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U.S.-Asia trade: dynamic general equilibrium linkages

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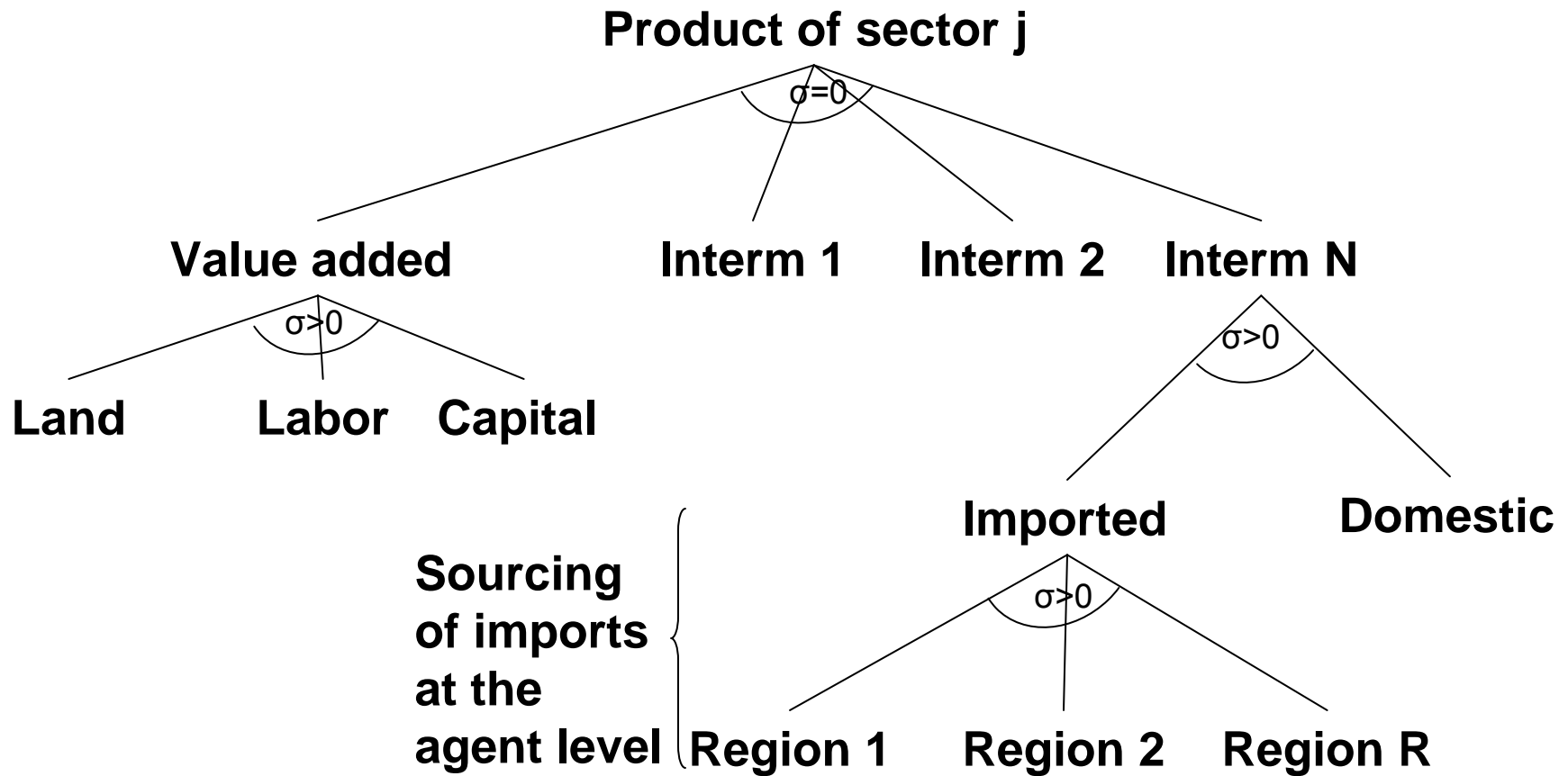
Overview

- A global database: Zhi Wang, Mark Gehlhar, 2012, “How a Global Inter-Country Input-Output Table with Processing Trade Account Can be constructed from GTAP Database”
- A dynamic global trade computable general equilibrium (CGE) model to fit this global database
- Simulations of several hypothetical developments in U.S.-Asia trade

Dynamic CGE Model

- Dynamic CGE simulation model has two parts
- First part is a comparative-static CGE model simulating changes within a given year
 - Perfect competition, constant returns to scale
 - Single-output firms minimize costs subject to production function
 - Households maximize utility subject to budget constraint
 - Labor and capital are region specific, mobile across sectors, fully employed
 - International trade: products differentiated by region of origin, at the agent level
- Second part provides inter-temporal linkages and simulates changes between years
- Linearized model implemented in GEMPACK software (CoPS, Monash University)

