

Chapter 14 - The Distributional Effects of Low Carbon Policies in Japan and South Korea

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- 動機・研究目的
- 先行研究及び主な分析内容
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動機・研究目的

研究目的

- 炭素税の用途
 - 家計への還元
 - 環境対策
 - 経済への影響を小さく、社会問題の歪みを改善
 - 社会保障雇用者負担の削減財源
 - 低所得者の所得税の引き下げ財源
 - 年金保険料の負担軽減財源
- 炭素税：所得格差への影響？

結論

- 目的

- 炭素税のリサイクル: 逆進性があるかどうか? 所得格差を考慮した税込還元の効果は?
- Triple dividend? : CO₂、GDP、所得格差を是正?

- 結果

- 日・韓、Benefit還元ケース、一括還元の両ケース: CO₂削減、GDPや実質所得増加
- 所得分配指数(GINI): 小さくなる
- 所得格差縮小効果: 一括還元の効果 < benefit支出を増やす還元

社会問題

- 経済格差

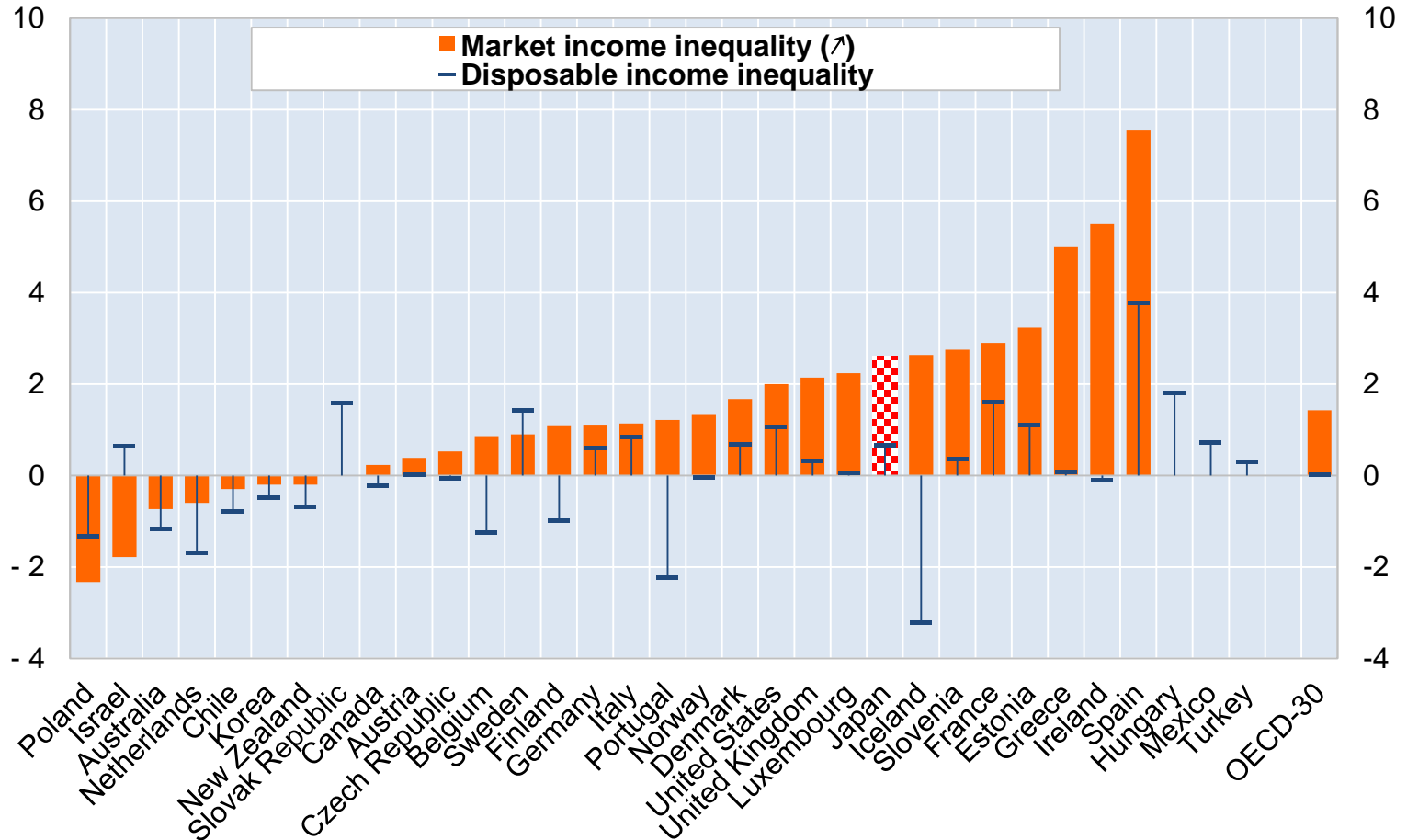
- 所得格差→炭素税の導入:低所得世帯への負担が増加(逆進性)

- エネルギー貧困?

- 炭素税の導入→エネルギー価格の増加→低所得:冷暖房やエネルギーへのアクセスが困難
 - 太陽光発電、省エネ器機への買い替えでCO2削減可能。But,低所得世帯:初期費用の負担が大

