 1}{\sigma_n}} + \alpha_i^F (H_i^F)^{\frac{\sigma_n - 1}{\sigma_n}} \right]^{\frac{\sigma_n}{\sigma_n - 1}}.$$

Competitive labor markets

Wages:

$$W_i = \Big[(\alpha_i^L)^{\sigma_s}(W_i^L)^{1-\sigma_s} + (1-\alpha_i^L-\alpha_i^H)^{\sigma_s}(W_i^M)^{1-\sigma_s} + (\alpha_i^H)^{\sigma_s}(W_i^H)^{1-\sigma_s}\Big]^{\frac{1}{1-\sigma_s}} .$$

Consumer's problem

Non-homothetic preferences

$$\max_{\{T_i, x_{ij}(k), y_i(k)\}} \beta^T (T_i)^{\mu} + \left(1 - \beta^T\right) \left[(1-\beta)(Y_i)^{\frac{\theta-1}{\theta}} + \beta(X_i)^{\frac{\theta-1}{\theta}}\right]^{\frac{\theta}{\theta-1}}$$

subject to: $T_i + P_i^Y Y_i + P_i^X X_i = w_i,$

$$X_i = \left[\sum_{j=1}^{J} \int_0^{N_j^X} (x_{ij}(k))^{\frac{\epsilon-1}{\epsilon}} dk\right]^{\frac{\epsilon}{\epsilon-1}}, \quad Y_i = \left[\int_0^{N_i^Y} (y_i(k))^{\frac{\epsilon-1}{\epsilon}} dk\right]^{\frac{\epsilon}{\epsilon-1}}.$$

Indirect utility and price indices

$$U_i = \beta^T \left(\frac{\beta^T \mu}{1 - \beta^T} P_i \right)^{\frac{\mu}{1-\mu}} + (1 - \beta^T) \frac{w_i - T_i}{P_i}.$$

where P_i is the ideal price index in country i,

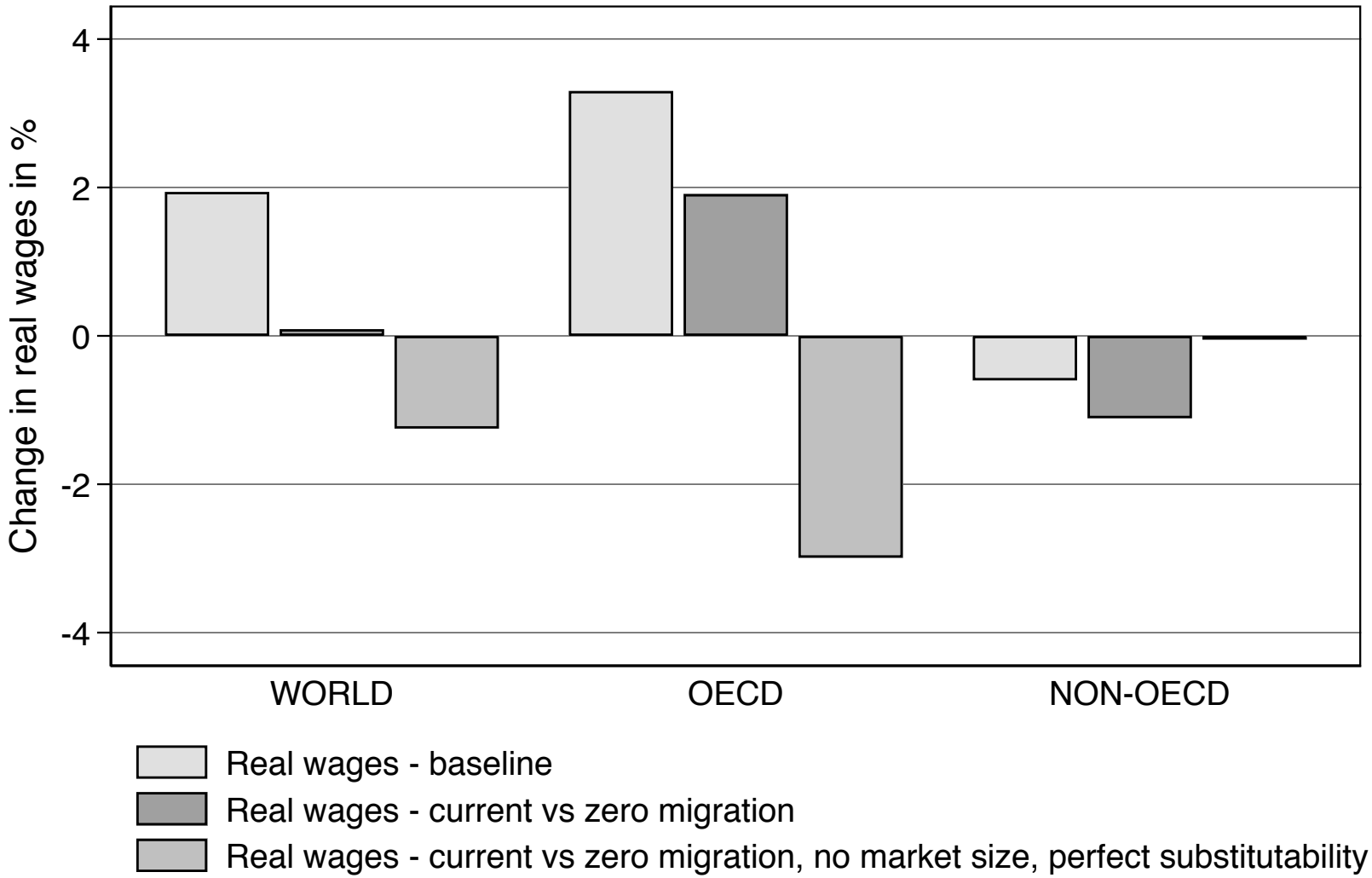
$$P_i = \left[(1-\beta)^\theta \left(P_i^Y \right)^{1-\theta} + \beta^\theta \left(P_i^X \right)^{1-\theta} \right]^{\frac{1}{1-\theta}},$$

$$\text{with: } P_i^X = \left[\sum_{j=1}^{J} \int_0^{N_j^X} \left(p_{ij}(k) \right)^{1-\epsilon} dk \right]^{\frac{1}{1-\epsilon}},$$

$$\text{and } P_i^Y = \left[\int_0^{N_i^Y} \left(p_i(k) \right)^{1-\epsilon} dk \right]^{\frac{1}{1-\epsilon}}.$$

Positive for low skilled - really?

Global



back

Extension: change nr of high-skilled migrants only

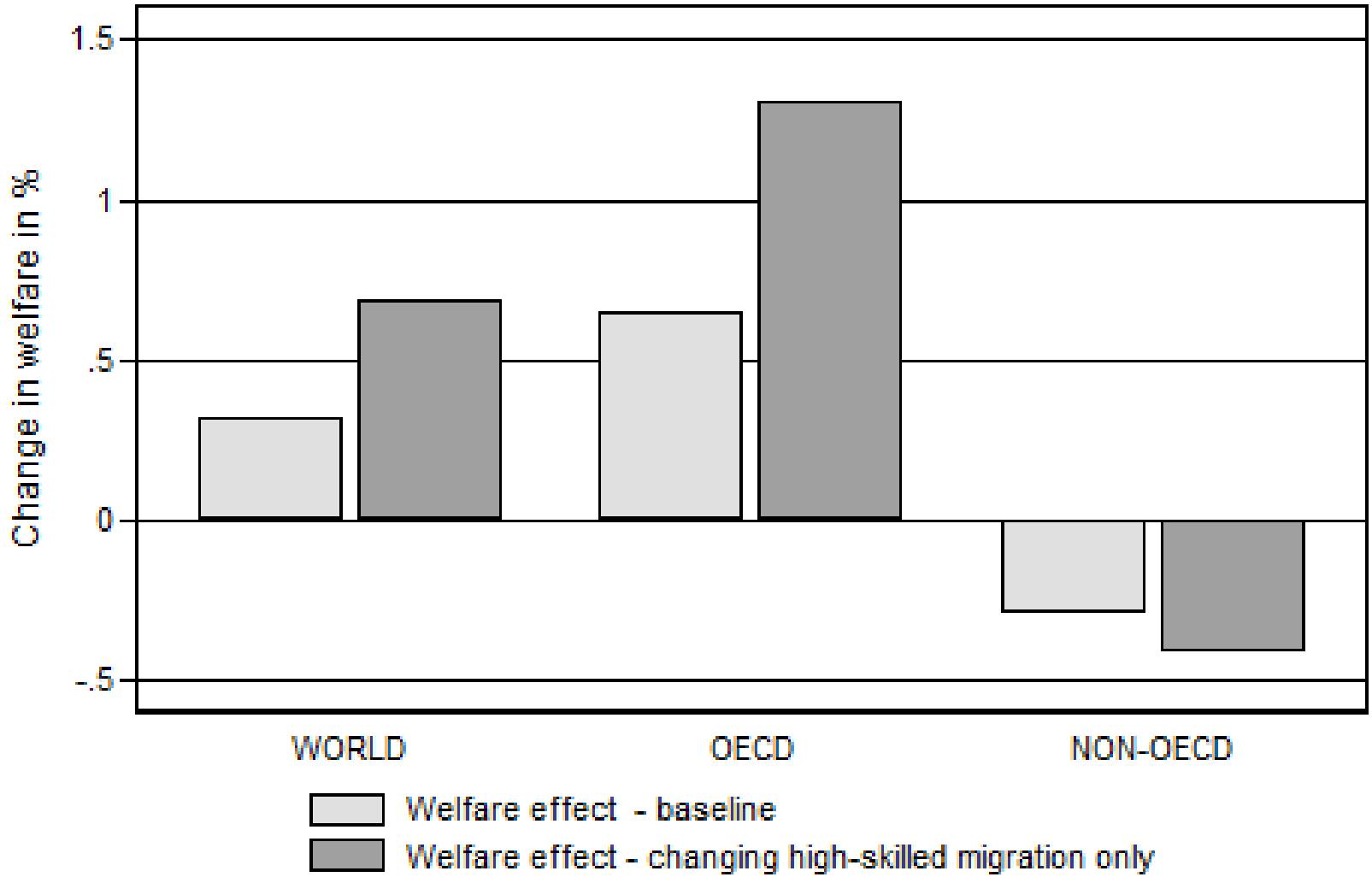
Idea: **reduce number of high-skilled migrants** only

..until the **skill-bias** is eliminated

Advantage: consistent with policy
Problem: Change scale and selectivity

back

Extension: change nr of high-skilled migrants only



Extension: remittances

So far: every migrant **remits a fixed amount**, hence skill-biased migraton leaves remittances unaffected.