This AGE model
Sourcing of imports at the agent level



Intertemporal linkages in the CGE model

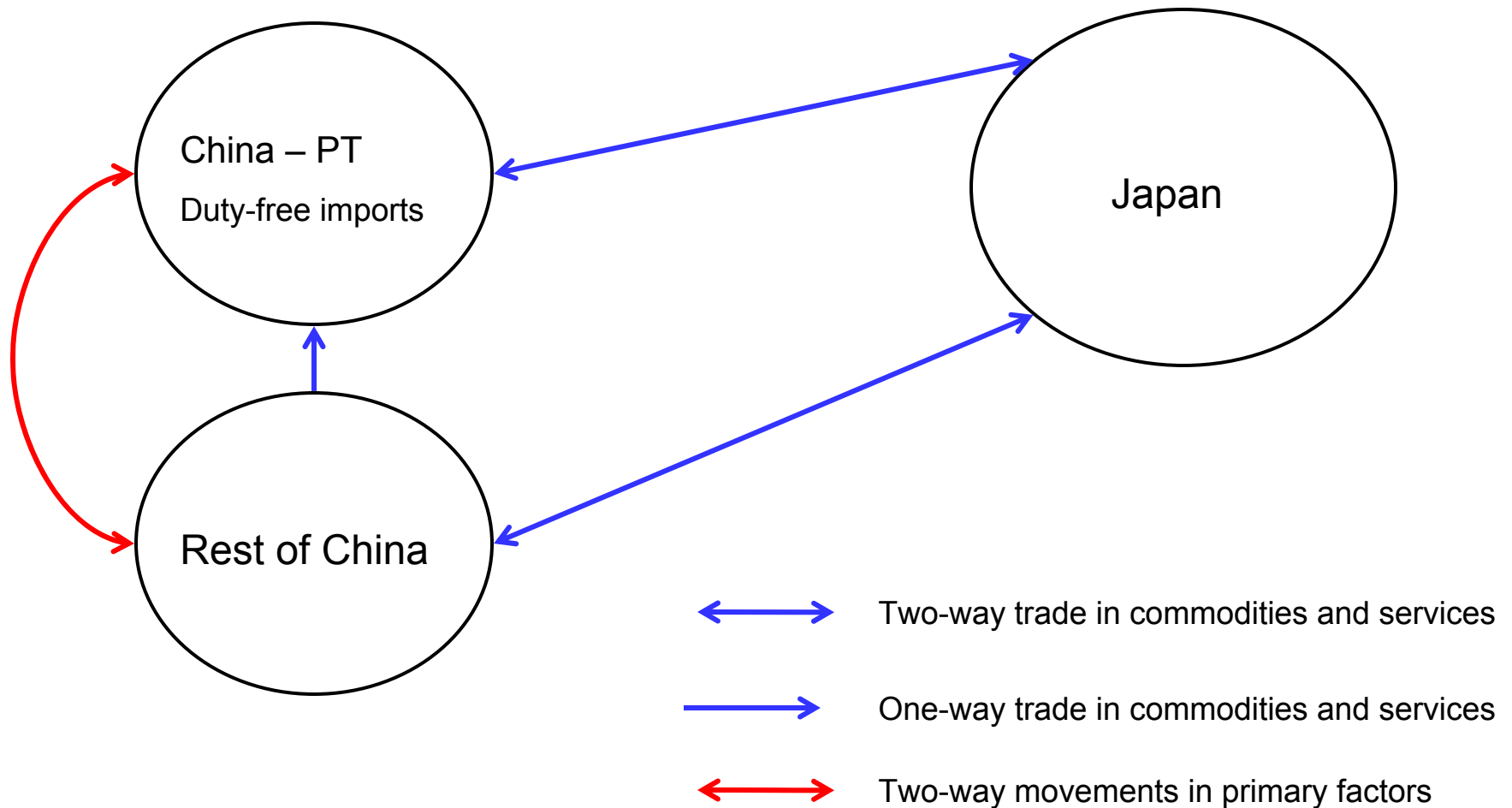
- To simulate changes between years t and $t+1$, CGE model incorporates physical capital accumulation for the economy as a whole:
- $K_{r,t+1} = (1 - D_r) \times K_{r,t} + I_{r,t}$
- $K_{r,t}$ is the quantity of capital available for use in region r during year t ;
- $I_{r,t}$ is the quantity of new capital created in region r during year t ; and
- D_r is the rate of capital depreciation in economy r

Database has 26 Economies or Aggregate Regions

CHINA, MEXICO have Processing Trade (PT) components

-
- 1 Australia and New Zealand
 - 2 China
 - China - processing trade*
 - Rest of China*
 - 3 European Union - 12
 - 4 European Union - 15
 - 5 Hong Kong
 - 6 Indonesia
 - 7 Malaysia
 - 8 Philippines
 - 9 Singapore
 - 10 Thailand
 - 11 Taiwan
 - 12 Vietnam
 - 13 India
 - 14 Japan
 - 15 Korea
 - 16 Canada
 - 17 USA
 - 18 Mexico
 - Mexico - processing trade*
 - Rest of Mexico*
 - 19 Russia Federation
 - 20 Brazil
 - 21 Rest of East Asia
 - 22 Rest of Asia
 - 23 Rest of South America
 - 24 South Africa
 - 25 Rest of High Income
 - 26 Rest of the world
-