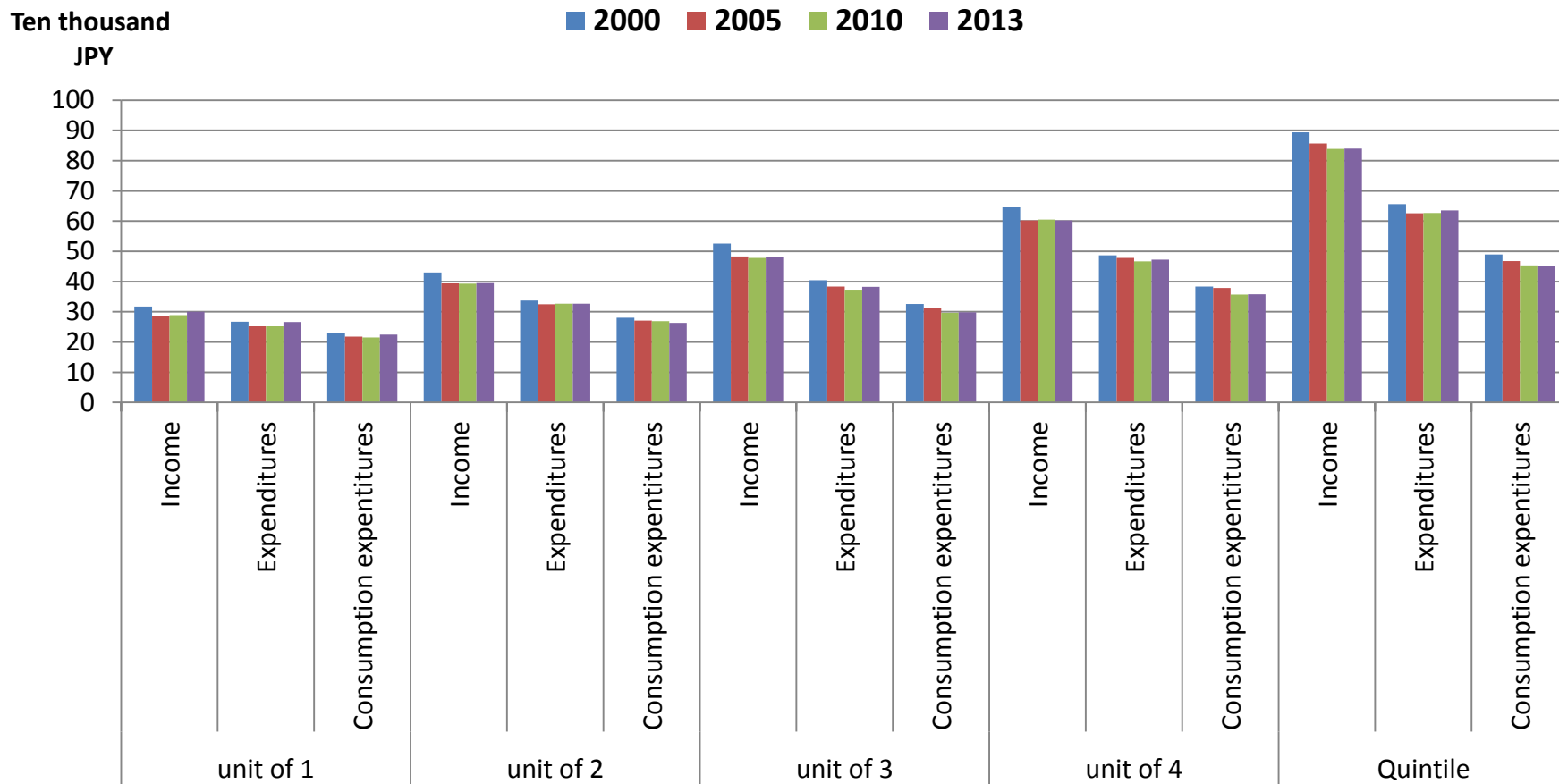
所得格差1

Percentage point changes in the Gini coefficient of household market and disposable incomes between 2007 and 2011



Source: OECD Income Distribution Database (via www.oecd.org/social/income-distribution-database.htm)

