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INFLUENCES OF TRUMP'S ENERGY POLICY ON THE WORLD'S EFFORTS TO COMBAT CLIMATE CHANGE AND THEIR COSTS

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Background

Int'l Framework – from Kyoto to Paris

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Top-down

Bottom-up

1997 2008 2012 2015 2020

Agreement on "Kyoto Protocol"

1st CP

2nd CP

- ✓ Limited coverage of emitters
- ✓ Withdrawal of the U.S.
- ✓ Mandatory target

2013 - 2020
Reduction according to voluntary targets

Negotiation on "post-Kyoto"

Paris Agreement

st al

We are getting out!
1st June, 2017

Reactions and forecasts

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No/Little influences	Some extent of influences
Major emitters - Europe, China, India still "support the Paris Agreement"	
Businesses - US companies "WE ARE STILL IN" – efforts to reduce emissions without the leadership of gov't - Electric utilities: no plan of building new coal power plants	- Delay in R&D due to budget cut - Electric utilities: extension of lifetime of coal fired power plants
Research etc. - Market works out rather than carbon – gas is more competitive than coal	- EIA: coal consumption increases without the regulation such as the Clean Power Plan (CPP)

Purposes of research

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Considering the significance of the U.S. both as energy producer and consumer,

- To look into the details of how each major emitter is influenced by the U.S. withdrawal, through changes in energy prices and costs of emissions reduction
- To draw implications on whether other countries would pursue reduction as they stated

Based on quantitative analysis using a CGE model on direct and indirect economic effects of the U.S. withdrawal

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Methodology

CGE model and scenarios

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- GTAP-E (Version 6-pre2 (2007))
  - Energy and environmental version of GTAP (Global Trade Analysis Project) model developed by Purdue Univ.
  - CO2 emissions from fossil fuel combustion
  - Substitution: interfuel (coal, oil, gas, oil products), capital-energy
  - Database: 2011

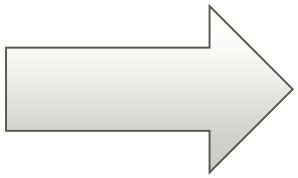
- Scenarios
  1. Paris Agreement: All the countries have targets and achieve them
  2. US withdrawal: Same as 1 but without reduction by US
  3. Coal phase-out: Same as 2 + Canada, UK, and France eliminate coal as input of electricity

Modification of figures

- Database Update：2011→ 2030
  - Population: Forecast by the World Bank
  - Labor: 15-64 year-old population forecast by the World Bank
  - Capital: Capital formation annual growth forecast by the World Bank

- Recalculation of NDCs (Nationally Determined Contributions)

Country	Base year	Target
US	2005	-26-28%
China	2005	-60-65%/GDP
India	2005	-33-35%/GDP
Japan	2013	-26%
EU	1990	-40%
…		



- Reduction from 2030 baseline
- Excluding reduction from land use

Country	Target
US	-16%
China	-23%
India	-8%
Japan	-26%
EU	-42%
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Results

Scenario 1: Evaluation of Reduction Target

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- Real carbon tax (USD) required to achieve targets

USA	MEX	CAN	CHN	JPN	KOR	IND	RUS	BRA	AUS	DEU	GBR	FRA
28	9	47	14	144	33	2	5	88	188	234	252	442

- Change in real GDP (%)

USA	MEX	CAN	CHN	JPN	KOR	IND	RUS	BRA	AUS	DEU	GBR	FRA
-0.13	-0.21	-0.25	-0.29	-0.81	-0.1	0.06	-0.98	-0.17	-1.07	-1.02	-1.58	-2.16

- US target
  - Relatively lenient target among developed countries and compared with some emerging economies

Scenario 1: Breakdown of GDP changes

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- Decrease in imports – drop in production depresses firms' demand for intermediate goods
- Import of fuels increases in countries with low reduction targets – rise in domestic price is relatively higher than imported one
- Energy exporting countries reduce their export of fossil fuels and increase that of manufactured goods due to a very low carbon tax
- Consumption drops a lot in countries with high carbon tax as well as those with a very low carbon tax

Scenario 2: Changes in reduction costs and GDP

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- Real Carbon Tax
  - Negative change in all the countries but the extent is small (<$1)
  - Caused by fossil fuel price rise in the US, which slightly lessens the need to impose a cost on fossil fuel consumption
  - $2-4 drop in those countries with stringent reduction target