Processing Trade Linkages



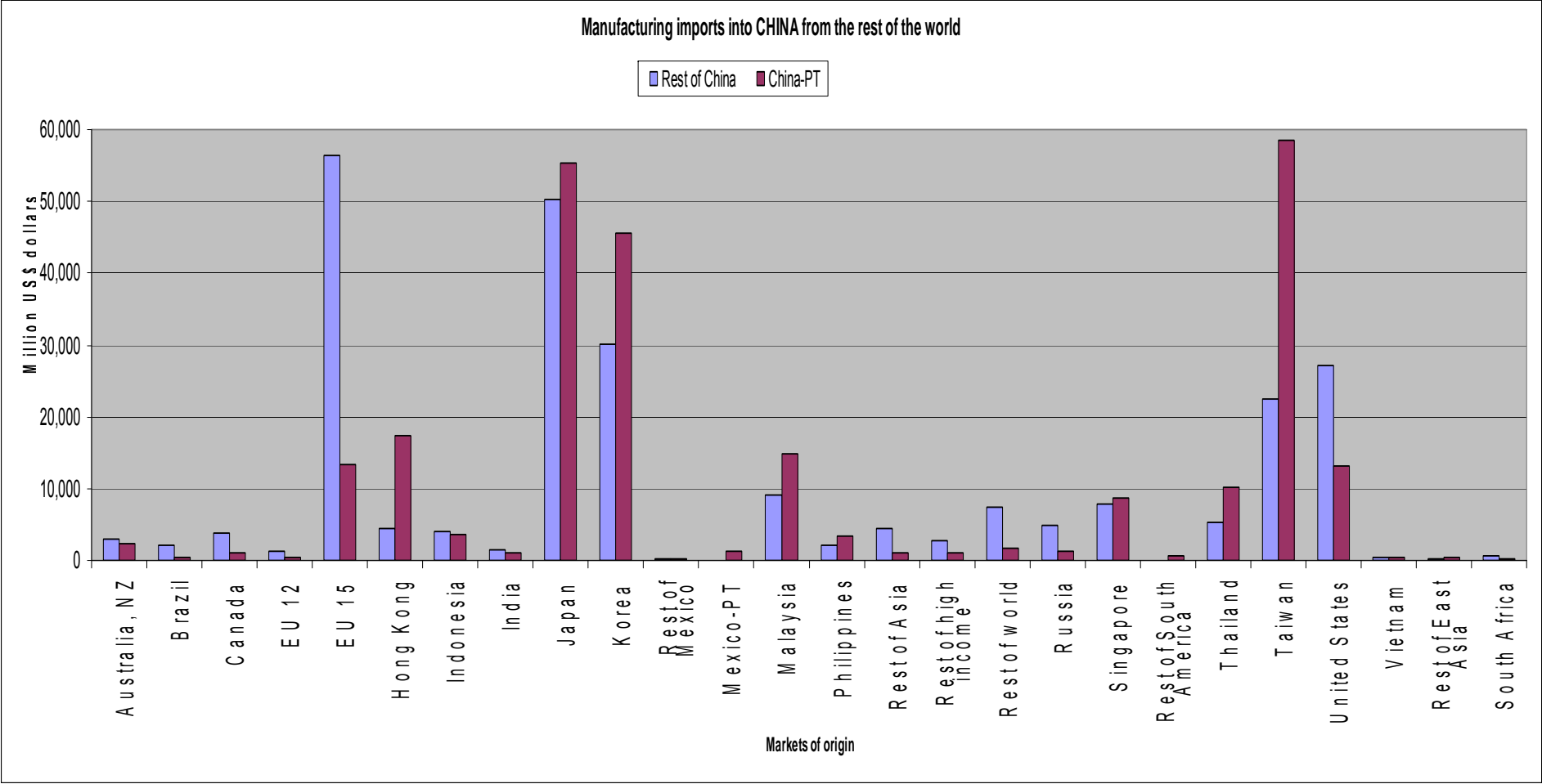
Database has 41 Sectors

Processing Trade has 19 Manufacturing Sectors

Agriculture, Natural Resource-based	Manufacturing	Services
1 Crops	8 Meat and dairy products	27 Electricity
2 Liv estock	9 Other foods	28 Gas manufacture, distribution
3 Forestry	10 Beverages and tobacco products	29 Water
4 Fishing	11 Textiles	30 Construction
5 Coal	12 Wearing apparel	31 Trade
6 Oil and gas	13 Leather products	32 Transport nec
7 Minerals nec	14 Wood products	33 Water transport
	15 Paper products, publishing	34 Air transport
	16 Petroleum, coal products	35 Communication
	17 Chemical, rubber, plastic products	36 Financial services nec
	18 Mineral products nec	37 Insurance
	19 Ferrous metals	38 Business services nec
	20 Metals nec	39 Recreational and other services
	21 Metal products	40 Public Admin., Defense, Educ., Health
	22 Motor vehicles and parts	41 Dwellings
	23 Transport equipment nec	
	24 Electronic equipment	
	25 Machinery and equipment nec	
	26 Manufactures nec	