Monthly income and expenditure of workers' households in Japan

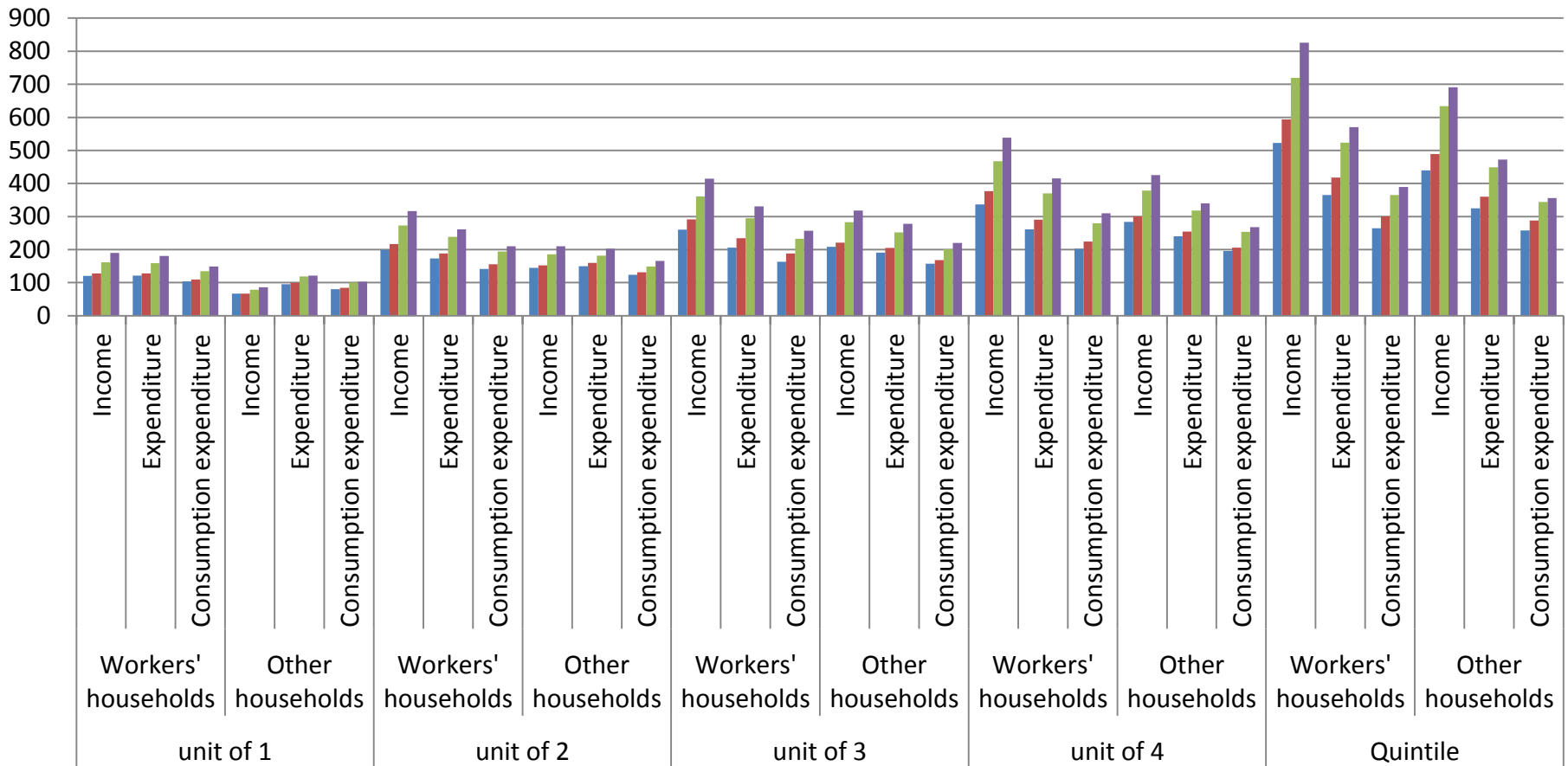


Source: Portal site of Official Statistics of Japan: Family Income and Expenditure Survey (<http://www.e-stat.go.jp/>)