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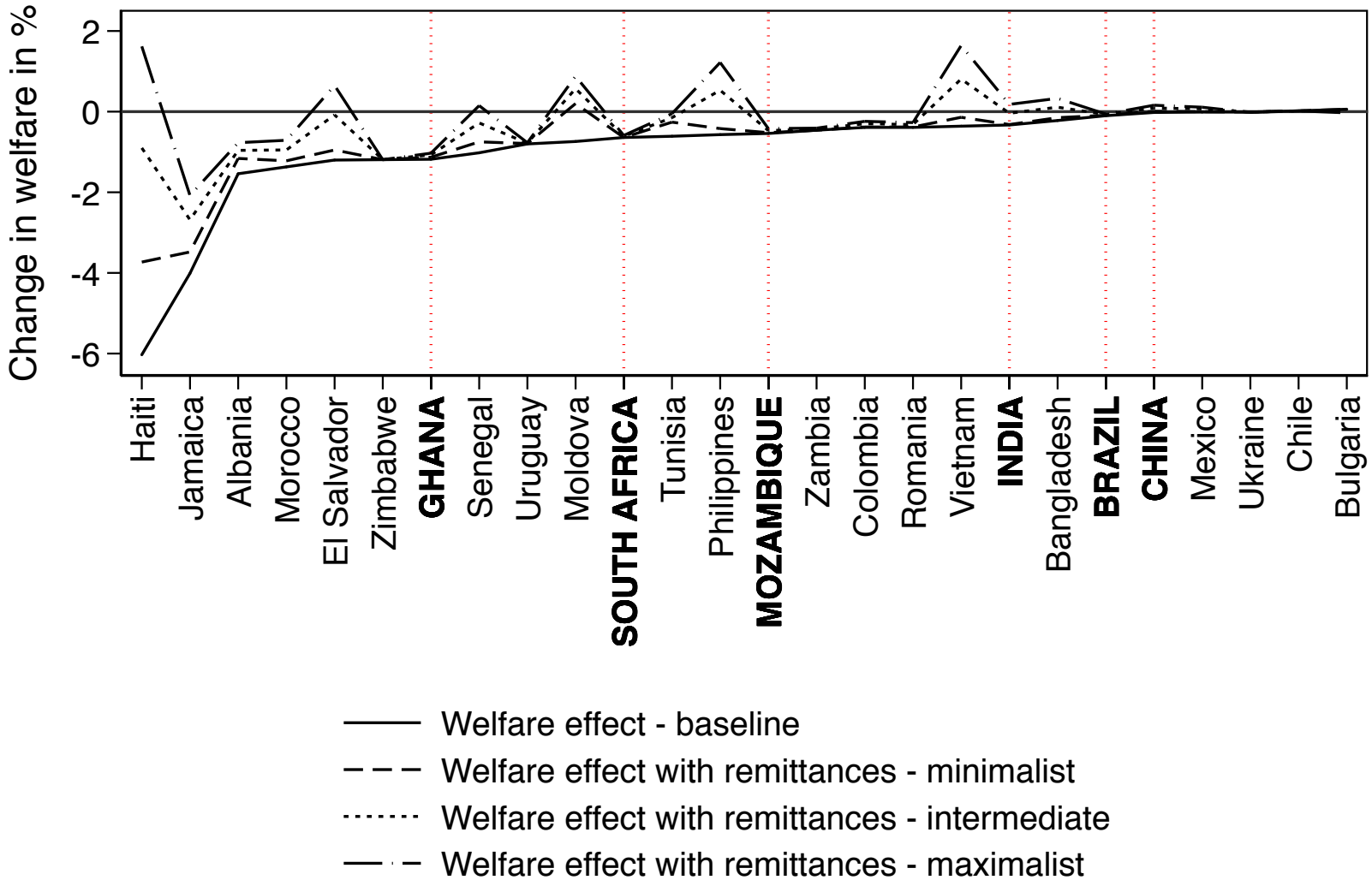
Three cases:

- Every migrants remits a fixed amount (minimalist)
- Every migrant remits a **fixed share** of his/her **income** (maximalist)
- Combination of the two cases (intermediate)

Remittances are paid as a **lump-sum transfer** to **non-migrants at origin**

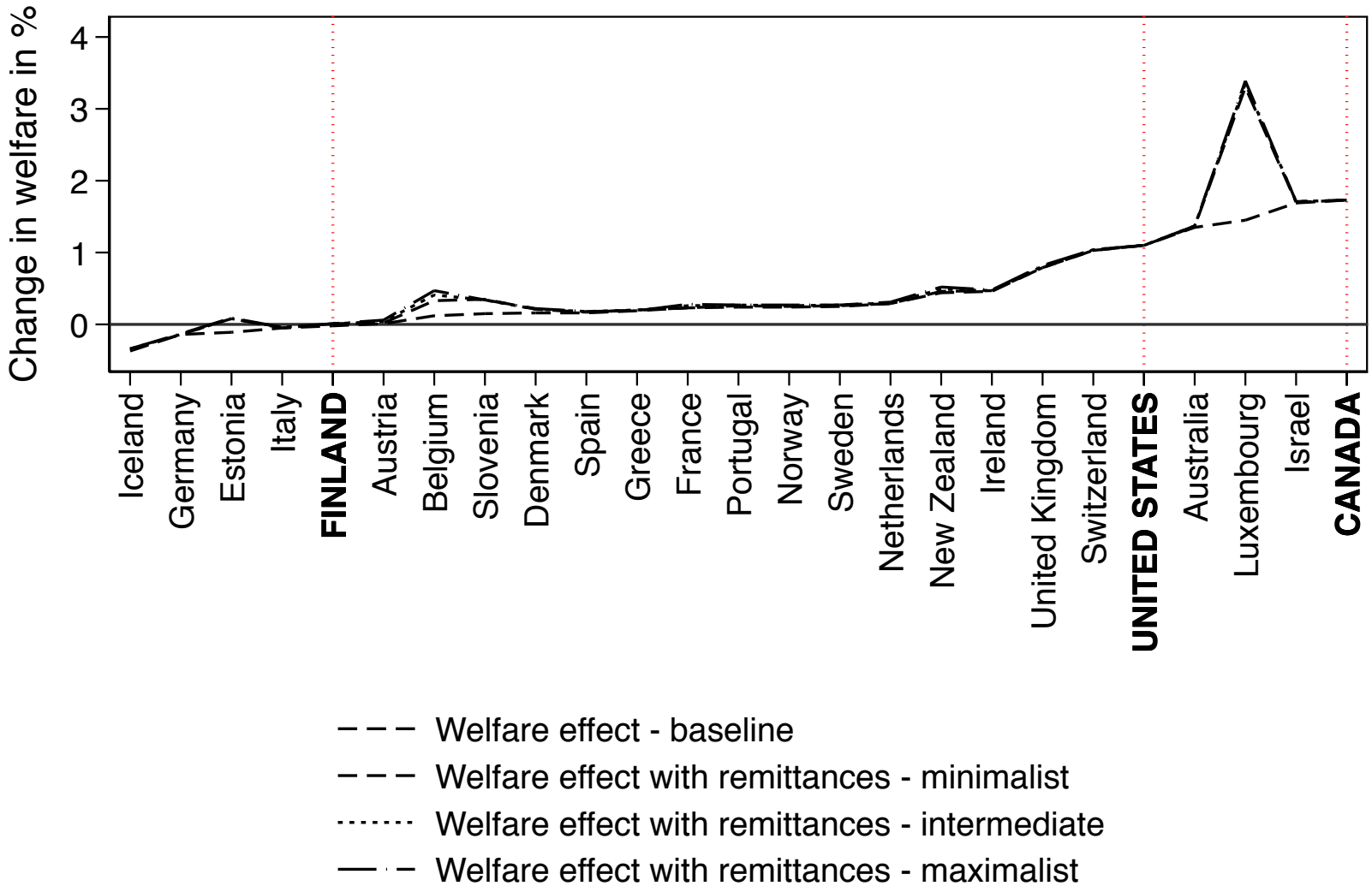
Extension: remittances

Non-OECD countries



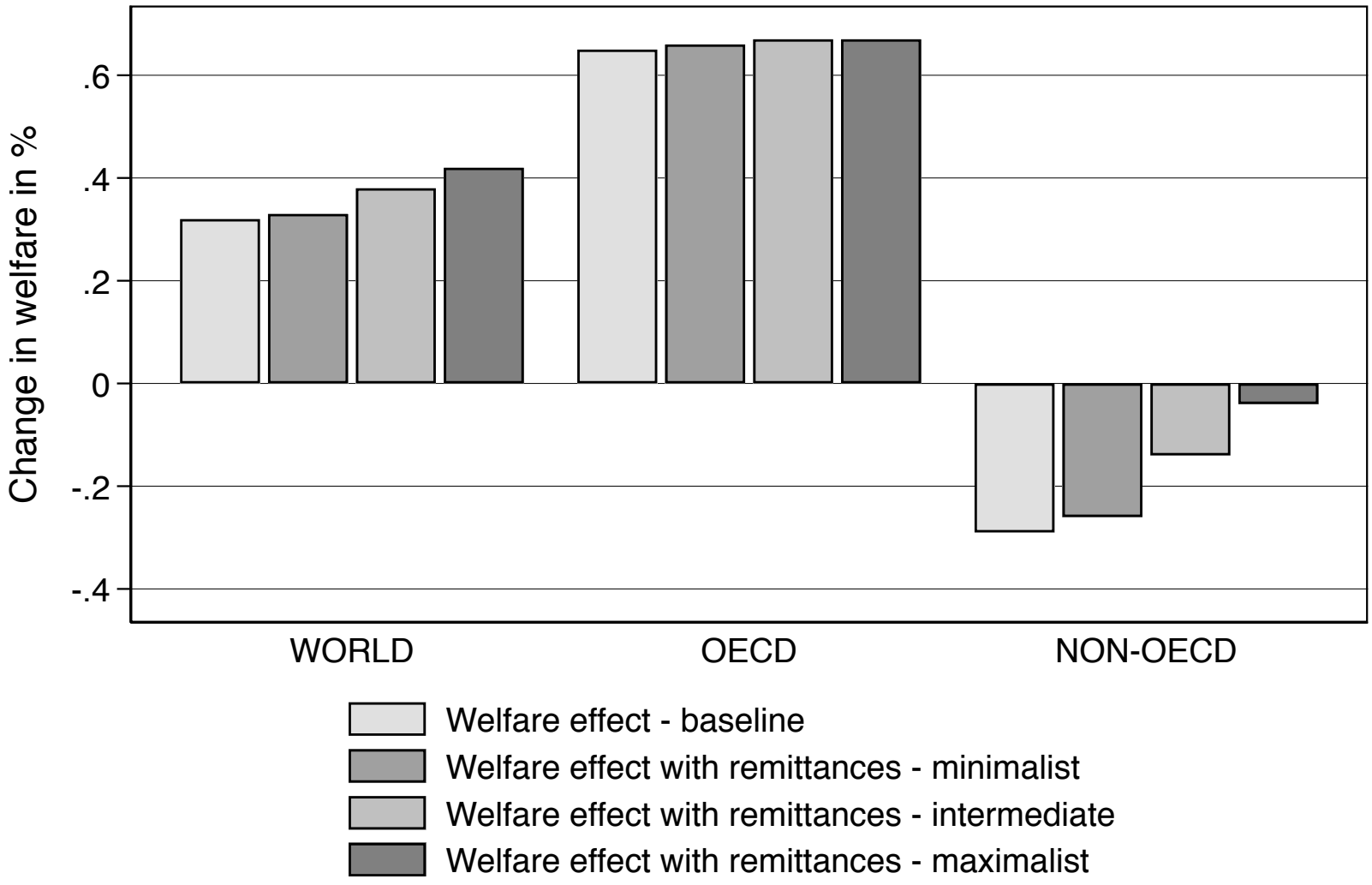
Extension: remittances

OECD countries



Extension: remittances

Global



Extension: Brain gain effect

Idea: migration creates incentives to invest in education

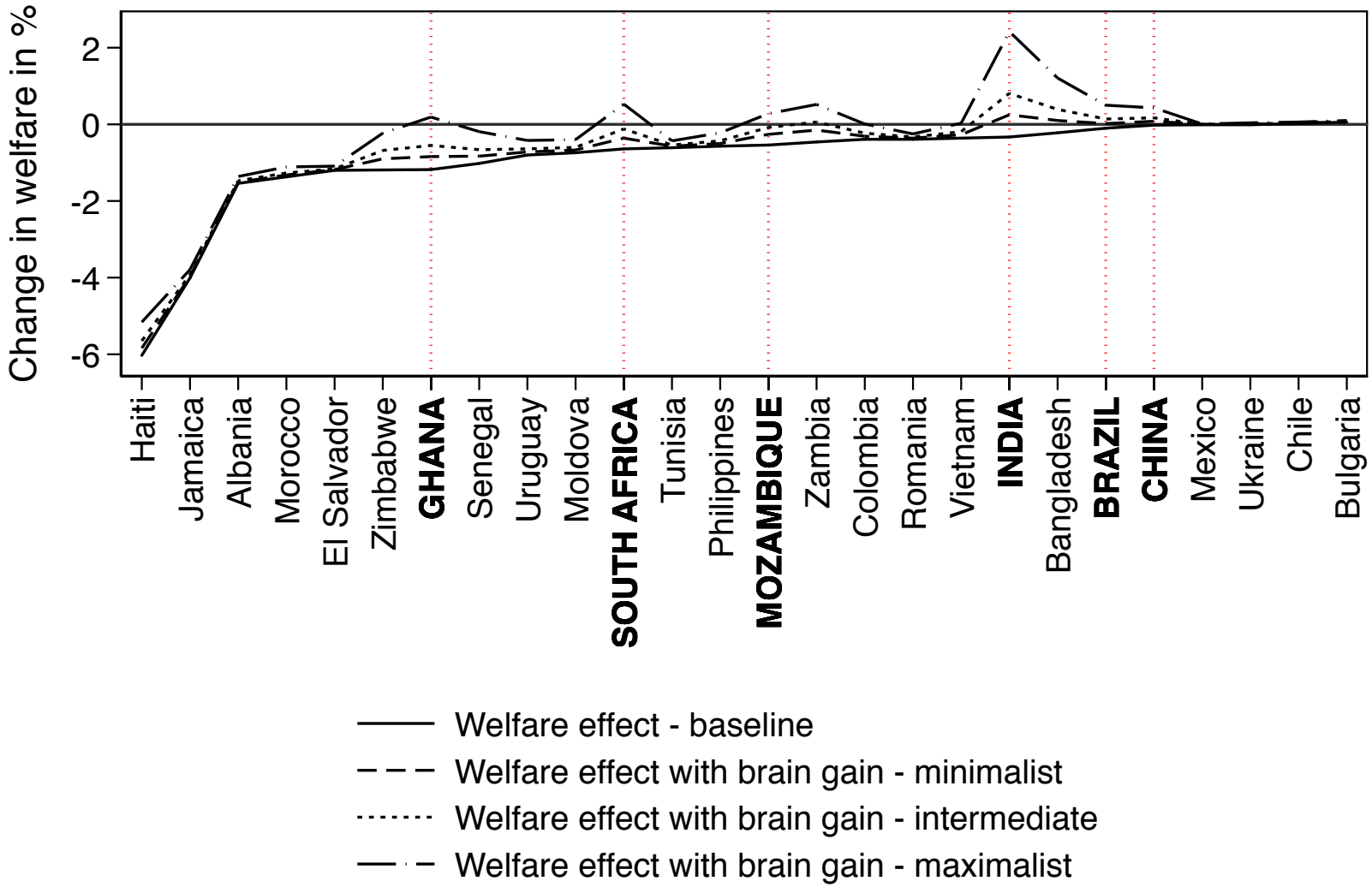
Theory: Mountford (1997), Stark et al (1998), Beine et al (2001)