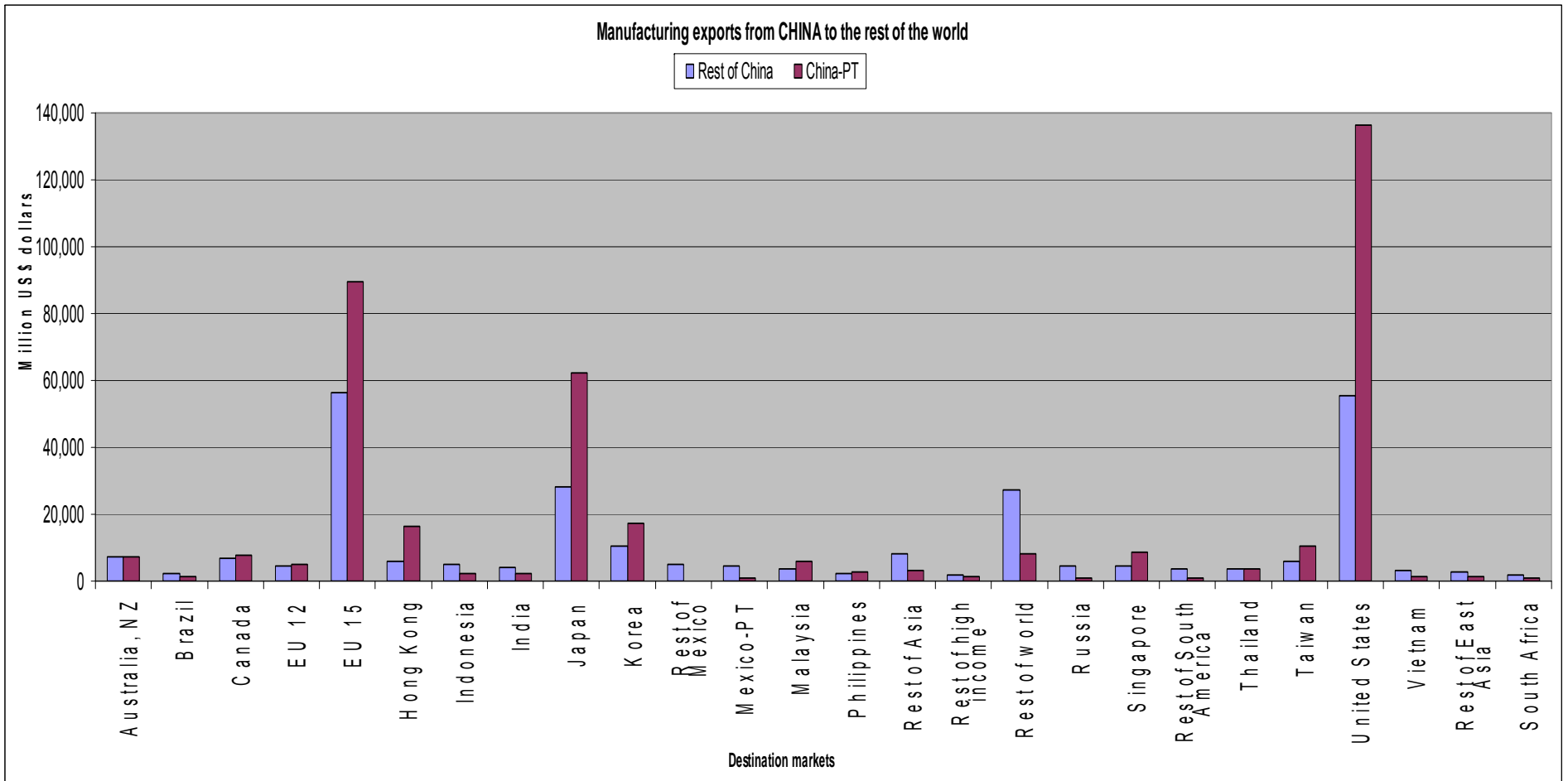
CHINA manufacturing imports

PT imports have different sourcing patterns



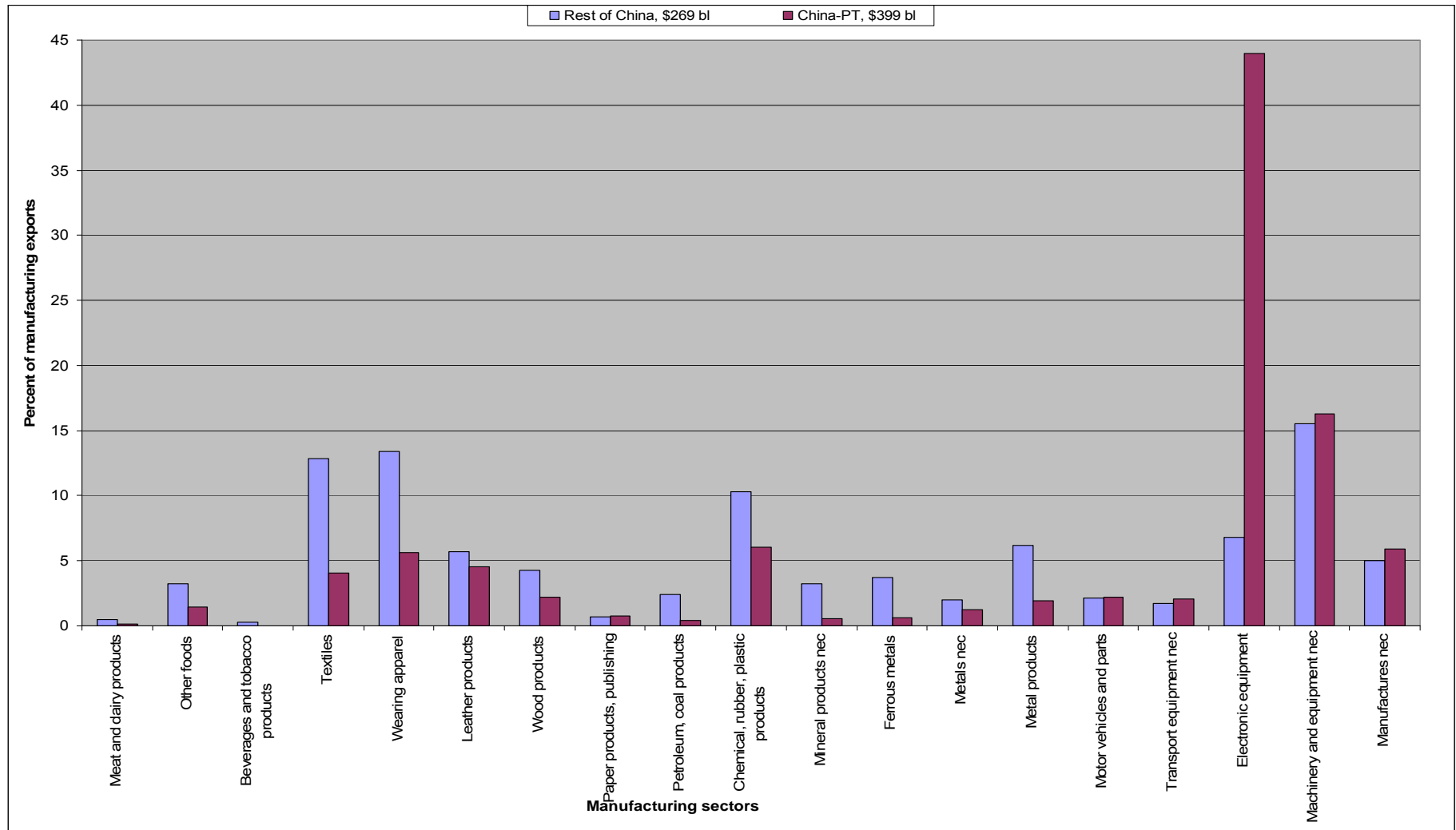