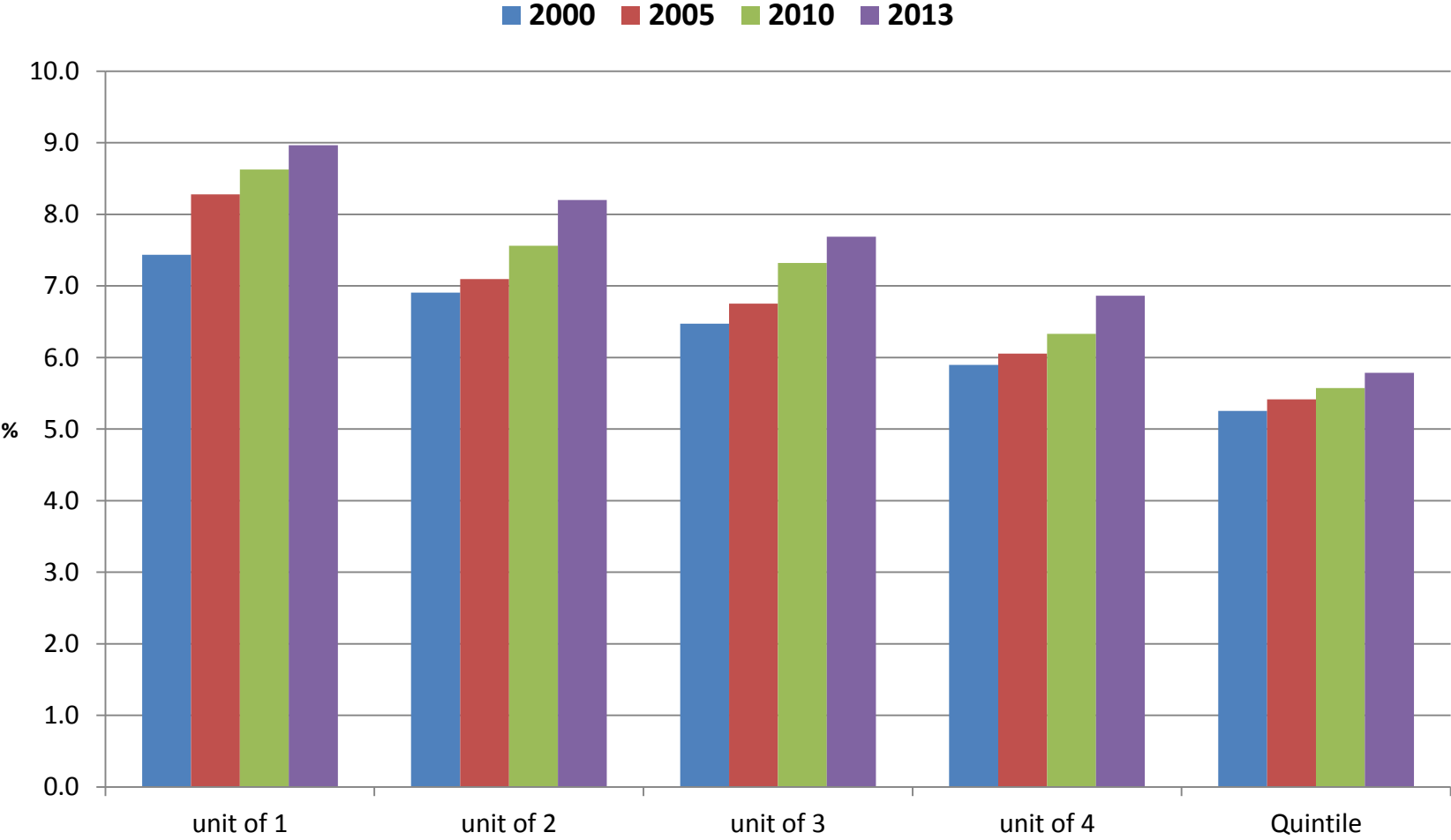
Monthly income and expenditure in Korea

Ten thousand KRW

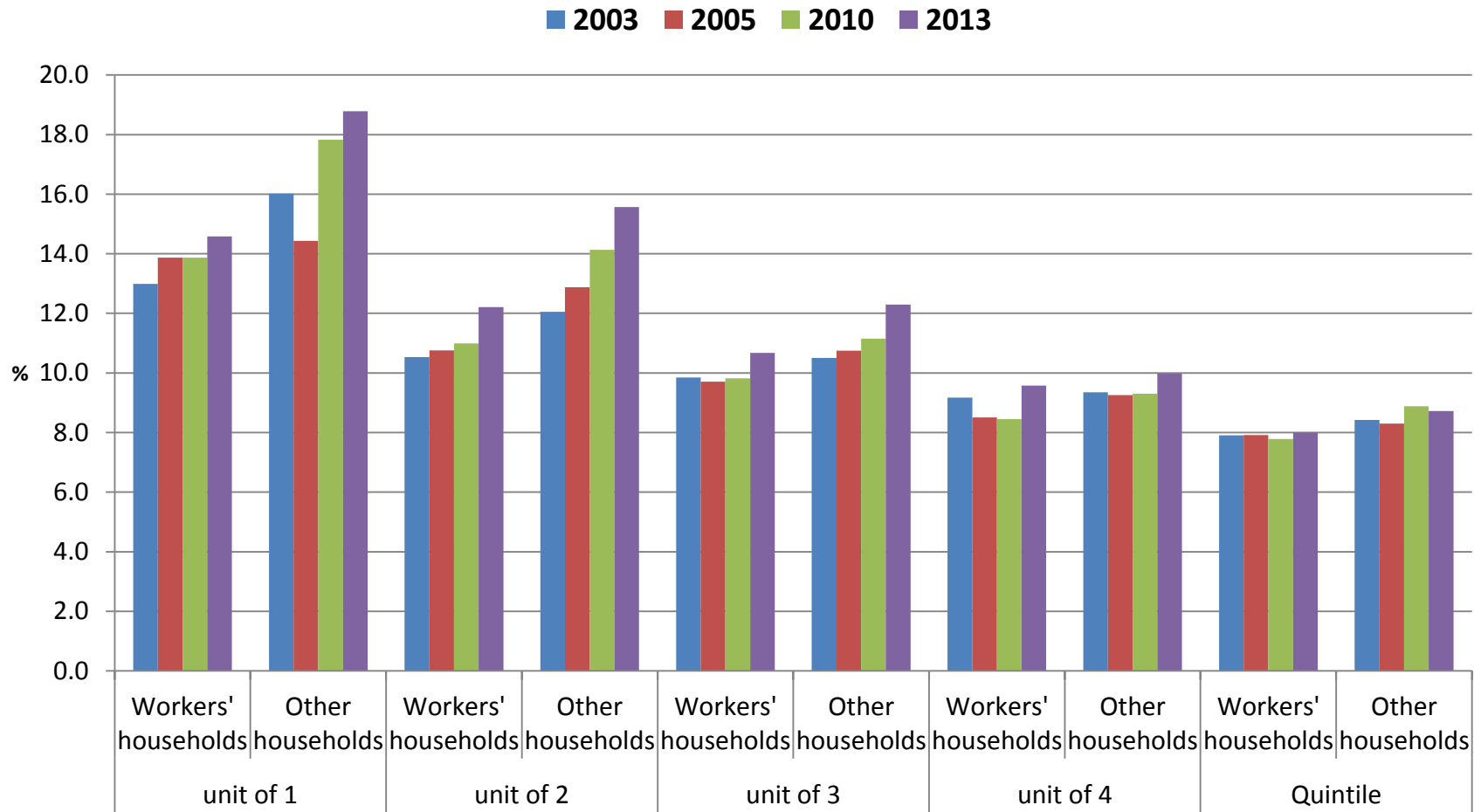
2003 2005 2010 2013



The share of utility costs of computation expenditure in Japan



The share of utility costs of computation expenditure in Korea



先行研究および分析内容

先行研究：逆進性

- Speck (1999)、Tiezzi (2005)、Callan et al. (2009)、Heerden et al. (2006) and Bureau (2011)
 - 逆進性：認められる
 - 税収の還元によって改善
- Fujikawa and Watanabe (2004)、Shimoda and Watanabe (2006)
 - 低所得世帯への影響が大きい→逆進性あり

分析内容

- E3MEモデルを用いて、炭素税の税収を教育投資に還元した場合（人的資本投資）の効果を分析
- E3MEモデル：
 - Global macro-econometric E3 (Energy-Environment-Economy) model
 - マクロ計量モデル
 - Cambridge Econometrics 開発
 - www.e3me.com

所得分配への影響分析

1. 所得構成

$$SERI_{ij} = SRWC_{ij} \times RWS_j + 0.3 \times SRBC_{ij} \times RBEN_j + 0.7 \times SRPC_{ij} \times RBEN_j + SRRC_{ij} \times RRI_j - SRTC_{ij} \times RDTX_j - SRTC_{ij} \times REES_j$$

Where

$SERI_{ij}$	is average disposable income per year in current price for socioeconomic group i in region j
$SRWC_{ij}$	is share of income from wage for socioeconomic group i in region j
RWS_j	is an endogenous E3ME variable for total wage and salaries in region j
$SRBC_{ij}$	is share of income from benefits for socioeconomic group i in region j
$RBEN_j$	is an endogenous E3ME variable for total benefit payments in region j
$SRPC_{ij}$	is share of income from pensions for socioeconomic group i in region j
$SRRC_{ij}$	is share of income from other income for socioeconomic group i in region j
RRI_j	is an endogenous E3ME variable for residual incomes in region j
$SRTC_{ij}$	is share tax payment in income for socioeconomic group i in region j
$RDTX_j$	is an endogenous E3ME variable for total direct tax revenues in region j
$REES_j$	is an endogenous E3ME variable for total employees' social security contribution revenues in region j

つづき

- エネルギー価格への影響

$$PSE_{ij} = \frac{\sum(BSEC_{ijk} \times VCR_{kj})}{\sum(BSEC_{ijk} \times CR_{kj})}$$

Where

PSE_{ij} is average price deflator for socioeconomic group i in region j

$BSEC_{ijk}$ is product k share in total consumption by socioeconomic group i in region j