Evidence: Beine et al (2008), Batista et al (2013), Shrestha (2015)

$$\widehat{sh_S} = sh_S \left(1 + \sigma_b \frac{\widehat{sh_E} - sh_E}{sh_E} \right)$$

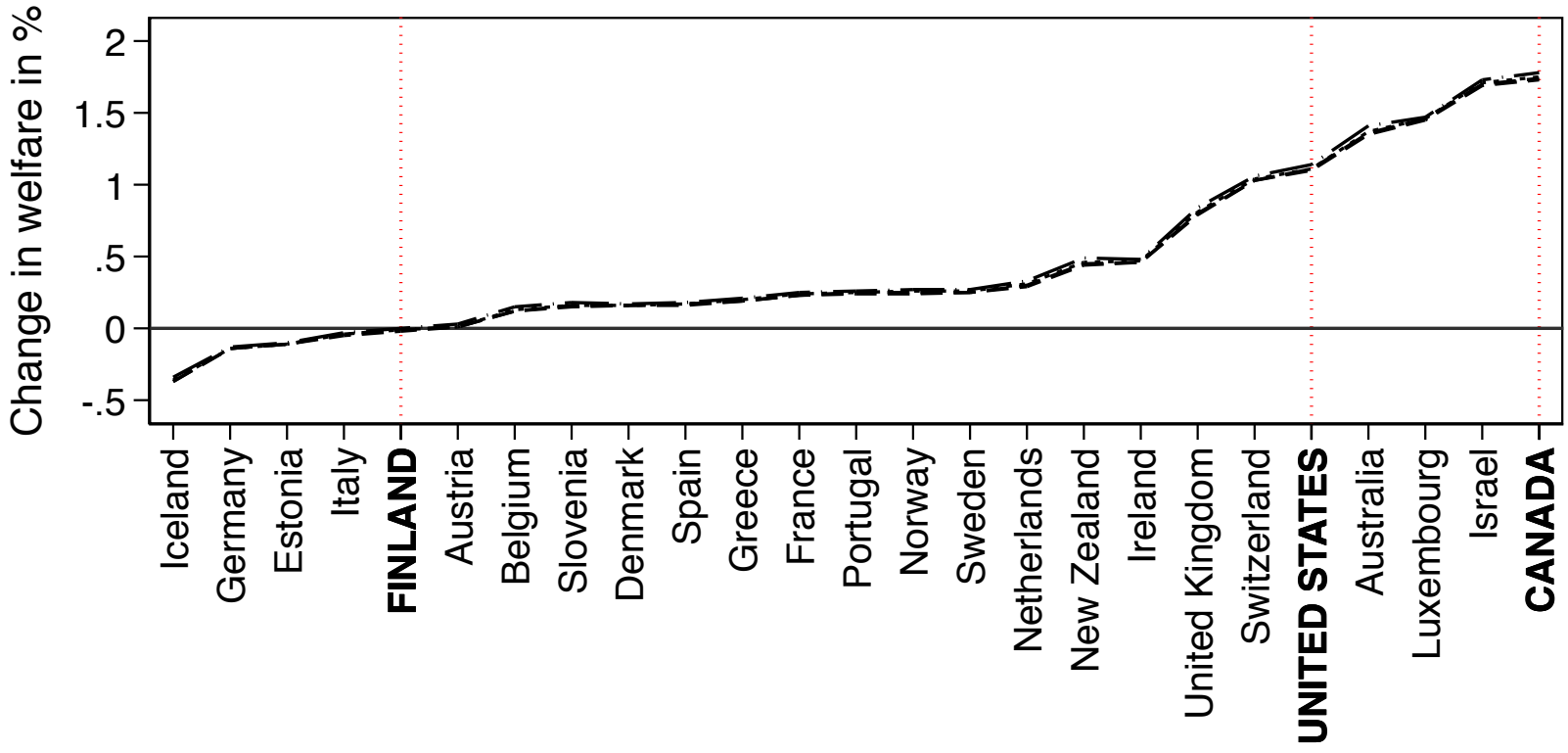
Extension: Brain gain effect

Non-OECD countries

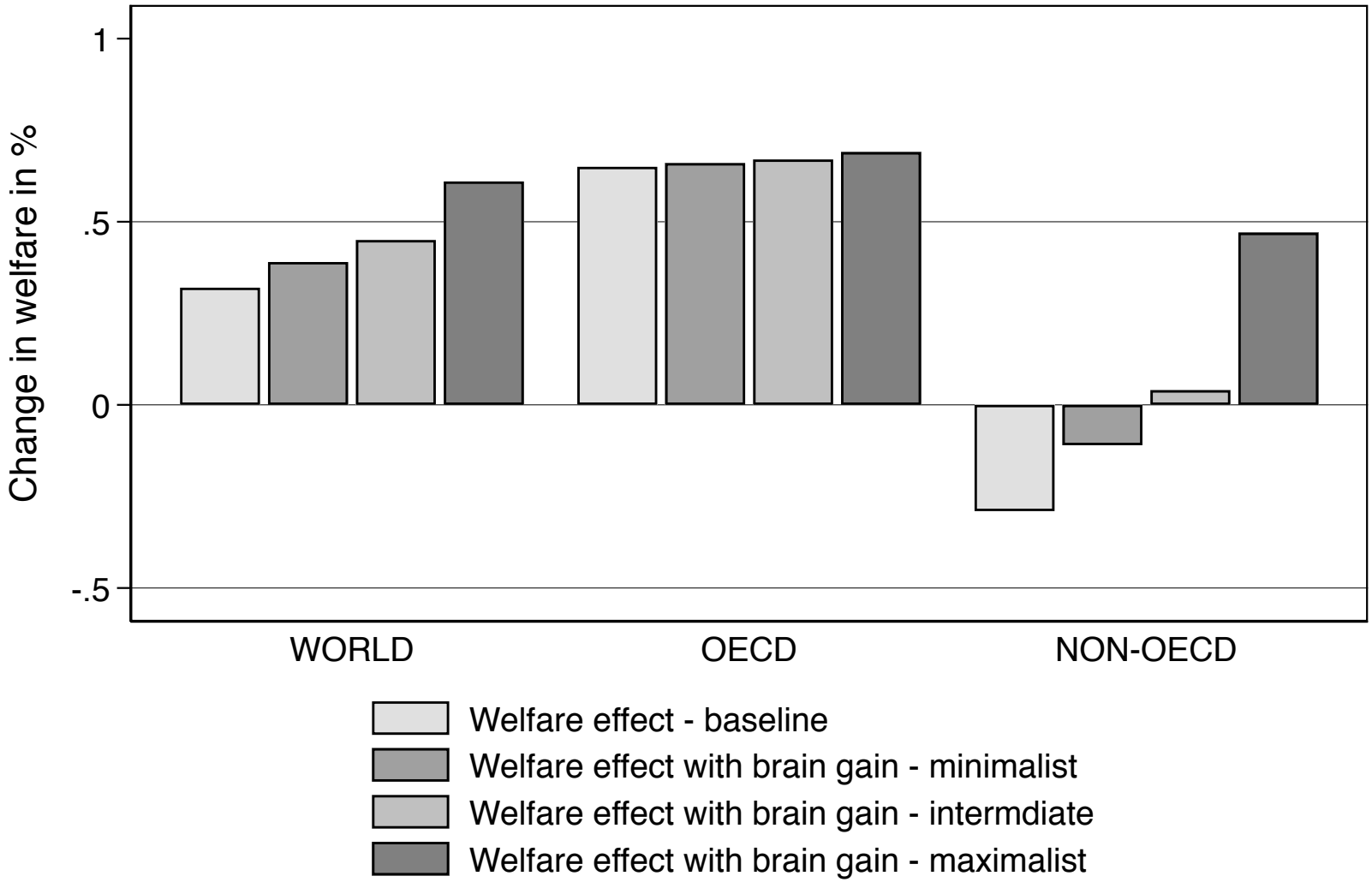


Extension: Brain gain effect

OECD countries



Extension: Brain gain effect



TFP Externalities

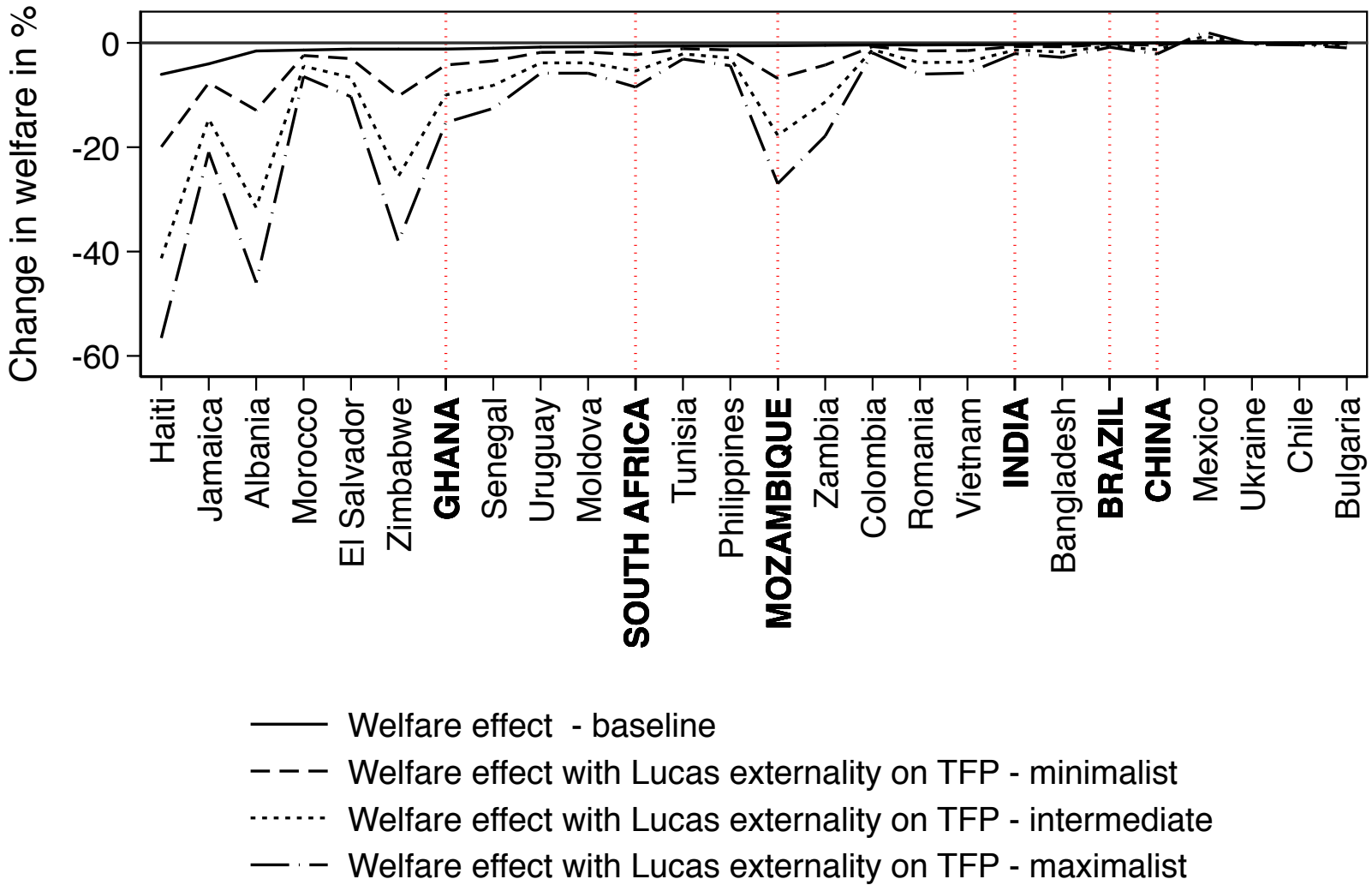
Idea: TFP increases in the average level of human capital