CHINA manufacturing exports

PT exports have different destination patterns



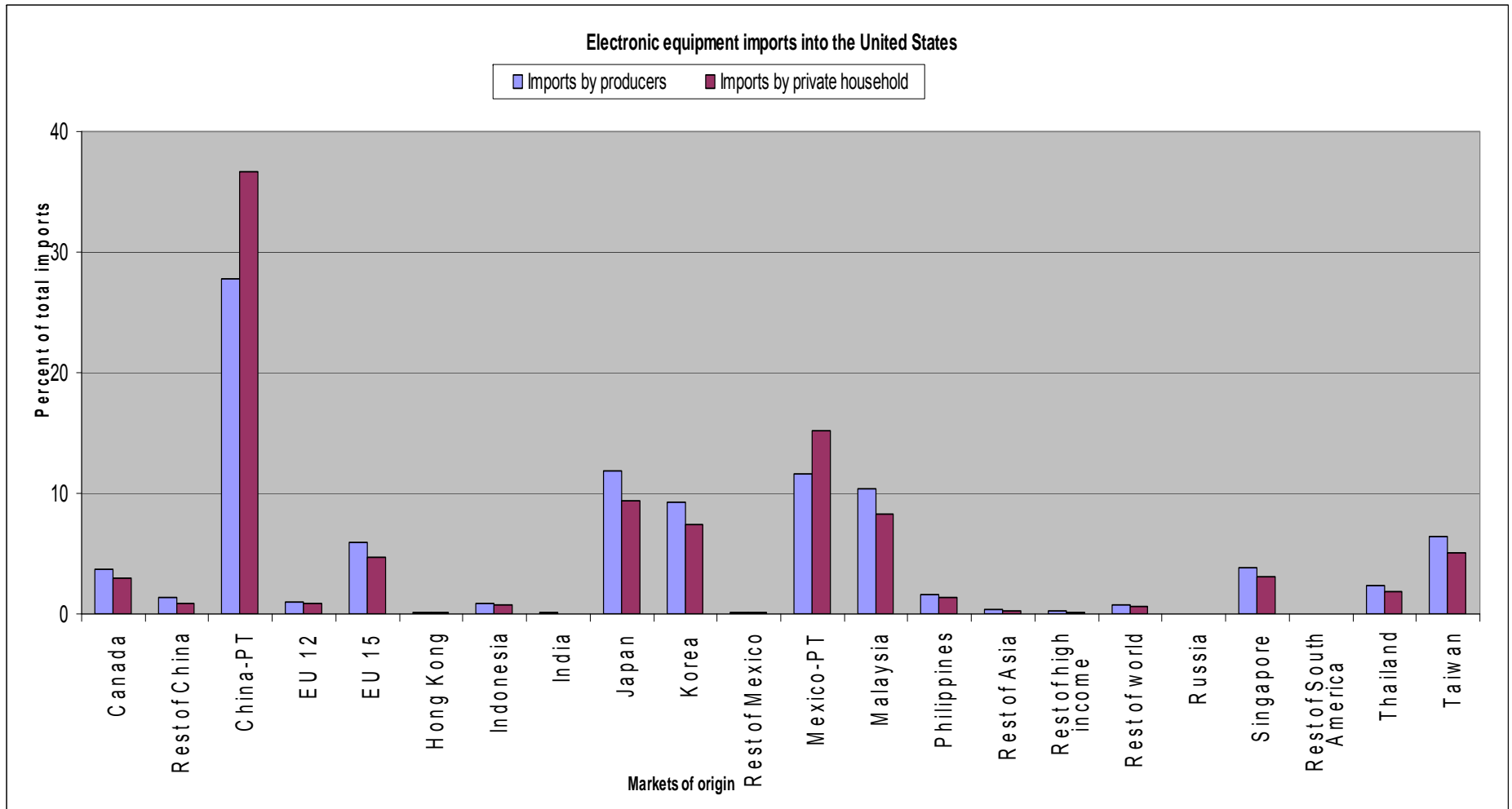
CHINA manufacturing exports to the rest of the world