VCR_{kj} is an endogenous E3ME variable for current price spending by product k in region j

CR_{kj} is an endogenous E3ME variable for constant price spending by product k in region j

實質所得效果

$$SRRI_{ij} = \frac{SERI_{ij}}{PSE_{ij}}$$

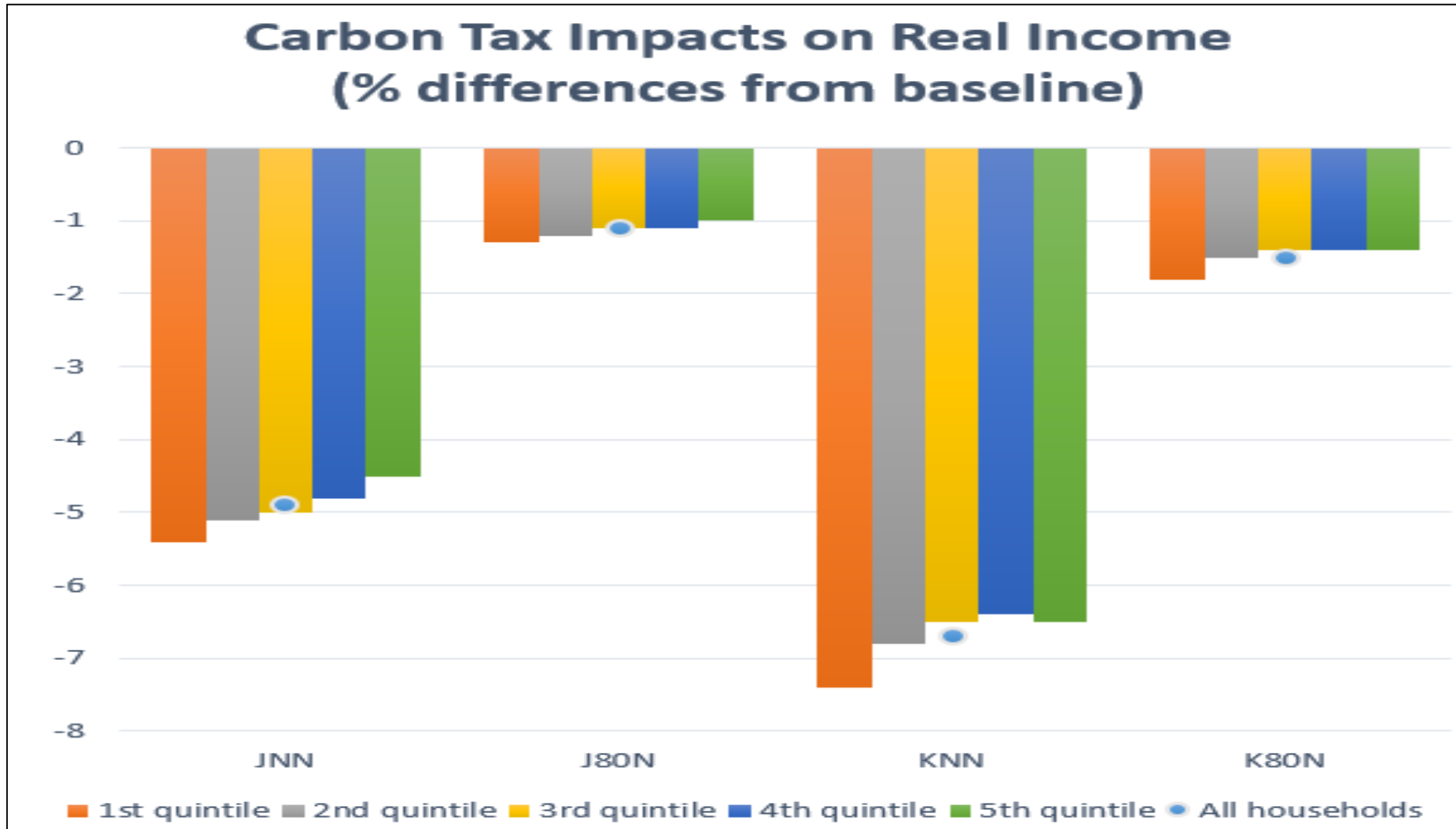
Where

$SRRI_{ij}$ is average real disposable income per year for socioeconomic group i in region j