Theory: Lucas (1988)

$$A_i = a_i \left(\frac{H_i}{H_i + M_i + L_i} \right)^{\sigma_a},$$

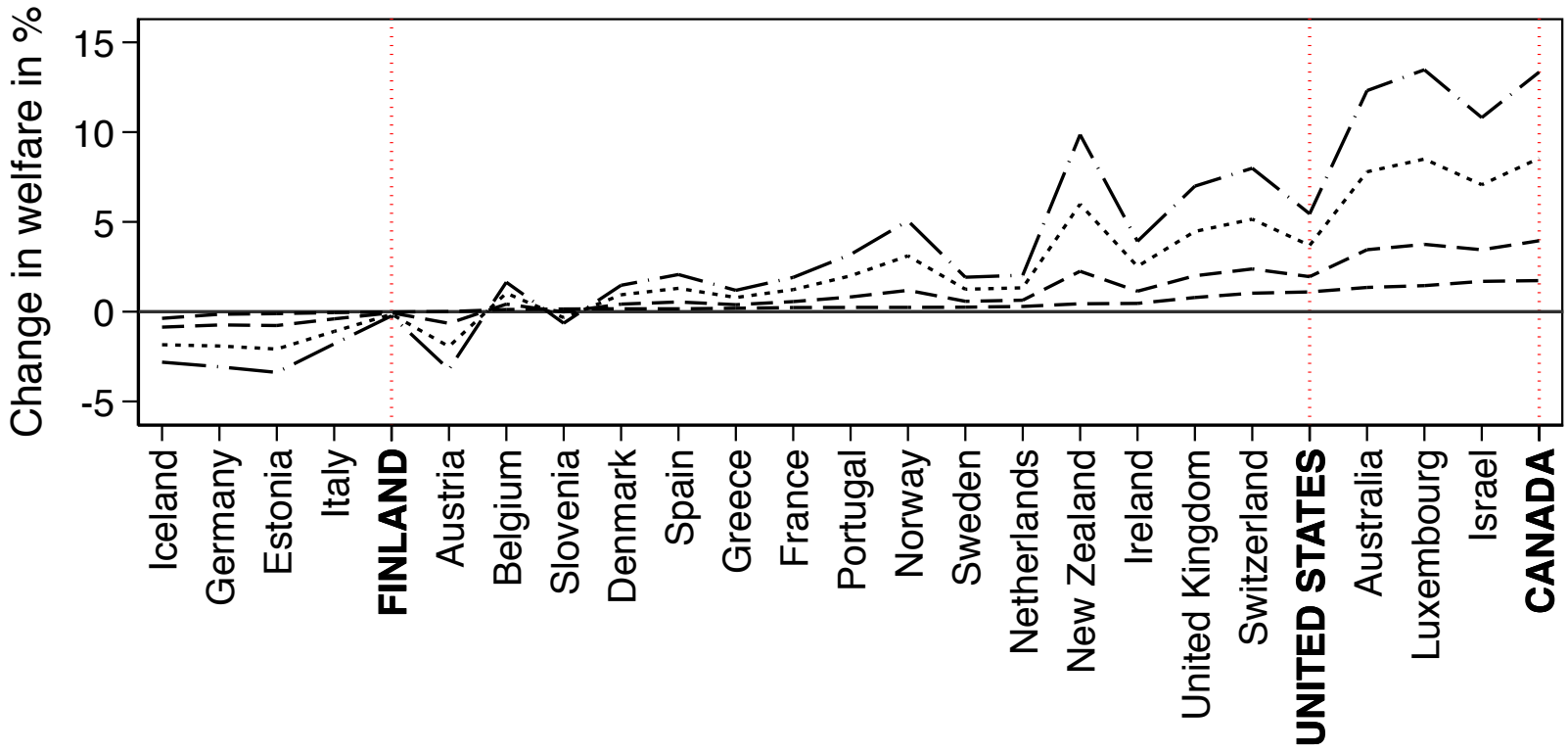
TFP Externalities

Non-OECD countries



TFP Externalities

OECD countries



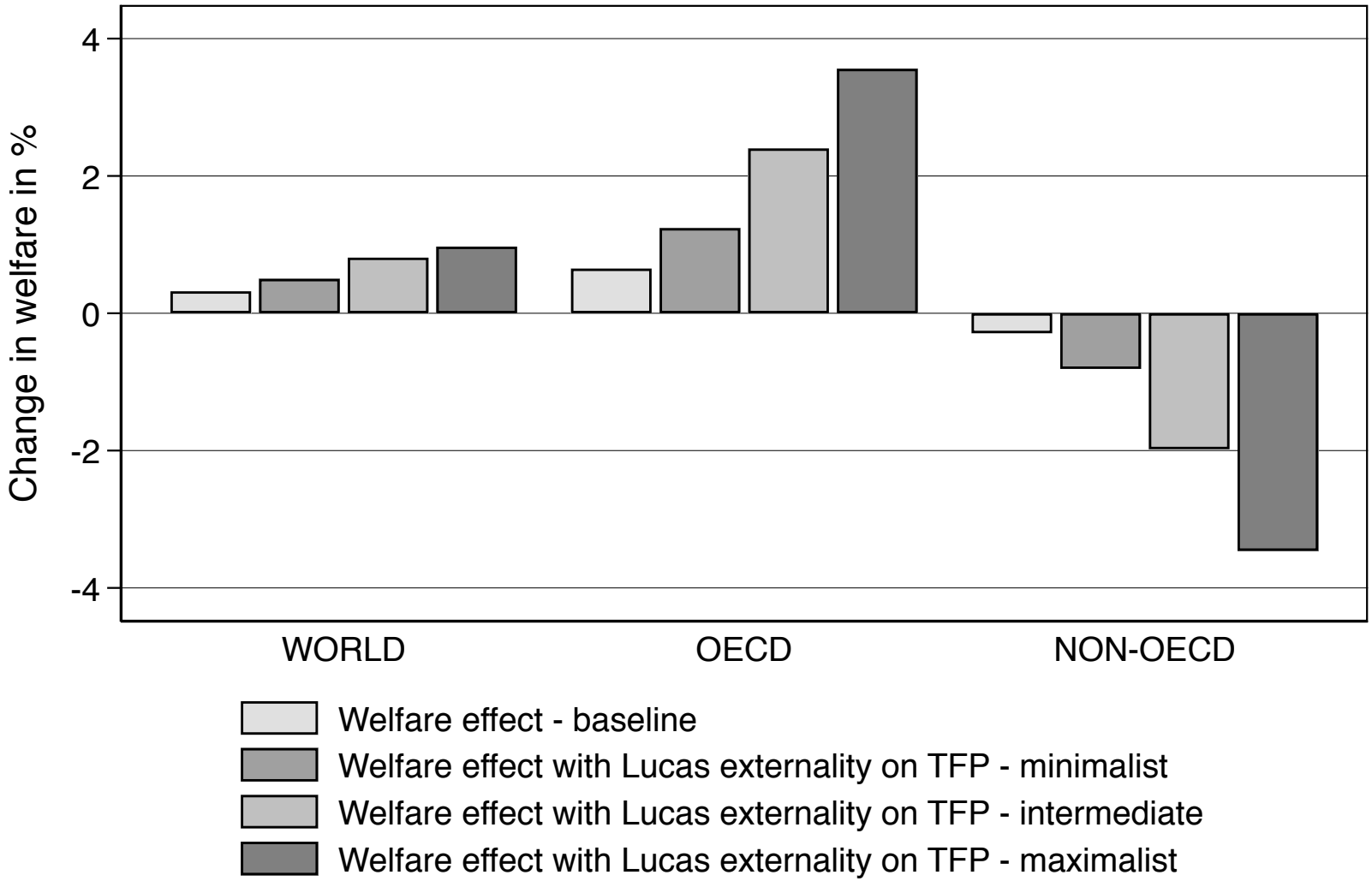
Welfare effect - baseline

Welfare effect with Lucas externality on TFP - minimalist

Welfare effect with Lucas externality on TFP - intermediate

Welfare effect with Lucas externality on TFP - maximalist

TFP Externalities



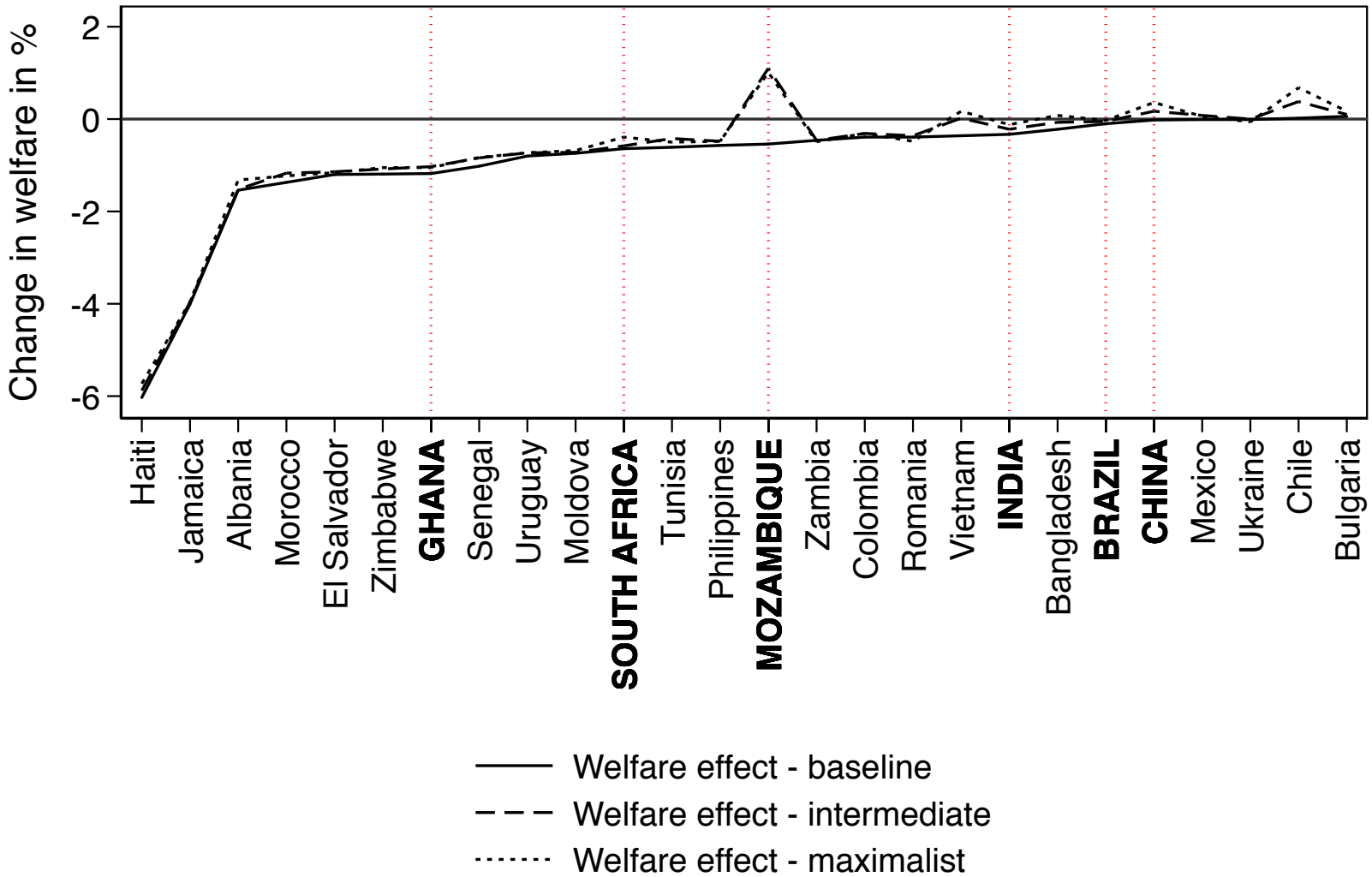
Extension: Network effects in trade

Immigrants foster trade with their home countries by reducing trade costs and demanding home-country-specific goods. Trade costs now:

$$\tau_{ij} = \bar{\tau}_{ij}\left(\frac{H_{ij}}{H_{ij} + M_{ij} + L_{ij}})\right)^{\sigma_t}$$