PT exports are concentrated in electronic equipment



U.S. sourcing of electronic equipment imports

Producers' sourcing is different from consumers'

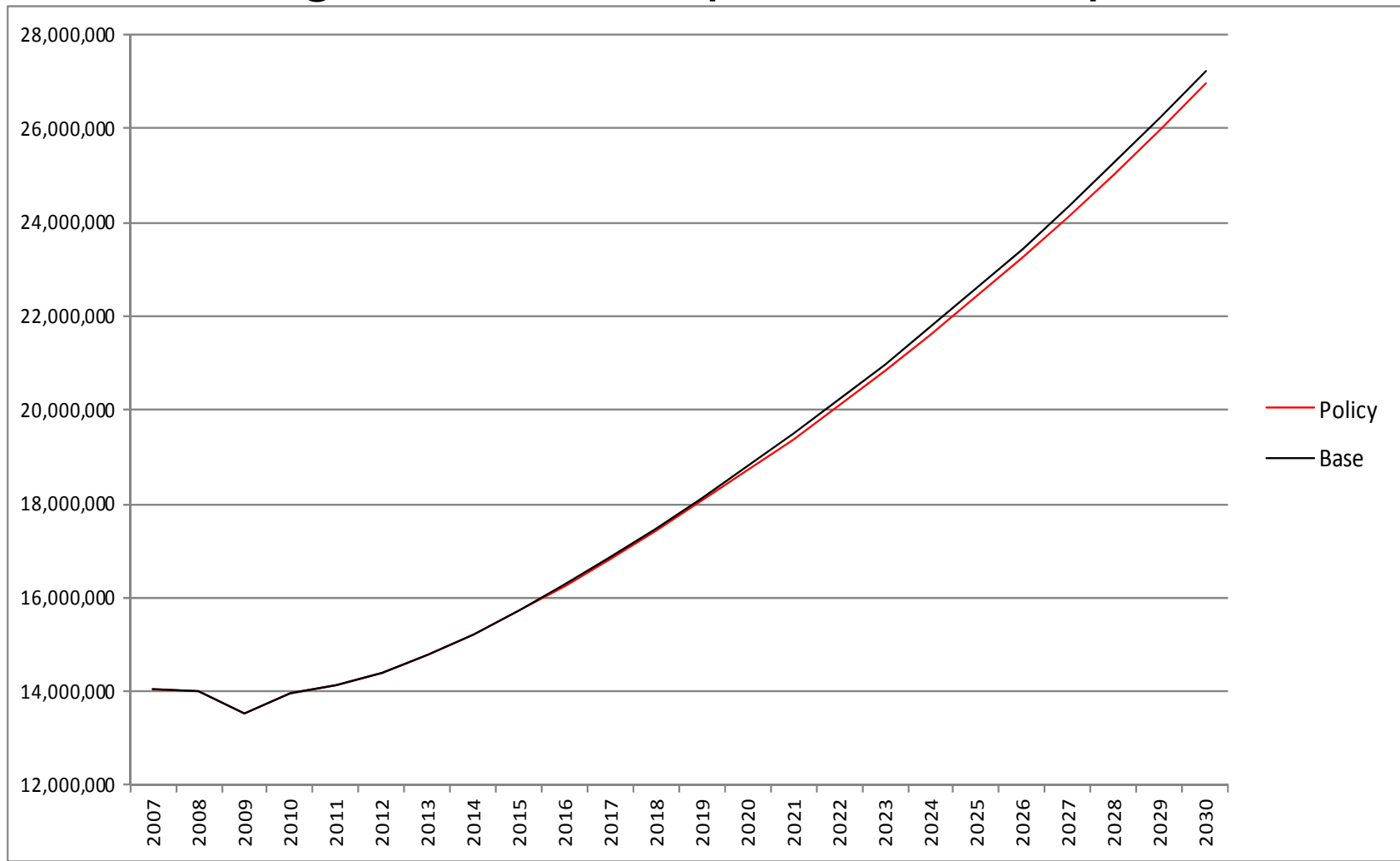


Three “policy” scenarios are simulated against the baseline

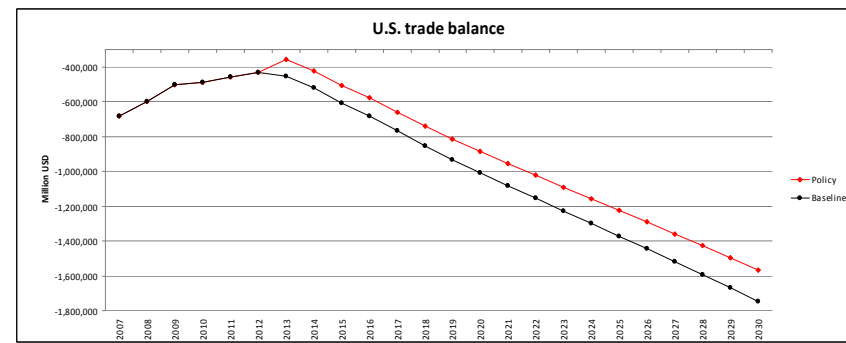
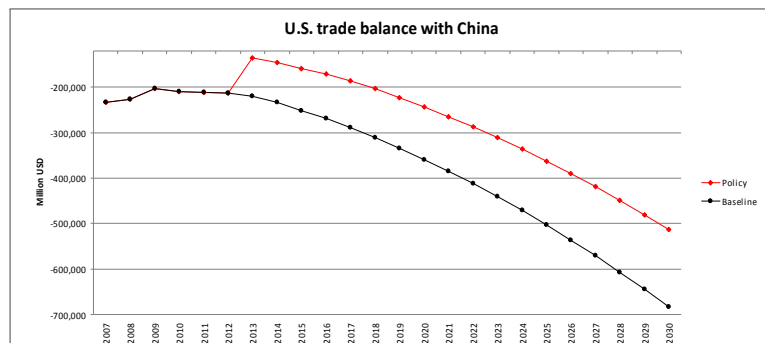
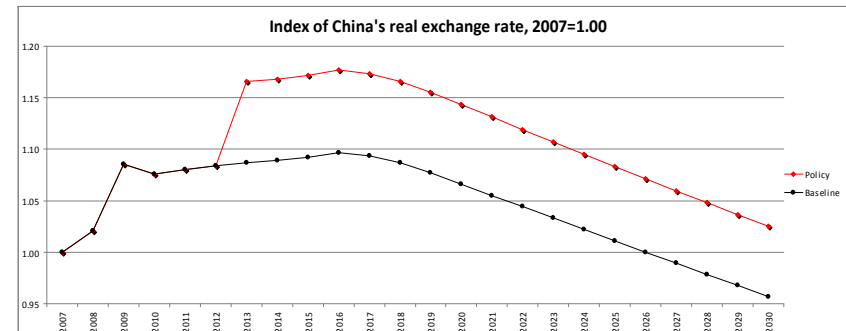
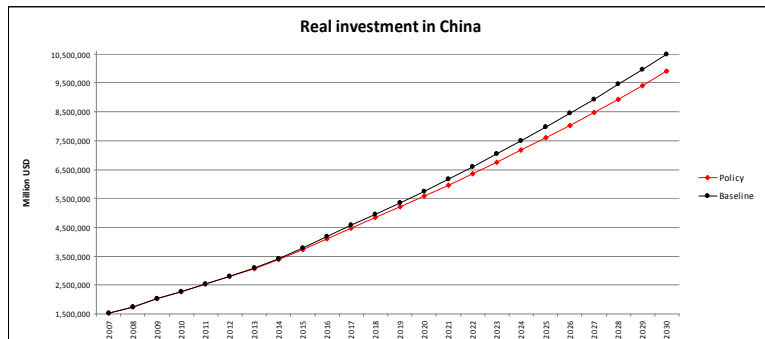
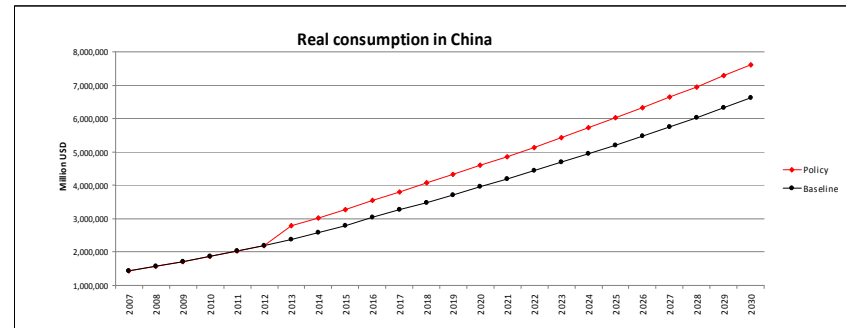
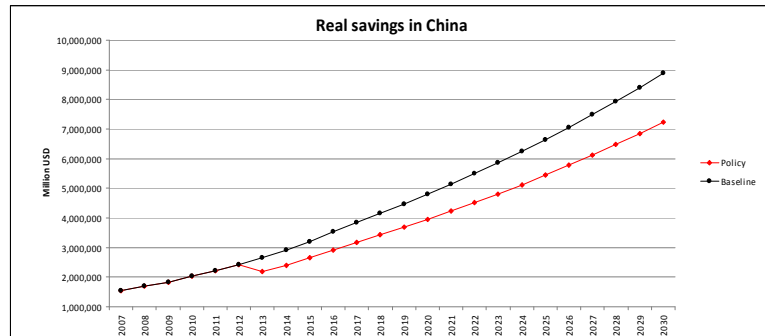
- (1) the national saving rate in China declines from 44 percent to 36 percent
- (2) the national saving rate in the United States increases from 5.6 percent to 7.2 percent
- (3) productivity improvements in unskilled labor employed in selected industries/economies