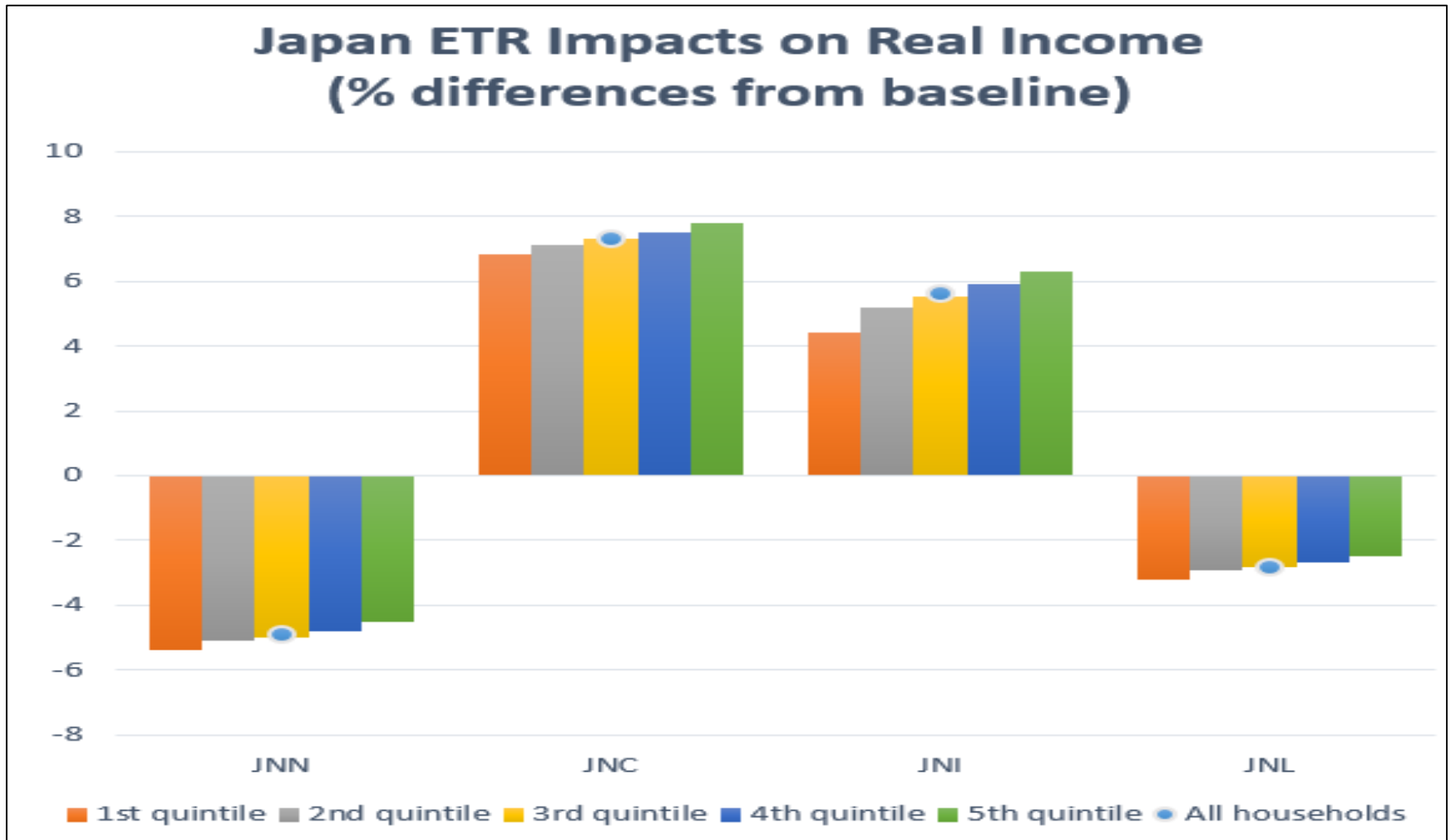
10章のシナリオと所得別影響

- CH. 10と同じ削減目標
 - 炭素税: 両国の政府目標を達成する(N)
 - 日本(J): 2020年に2005年比3.8%削減
 - 韓国(K): 2020年にベースラインレベルより30%削減
 - 炭素税: 同一炭素税(\$80/tCO₂ (80)) 導入
- シナリオ:
 - **No revenue recycling (N): JNN, J80N, KNN, K80N**
 - **Consumption tax (C): JNC, J80C, KNC, K80C**
 - **Income tax (I)**
 - **Labour tax (L)**

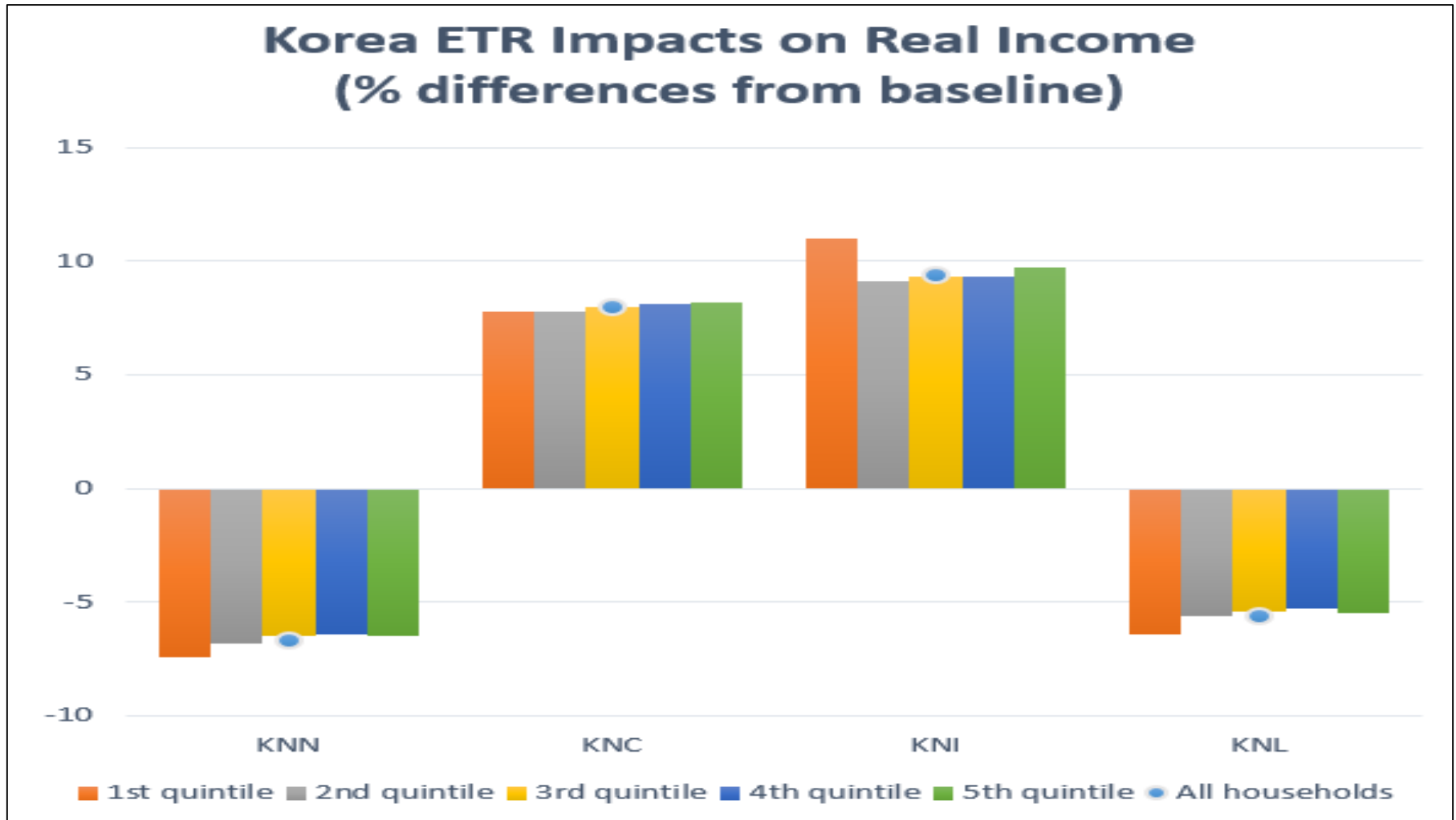
Carbon Tax Impact on Real Disposable Income 2020 (% differences from baseline)