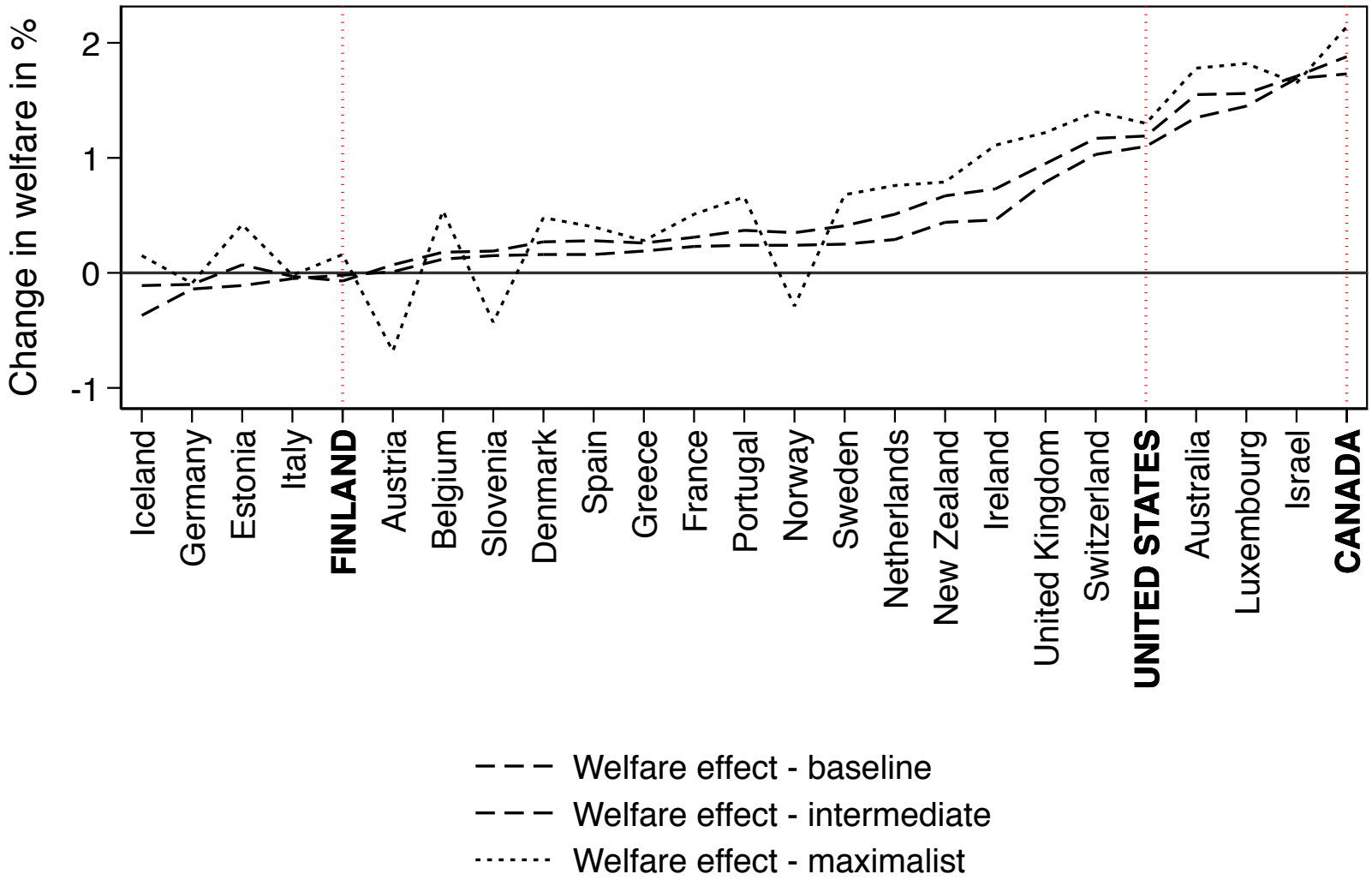
Extension: networks

Non-OECD countries



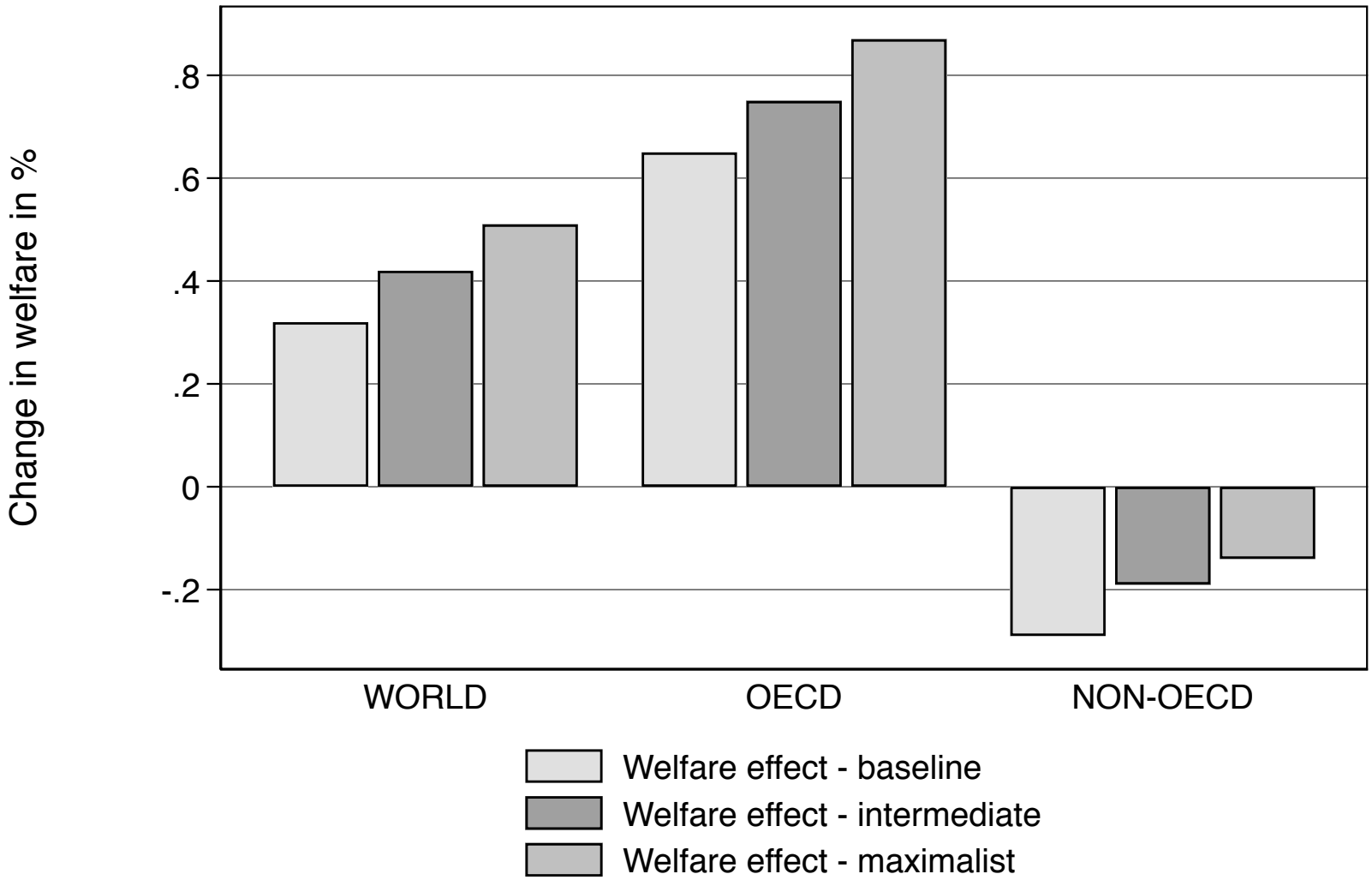
Extension: networks

OECD countries



Extension: networks

Global



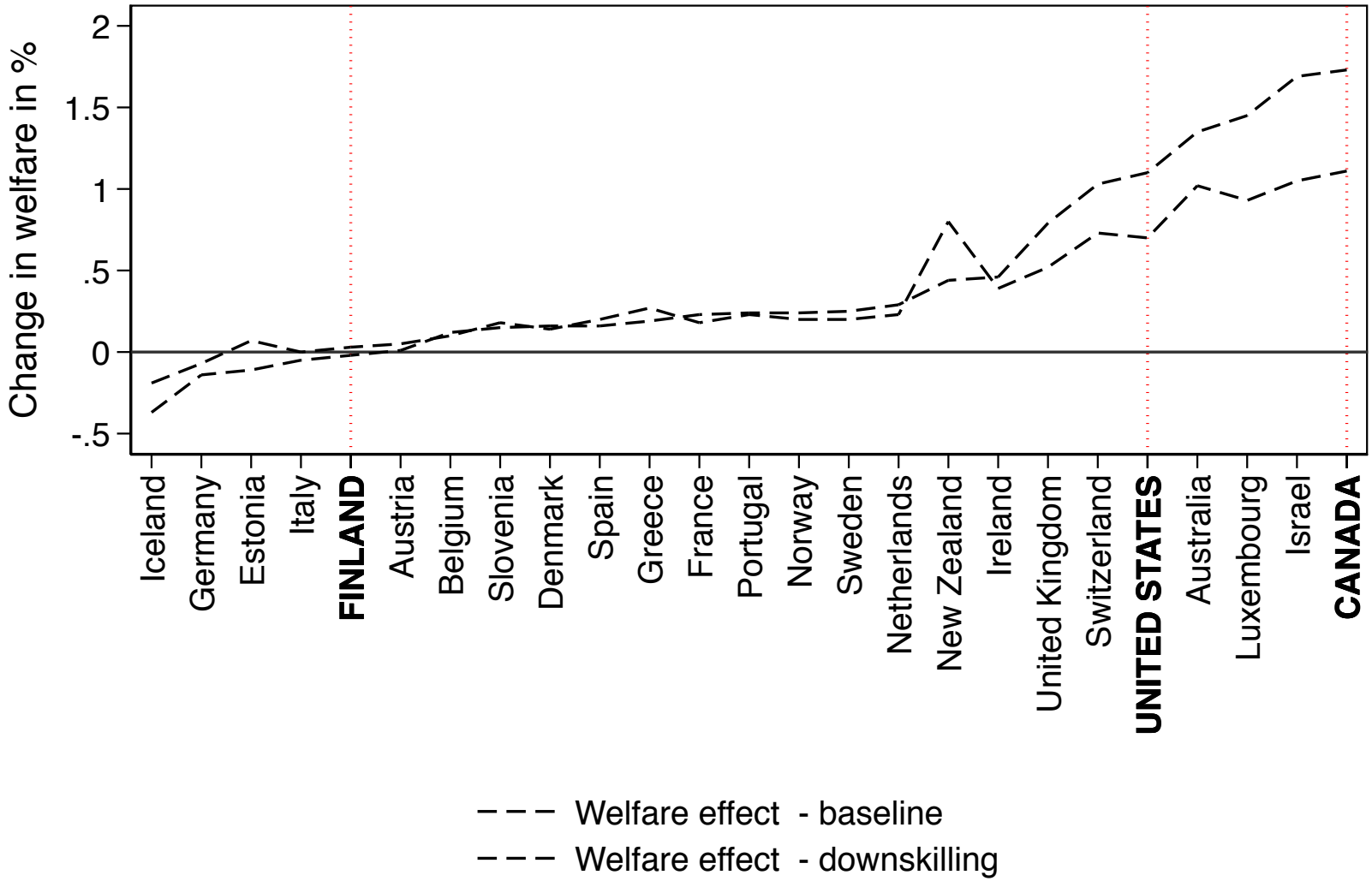
Downskilling

Idea: not all high-skilled immigrants work in high-skilled jobs

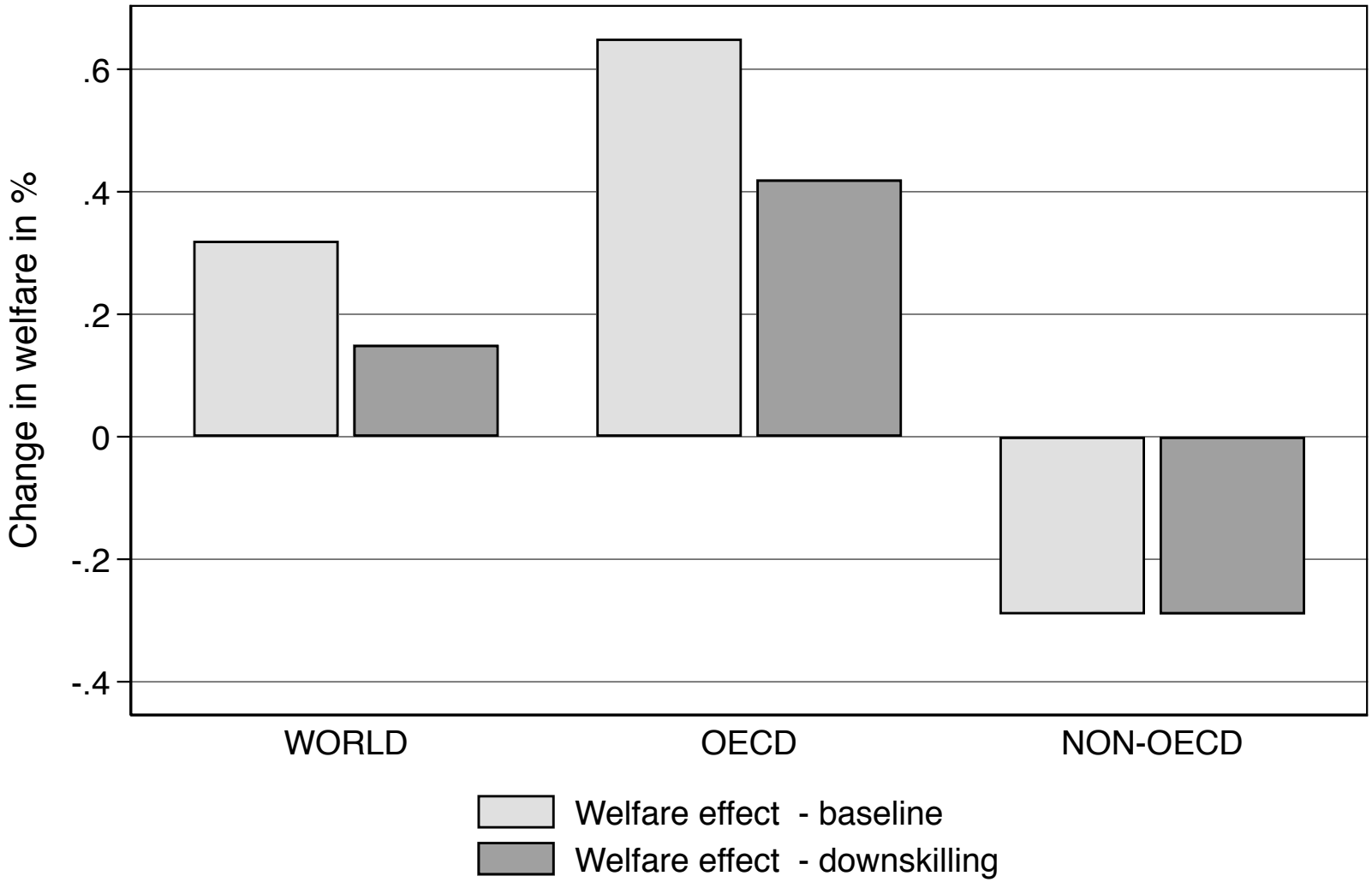