Baseline v. policy

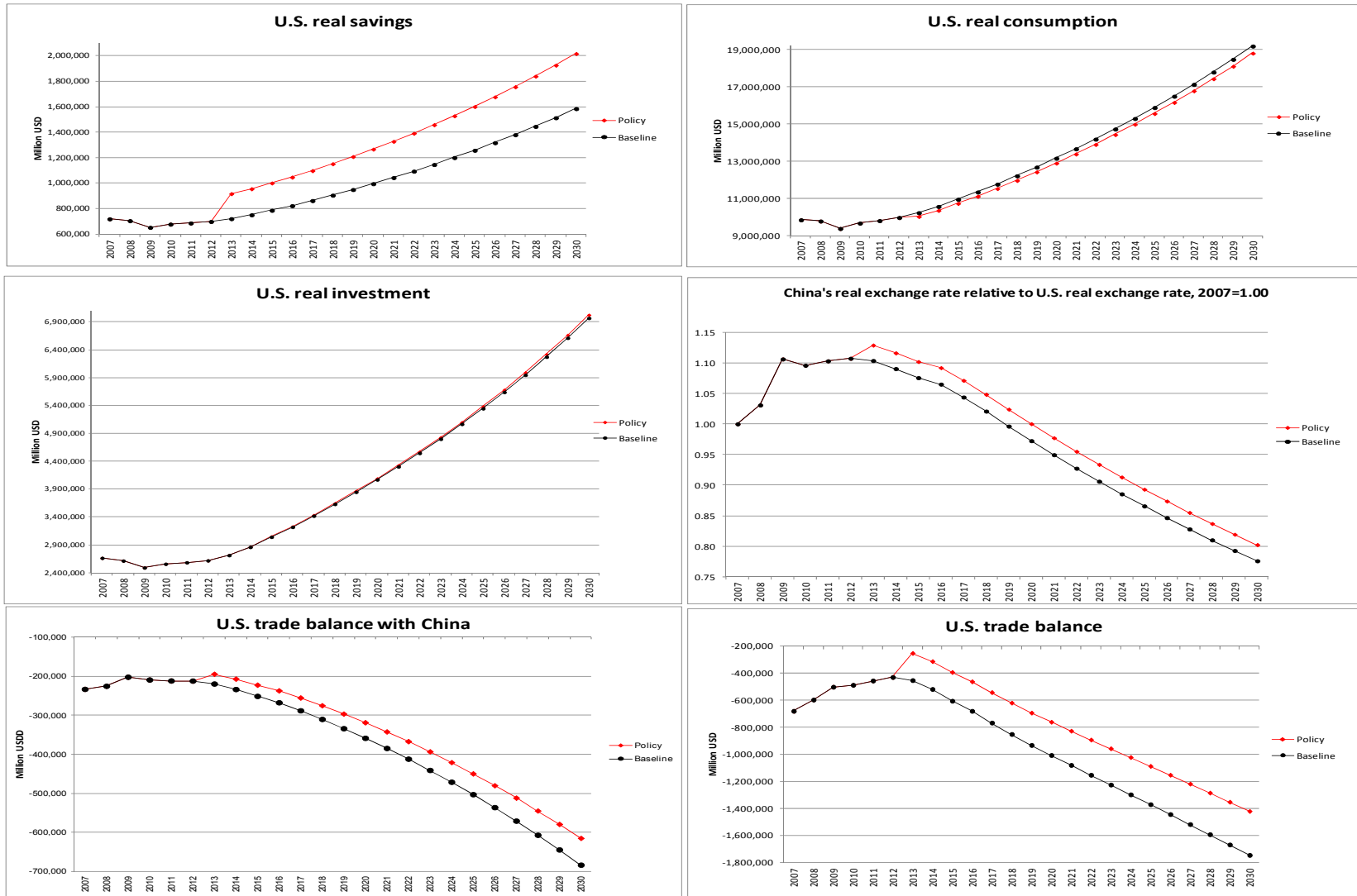
U.S. real GDP effect from a decline in China's saving rate from 44 percent to 36 percent



Selected simulated effects from a decline in China's saving rate from 44 percent to 36 percent



Selected simulated results from a decline in the U.S. saving rate from 5.6 percent to 7.2 percent

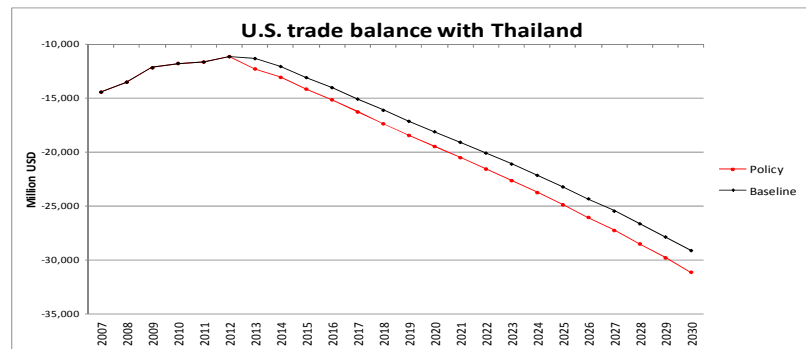
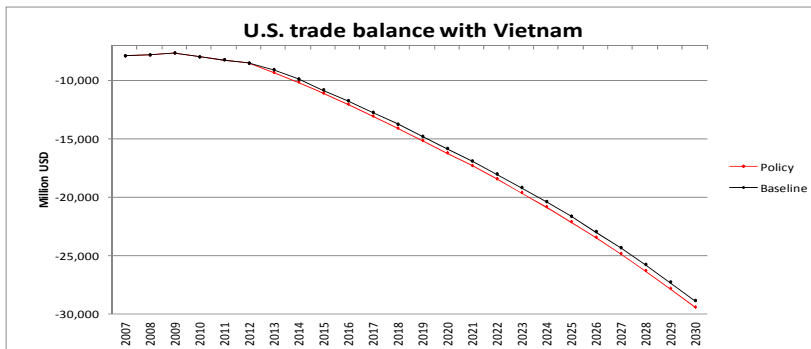
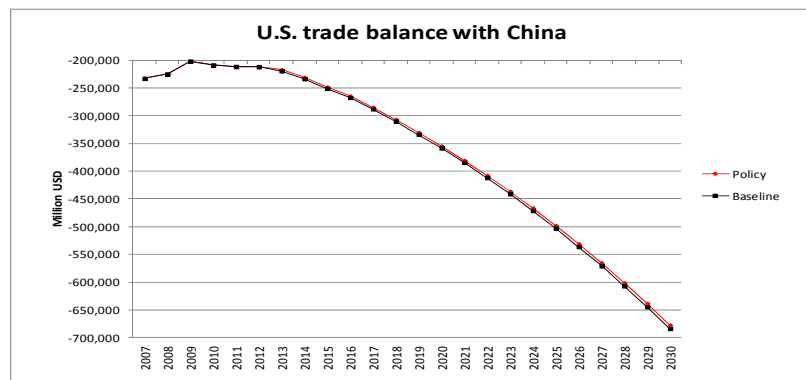
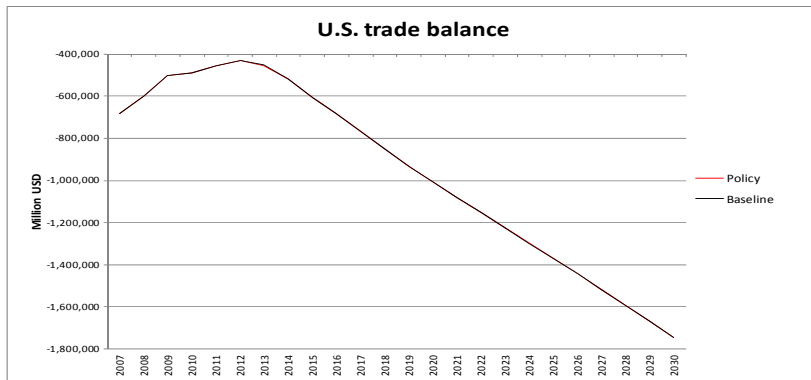
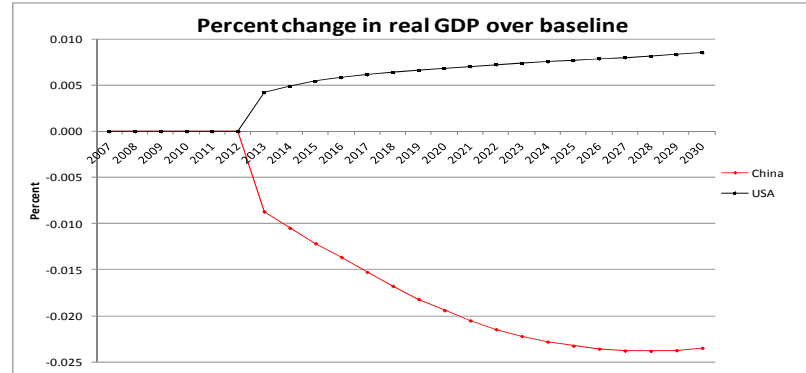
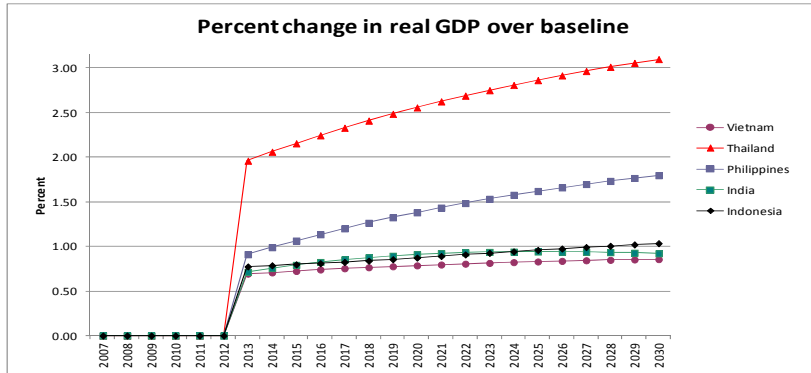