Japan ETR Impact on Real Income 2020 (% differences from baseline)



Korea ETR Impact on Real Income 2020 (% differences from baseline)



所得格差を考慮した税込還元

- 炭素税：両国の政府目標を達成する(N)
 - 日本(J)：2020年に2005年比3.8%削減
 - 韓国(K)：2020年にベースラインレベルより30%削減
- シナリオ
 - Benefit payment (B)： ???
 - Lump sum payment (P)： ???

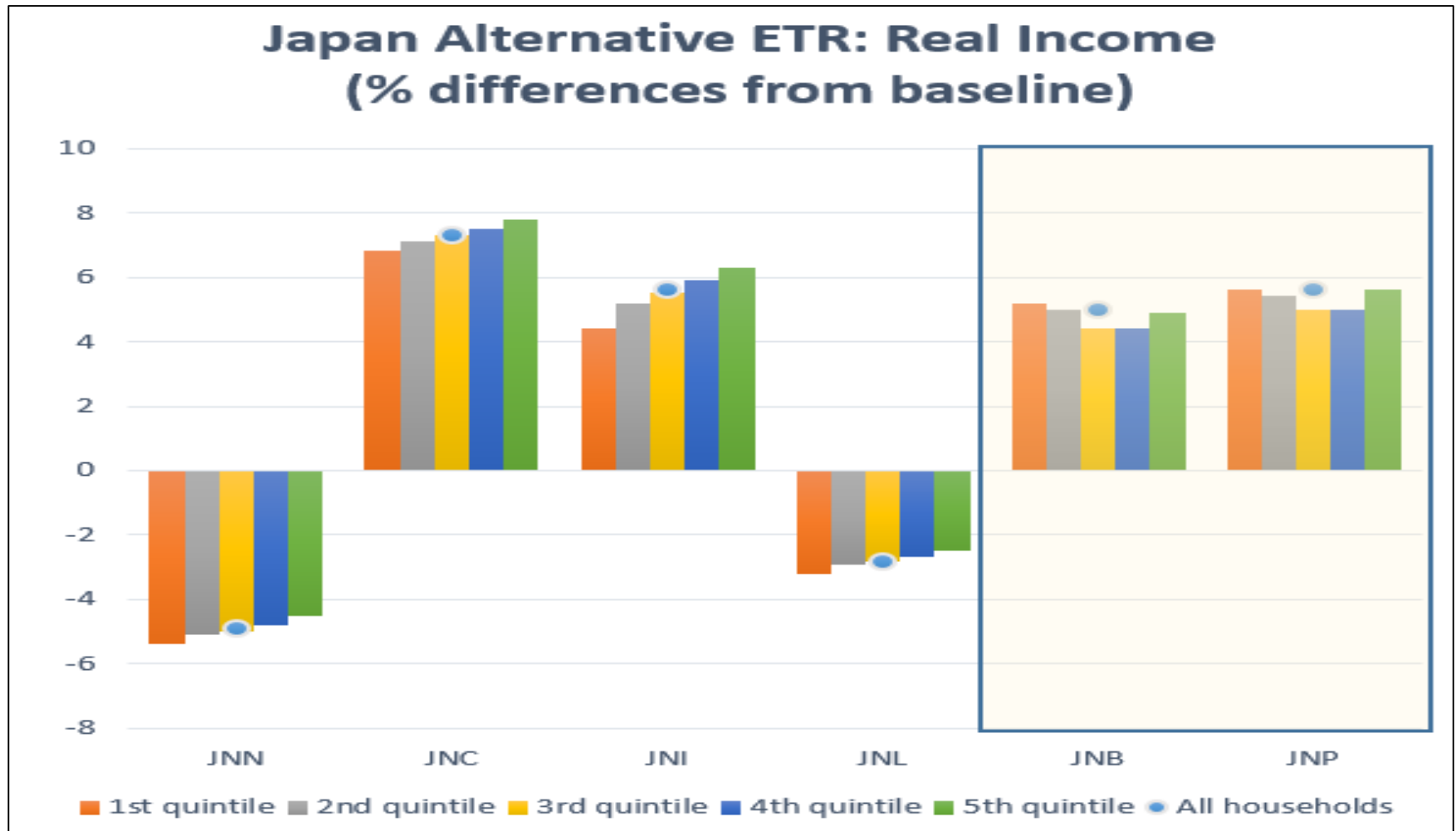
主な分析結果と結論

所得分配を考慮した還元ケース： 経済への影響

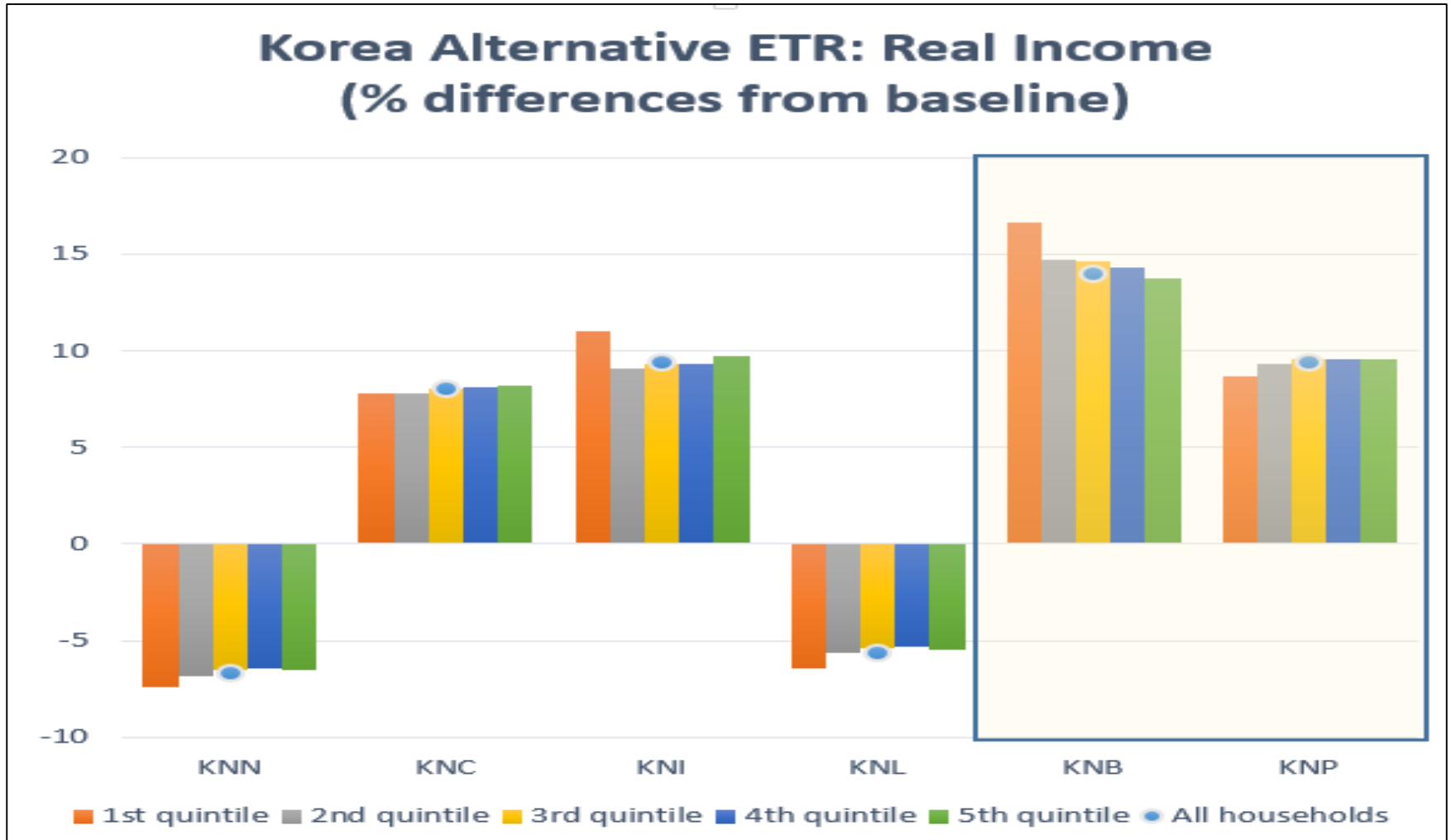
	from baseline (%)	2020		2030		2020		2030	
		JNB	JNP	JNB	JNP	KNB	KNP	KNB	KNP
RGDP	Real GDP	3.19	3.37	1.85	2.68	5.52	3.21	1.90	1.48
RCO2	CO₂ emission	-16.16	-16.02	-37.44	-37.88	-29.45	-30.96	-39.24	-39.93
REMP	Employment	0.62	0.77	0.55	0.83	0.97	1.84	-1.50	0.15
CR	Consumption	3.73	4.09	0.10	1.10	10.04	6.39	5.71	3.85
RSK	Investment	2.74	2.31	0.67	1.53	5.90	1.25	2.72	1.58
RSX	Export	0.77	0.59	0.11	0.42	-0.09	-0.14	0.21	0.10
RSM	Import	0.05	-0.33	-5.03	-4.47	1.28	0.03	2.19	0.93
RSG	Government consumption	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RWS	Nominal wage and salaries	6.62	3.82	1.76	5.61	17.76	1.68	14.06	4.19