We re-calculate the share of high-skilled based on occupational distributions

Downskilling

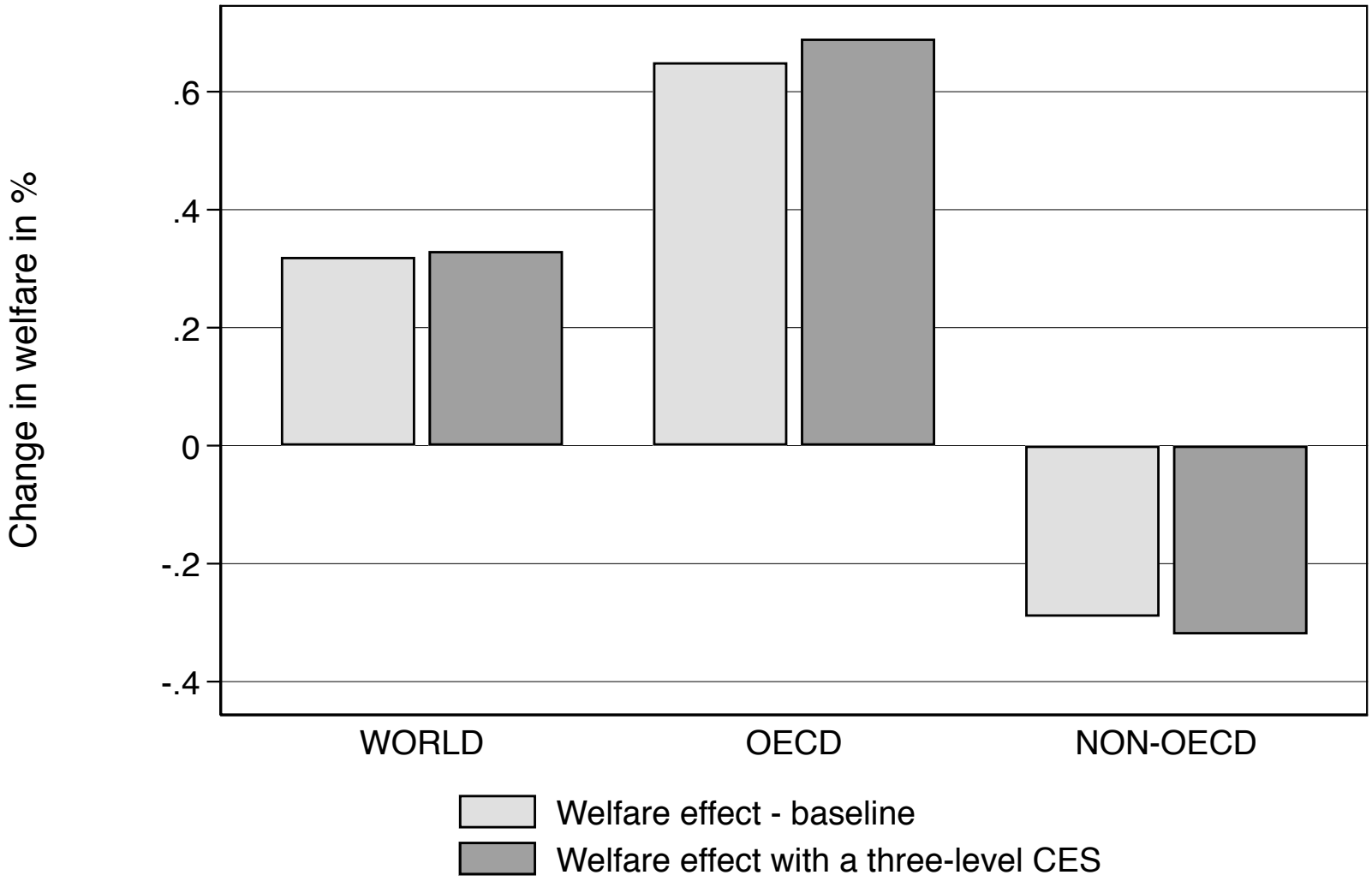
OECD countries



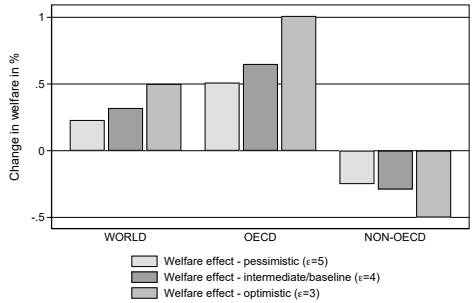
Downskilling



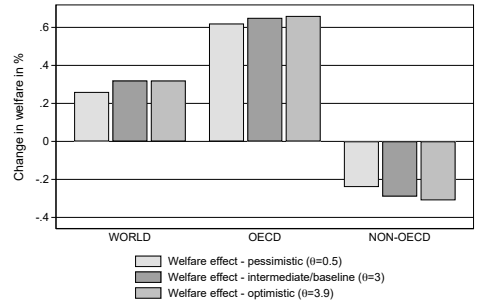
A nested CES


Change in welfare in %
.6
.4
.2
0
-.2
-.4
WORLD
OECD
NON-OECD
Welfare effect - baseline
Welfare effect with a three-level CES