USA	MEX	CAN	CHN	JPN	KOR	IND	RUS	BRA	AUS
-28.10	-0.43	-1.32	-0.05	-1.74	-0.69	-0.00	-0.38	-1.33	-0.77

DEU	GBR	FRA
-2.07	-2.00	-3.82

- GDP
  - less than positive or minus 0.01% in most of the countries

Scenario 2: Regional characteristics

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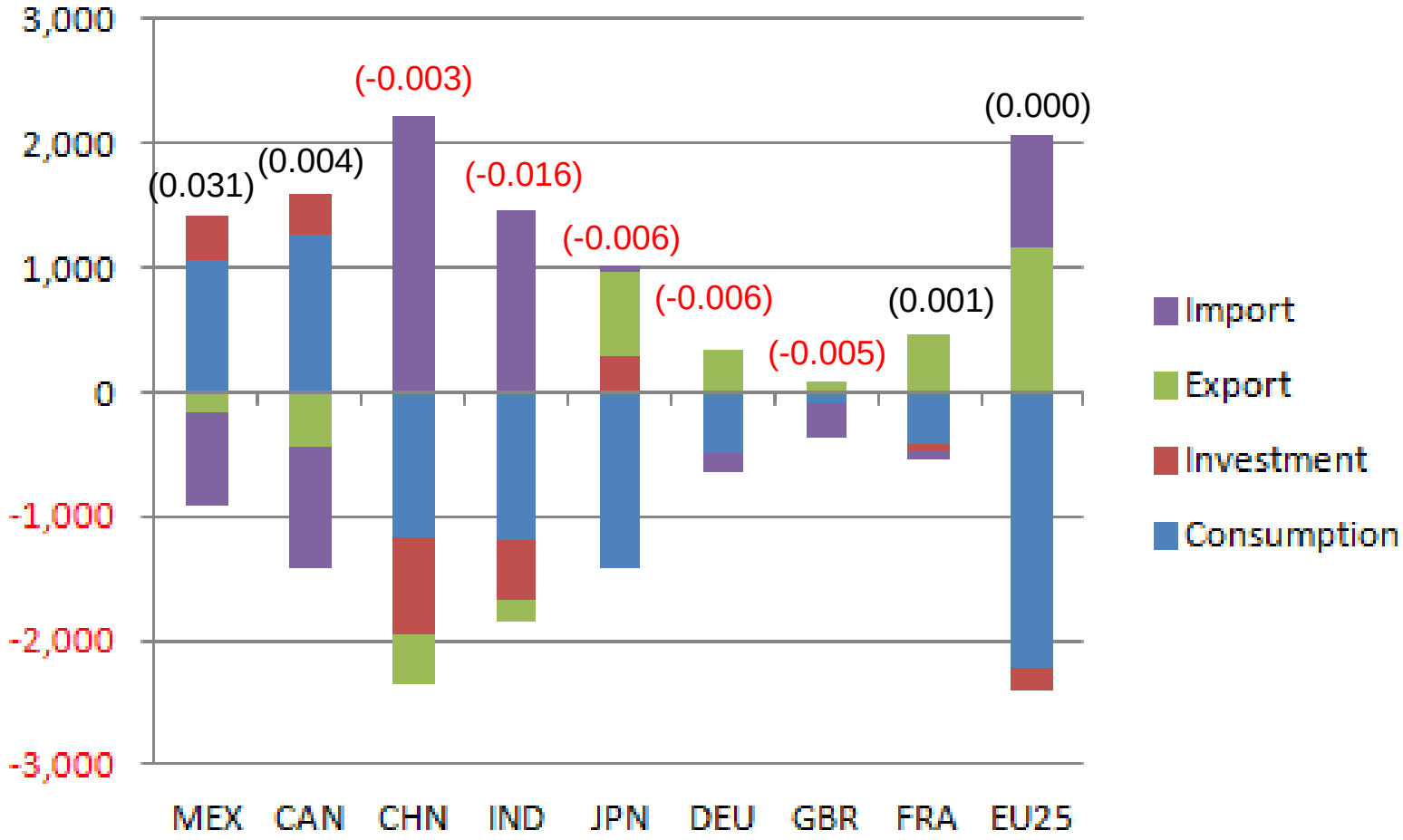
- Breakdown of changes in real GDP

(Million USD)



* Numbers in brackets indicate percentage change in real GDP from Scenario 1 to 2.

Scenario 2: Changes in the US

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- CO2 emissions
  - 2% increase compared to Scenario 1 in addition to unachieved reduction target
  - Fall in fossil fuel prices in other countries expands the US demand for imported fossil fuels
  - Demand for oil products particularly increases

- GDP
  - Recover the loss in Scenario 1 + 0.02% increase
  - Increase in export but loss of competitiveness as an energy exporter

Scenario 3: Coal phase-out

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- Changes in real GDP (%)

USA	MEX	CAN	CHN	JPN	KOR	IND	RUS	BRA	AUS
0.004	0.001	-4.163	0.002	0.004	-0.006	0.001	0.031	0.000	-0.002

DEU	GBR	FRA
-0.016	-4.376	-1.754

- Market price of electricity
  - Canada: 386%, UK: 609%, France: 128%
  - Substitution of coal with other fossil fuels for power generation
  - Smaller price rise In France due to less dependency on coal

- Real carbon tax
  - Significant drop in coal phase-out countries (Canada: $25, UK: $130, France: $36) but slight increase in other countries

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Conclusion

Conclusion and way forward

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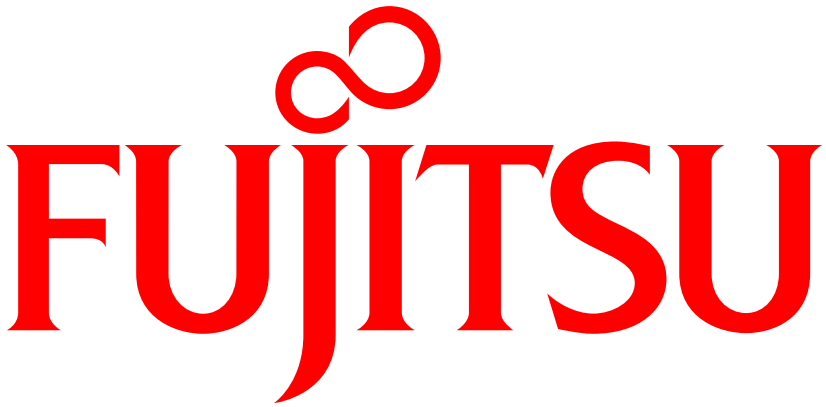
- Conclusion
  - US target is not a very stringent one
  - US withdrawal does not significantly change major emitter's costs to reduce emissions
  - More important for the Paris Agreement: whether major emitters can keep track on achieving its reduction target, rather than whether the US gets back
  - US loses competitiveness as energy exporter if it withdraws
  - Coal phase-out brings about significant loss in implementing countries but little impacts on others including the US

- Way forward
  - Analysis by a dynamic CGE model
  - Consideration of rapid changes in how energy is supplied



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