RTCA	Carbon Tax Rate (USD/tCO₂)	387.3	387.3	458.4	458.4	540.9	540.9	640.3	640.3

Source: E3ME, Cambridge Econometricsより筆者作成

Japan Alternative ETR: Impact on Real Income 2020



Korea Alternative ETR: Impact on Real Income 2020



ETR Impacts on GDP and GINI Index Summary (2020)

Japan			Korea		
	GDP	GINI	GDP	GINI	
	% difference from baseline	percentage point difference	% difference from baseline	percentage point difference	
JNN	-1.25	0.16	-2.41	0.12	KNN
JNC	3.93	0.16	3.85	0.05	KNC
JNI	3.37	0.35	3.21	-0.11	KNI
JNL	-0.59	0.13	-2.01	0.13	KNL
JNB	3.19	0.03	5.52	-0.26	KNB
JNP	3.37	0.10	3.21	0.10	KNP

Source: E3ME, Cambridge Econometrics

政策含意

- 所得分配を考慮した税込還元
 - 消費税減免の後で、高いGDP成長
 - 実質所得: Benefit、一括税ともに増加
 - 消費税や所得税減税も増加。But, 所得の高いグループほど高くなる→格差拡大。
 - 所得格差指数(GINI): 日本ではBenefitケース、韓国では所得税減税ケースで最も小さい

※所得格差を全て是正できないが、一括還元よりbenefit支出を増やす還元で、所得格差を縮小可能
→所得配分への影響を考慮した税込還元策が必要

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