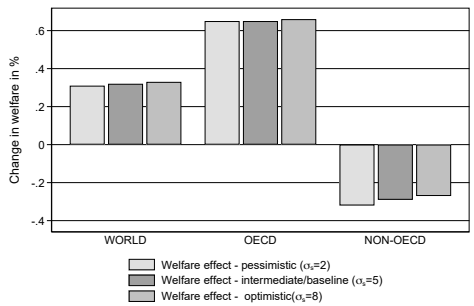
Sensitivity checks



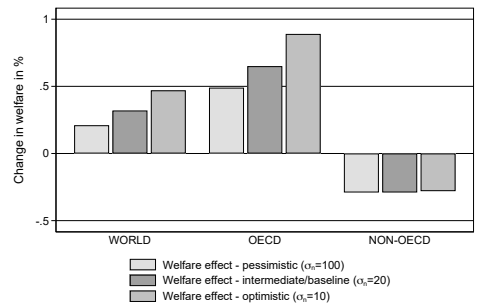
(a) Varying ε



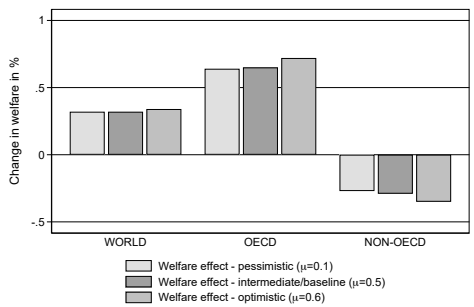
(b) Varying θ



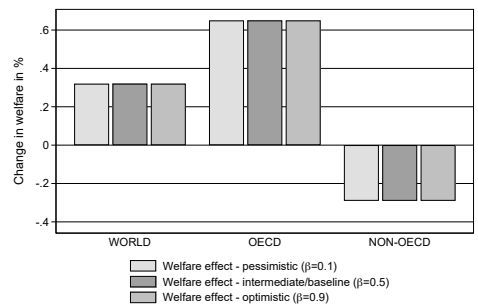
(c) Varying σ_s



(d) Varying σ_n

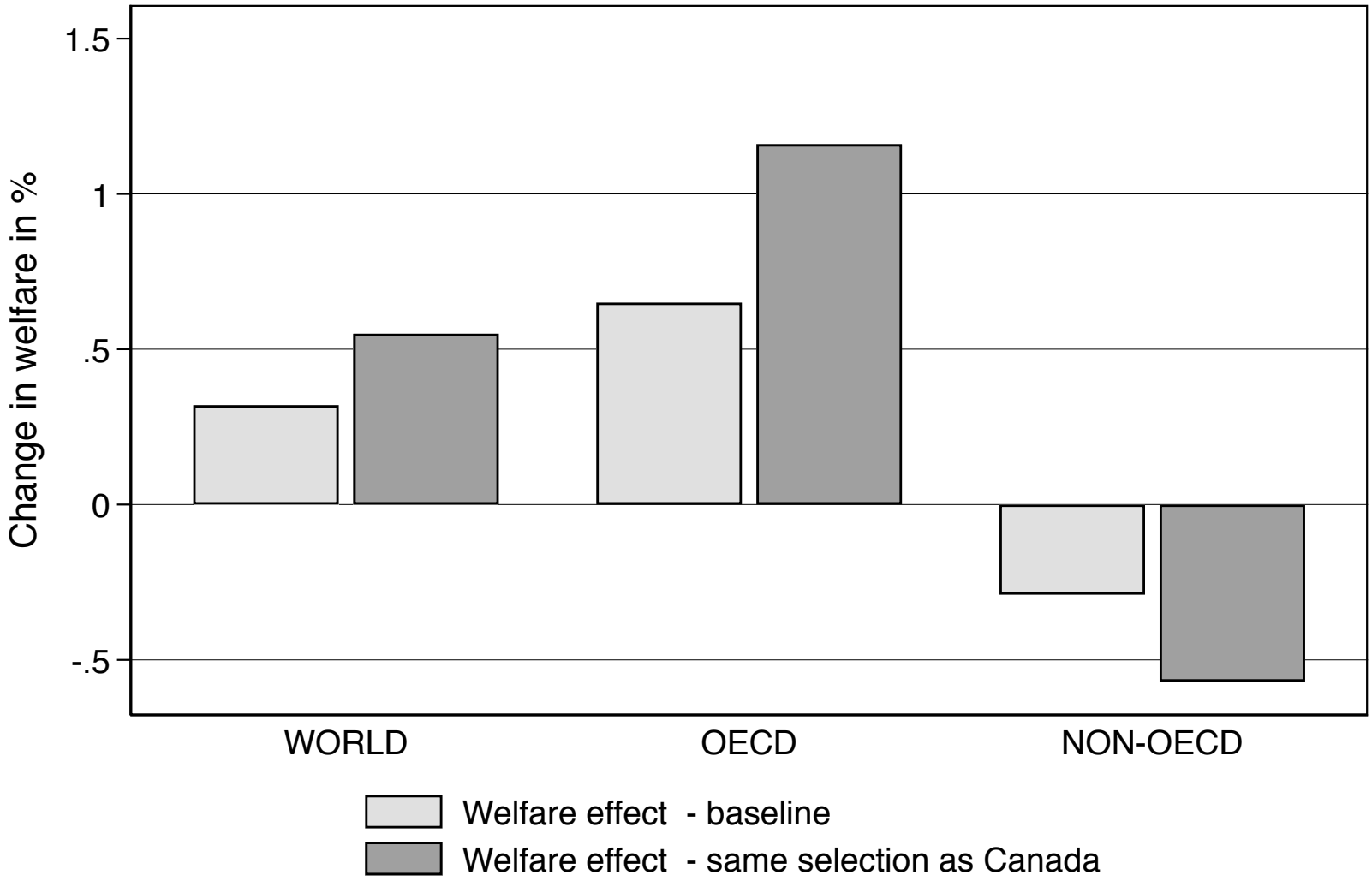


(e) Varying μ



(f) Varying β

All OECD as selective as Canada



Competitive labor markets

Traditional sector: low-skilled only

$$Q_i^T = A_i^T L_i^T$$

Tradables/non-tradables

3 skill levels: low-, medium, and high-skilled

$$Q_i^M = A_i^M \left[\alpha_i^L \left(L_i \right)^{\frac{\sigma_S - 1}{\sigma_S}} + \left(1 - \alpha_i^L - \alpha_i^H \right) \left(M_i \right)^{\frac{\sigma_S - 1}{\sigma_S}} + \alpha_i^H \left(H_i \right)^{\frac{\sigma_S - 1}{\sigma_S}} \right]^{\frac{\sigma_S}{\sigma_S - 1}}$$

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Immigrants and **natives imperfect substitutes**. Example for high skilled:

$$H_i = \left[(1 - \alpha_i^F)(H_i^N)^{\frac{\sigma_n - 1}{\sigma_n}} + \alpha_i^F (H_i^F)^{\frac{\sigma_n - 1}{\sigma_n}} \right]^{\frac{\sigma_n}{\sigma_n - 1}}.$$

Competitive labor markets

Wages:

$$W_i = \big[(\alpha_i^L)^{\sigma_s}(W_i^L)^{1-\sigma_s} + (1-\alpha_i^L-\alpha_i^H)^{\sigma_s}(W_i^M)^{1-\sigma_s} + (\alpha_i^H)^{\sigma_s}(W_i^H)^{1-\sigma_s}\big]^{\frac{1}{1-\sigma_s}} .$$

Consumer's problem

Non-homothetic preferences

$$\max_{\{T_i, x_{ij}(k), y_i(k)\}} \beta^T (T_i)^\mu + \left(1 - \beta^T\right) \left[(1-\beta)(Y_i)^{\frac{\theta-1}{\theta}} + \beta(X_i)^{\frac{\theta-1}{\theta}}\right]^{\frac{\theta}{\theta-1}}$$

subject to: $T_i + P_i^Y Y_i + P_i^X X_i = w_i,$

$$X_i = \left[\sum_{j=1}^{J} \int_0^{N_j^X} (x_{ij}(k))^{\frac{\epsilon-1}{\epsilon}} dk\right]^{\frac{\epsilon}{\epsilon-1}}, \quad Y_i = \left[\int_0^{N_i^Y} (y_i(k))^{\frac{\epsilon-1}{\epsilon}} dk\right]^{\frac{\epsilon}{\epsilon-1}}.$$

Indirect utility and price indices

$$U_i = \beta^T \left(\frac{\beta^T \mu}{1 - \beta^T} P_i \right)^{\frac{\mu}{1-\mu}} + (1 - \beta^T) \frac{w_i - T_i}{P_i}.$$

where P_i is the ideal price index in country i,

$$P_i = \left[(1-\beta)^\theta \left(P_i^Y \right)^{1-\theta} + \beta^\theta \left(P_i^X \right)^{1-\theta} \right]^{\frac{1}{1-\theta}},$$

$$\text{with: } P_i^X = \left[\sum_{j=1}^{J} \int_0^{N_j^X} (p_{ij}(k))^{1-\epsilon} dk \right]^{\frac{1}{1-\epsilon}},$$

$$\text{and } P_i^Y = \left[\int_0^{N_i^Y} (p_i(k))^{1-\epsilon} dk \right]^{\frac{1}{1-\epsilon}}.$$

Firms and market structure

Tradable/Non-tradable sector

- Monopolistic competition
- Differentiated goods
- Homogeneous firms
- Free entry
- Firms incur sunk cost of entry f_X, f_Y

Mark-up pricing

$$p_i(k) = p_i = \frac{\epsilon}{\epsilon - 1} c_i,$$

Market size

Share of X and Y in GDP

$$sh_i^X \equiv \frac{P_i^X X_i}{GDP_i^X + GDP_i^Y} = \beta^\theta \left(\frac{P_i^X}{P_i}\right)^{1-\theta}, \text{ and } sh_i^Y = (1-\beta)^\theta \left(\frac{P_i^Y}{P_i}\right)^1$$

Resource constraints:

$$sh_i^X A_i^M L_i^M = \frac{\epsilon}{\epsilon - 1} N_i^X x_i, \quad sh_i^Y A_i^M L_i^M = \frac{\epsilon}{\epsilon - 1} N_i^Y y_i.$$

Zero profit: $p_i x_i = \varepsilon W_i f_i^X$ and $p_i y_i = \varepsilon W_i f_i^Y$

Nr of units produced per firm

$$x_i = A_i^M f_i^X (\epsilon - 1), \quad y_i = A_i^M f_i^Y (\epsilon - 1).$$

Market size

$$N_i^X = \frac{sh_i^X L_i^M}{\epsilon f_i^X}, \quad N_i^Y = \frac{sh_i^Y L_i^M}{\epsilon f_i^Y},$$

Trade

Iceberg trade costs $\tau_{ji} > 1$. Trade costs are asymmetric, $\tau_{ji} \neq \tau_{ij}$.

$Trade_{ji}$ is given by

$$Trade_{ji} = \int_{k \in N_i^X} x_{ji} p_{ji} dk = N_i^X GDP_j^X \left[\frac{P_j^X}{\tau_{ji} p_i} \right]^{\epsilon - 1}.$$

Share of exports as a total share of production in sector X as

$$\frac{Trade_{ji}}{GDP_i^X} = \frac{GDP_j^X \left(P_j^X / \tau_{ji} \right)^{\epsilon - 1}}{\sum_{h=1}^{J} GDP_h^X \left(P_h^X / \tau_{hi} \right)^{\epsilon - 1}}.$$

Remittances

- Every migrant remits a fixed amount
- Distributed as lump-sum in sending country

Remittances

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- Distributed as lump-sum in sending country

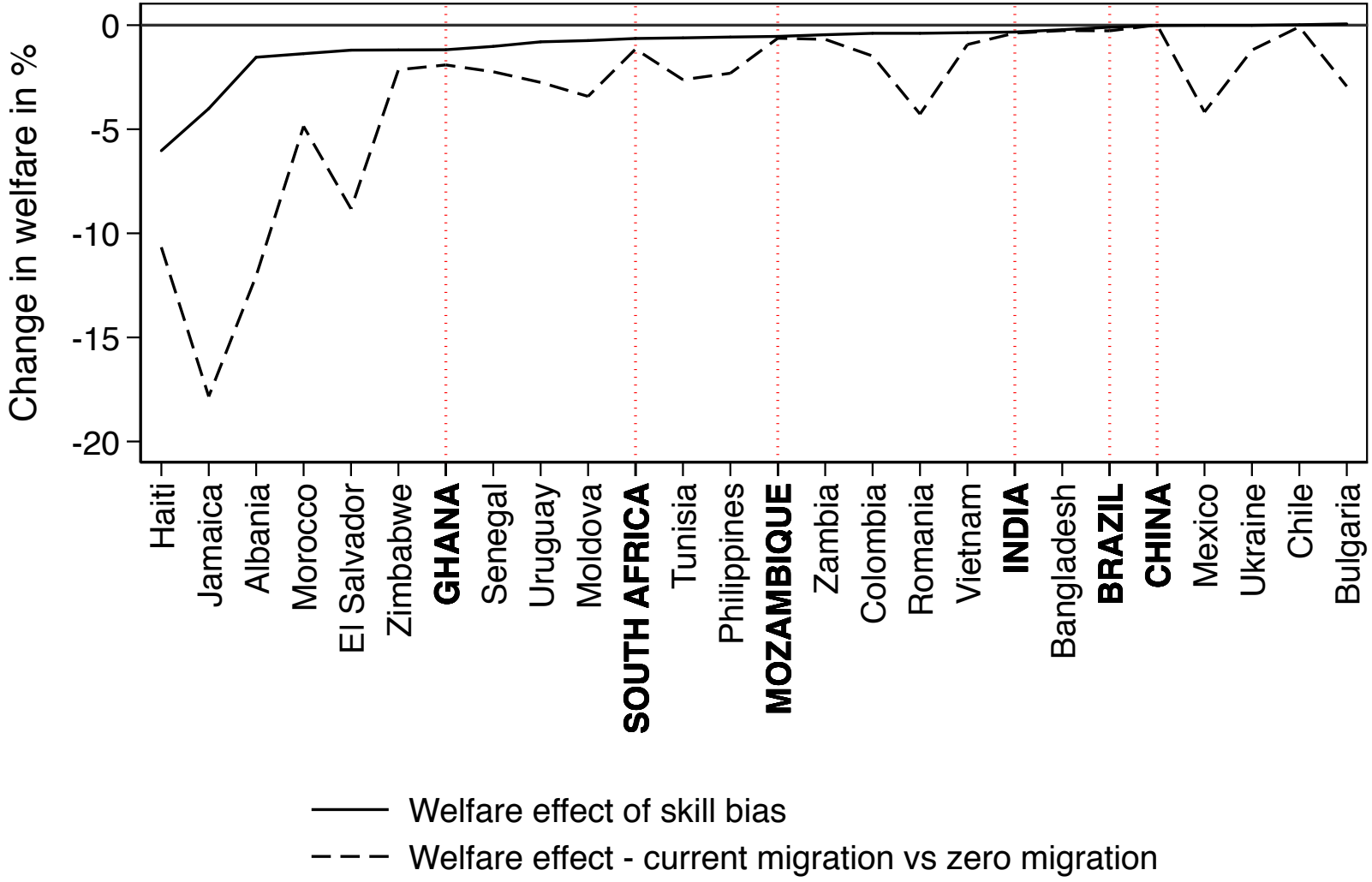
Extensions:

- Every migrant remits a fixed share of income
- High-skilled remit a higher share
- Low-skilled remit a higher share

Extension: selection vs. scale

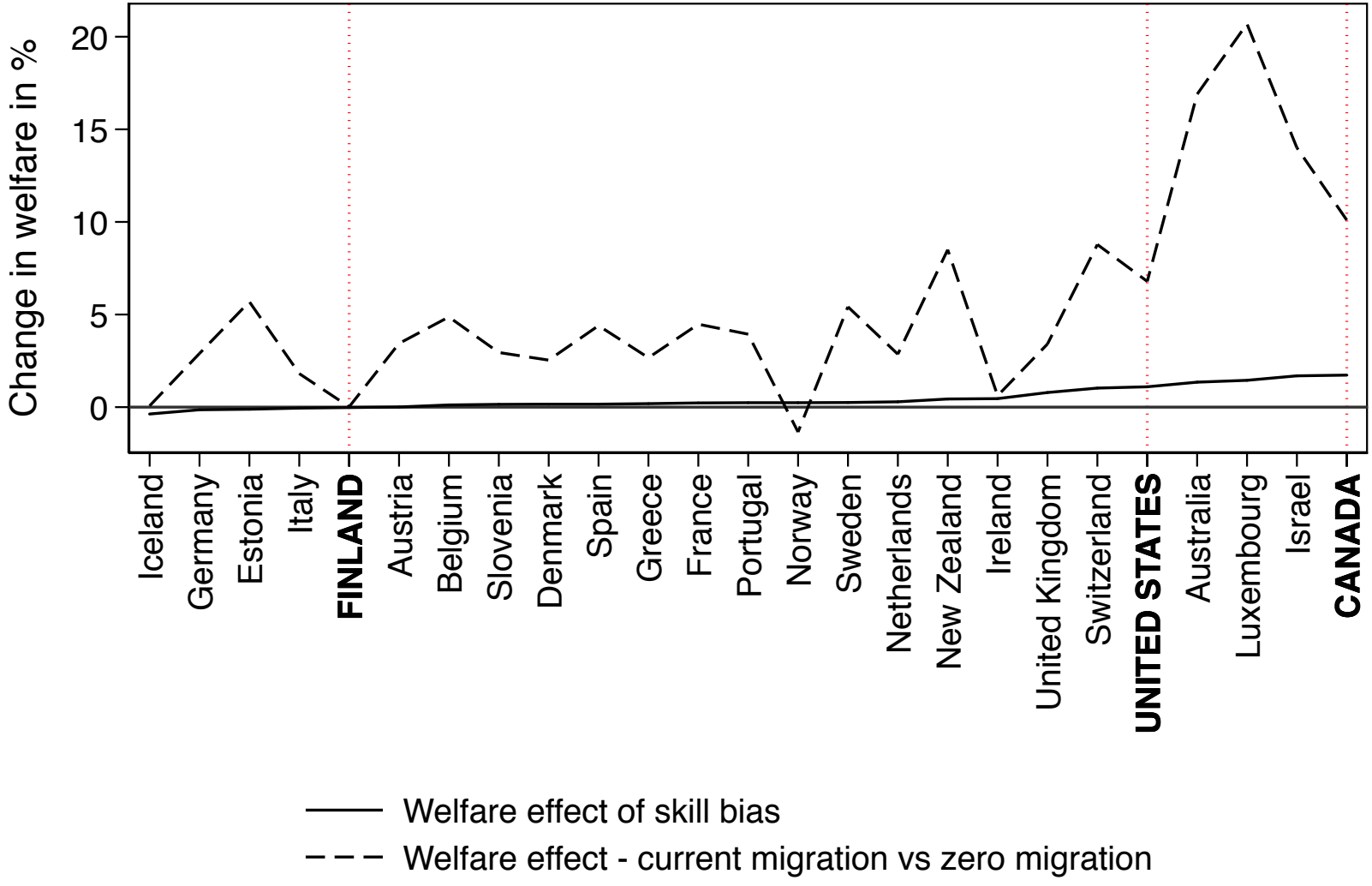
Extension: selection vs. scale

Non-OECD countries



Extension: selection vs. scale

OECD countries



Extension: The role of trade

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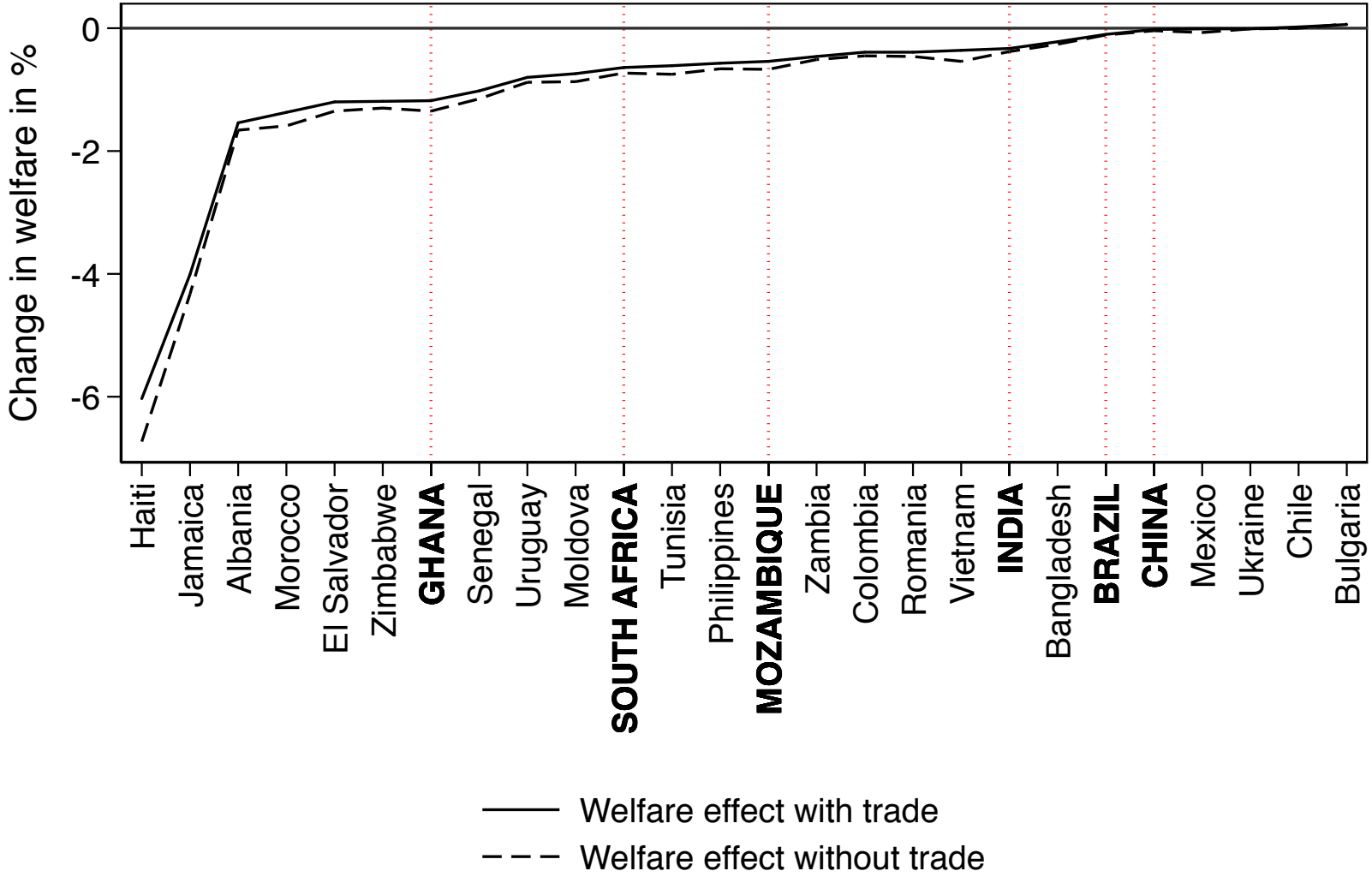
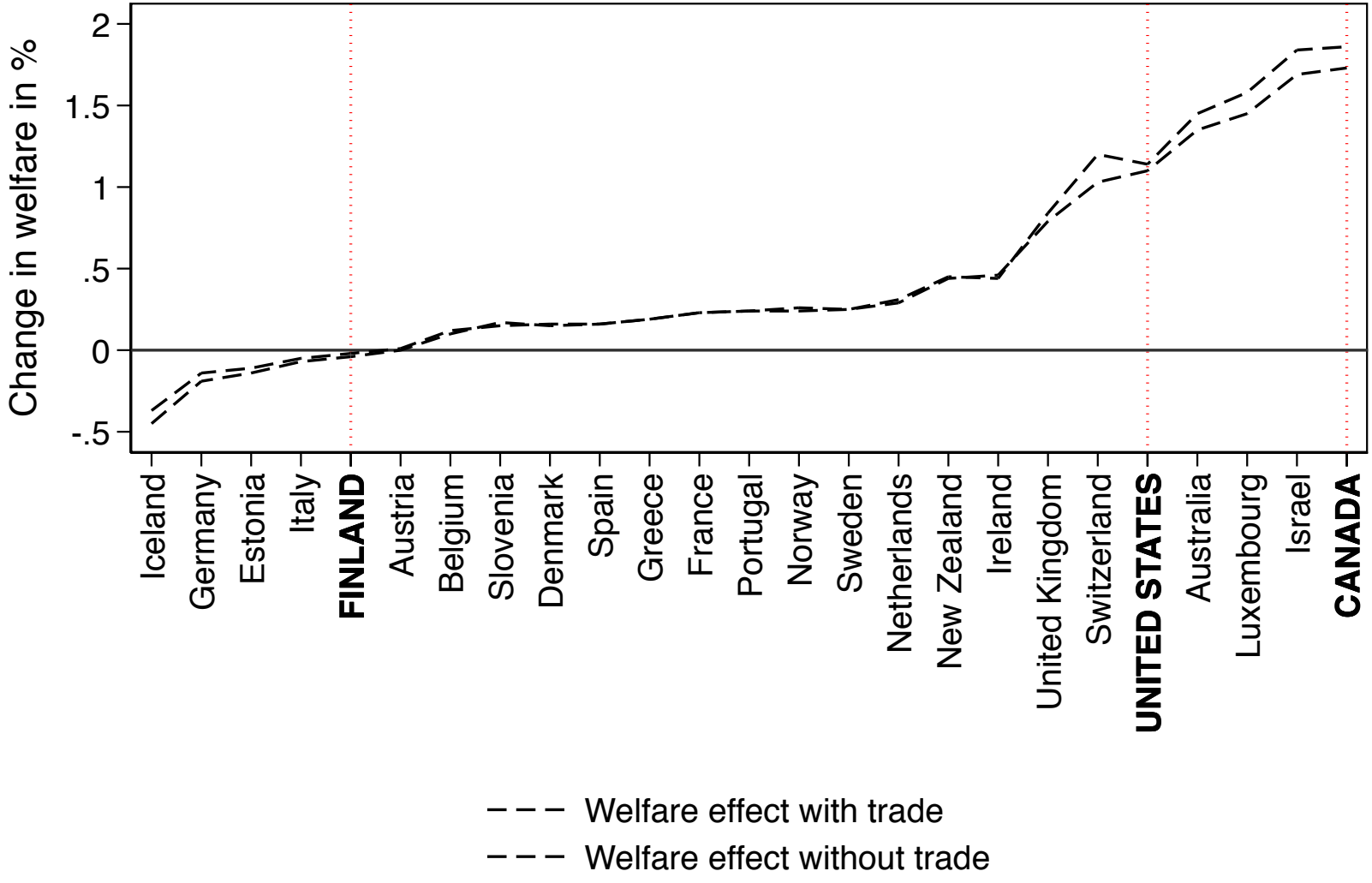
Non-OECD countries



Extension: The role of trade

OECD countries



Welfare per never-migrant