Scenario 3: productivity improvements in unskilled labor employed in selected industries/economies

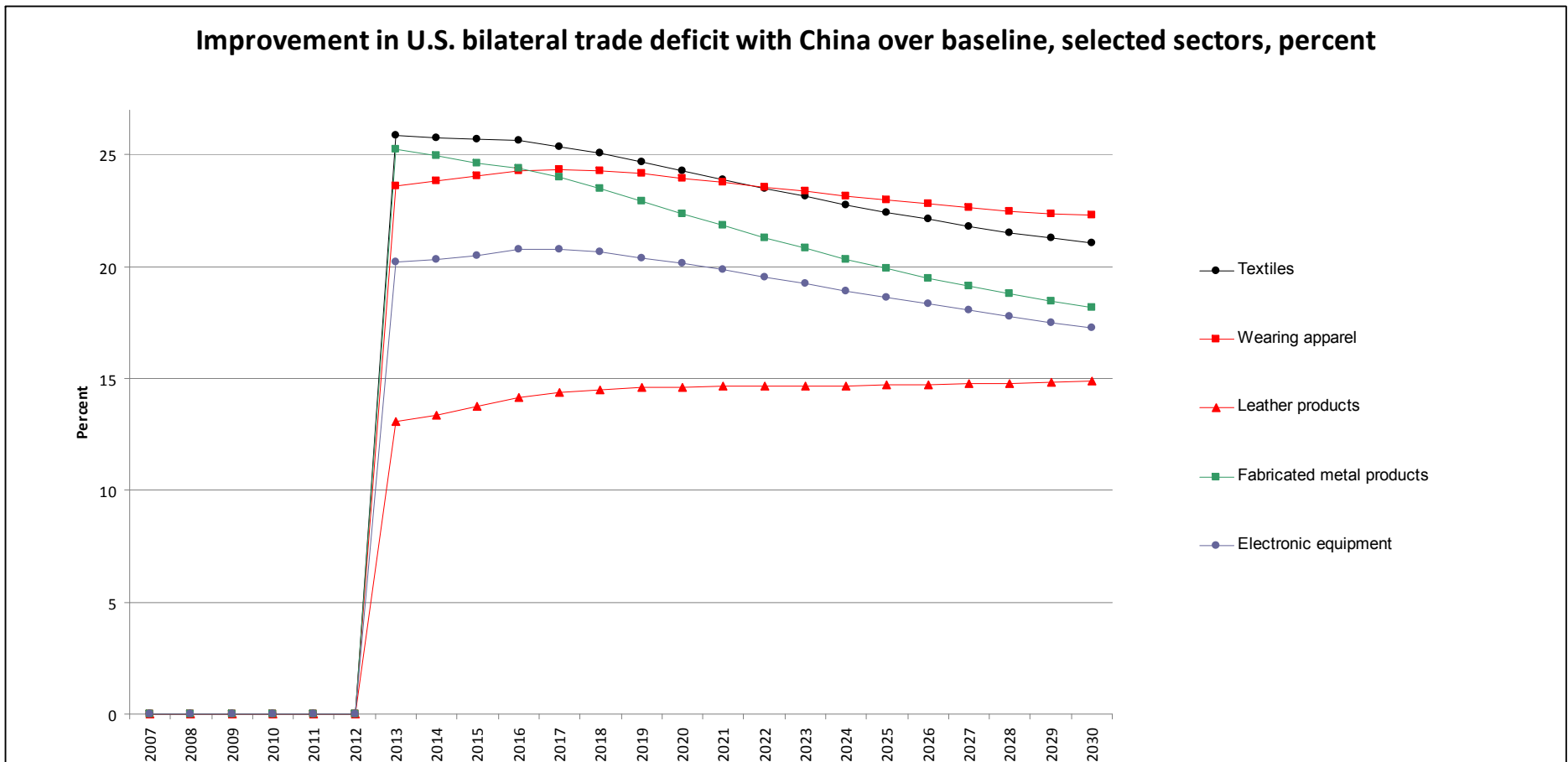
Sectors/economies with simulated improvement in unskilled labor productivity in

		Economies					
		Indonesia	India	Malaysia	Philippines	Thailand	Vietnam
Sectors	Textiles	x	x			x	
	Wearing apparel	x	x			x	x
	Leather products	x	x			x	x
	Wood products	x	x			x	x
	Motor vehicles and parts					x	
	Electronic equipment			x	x	x	
	Manufactures nec	x	x	x		x	x

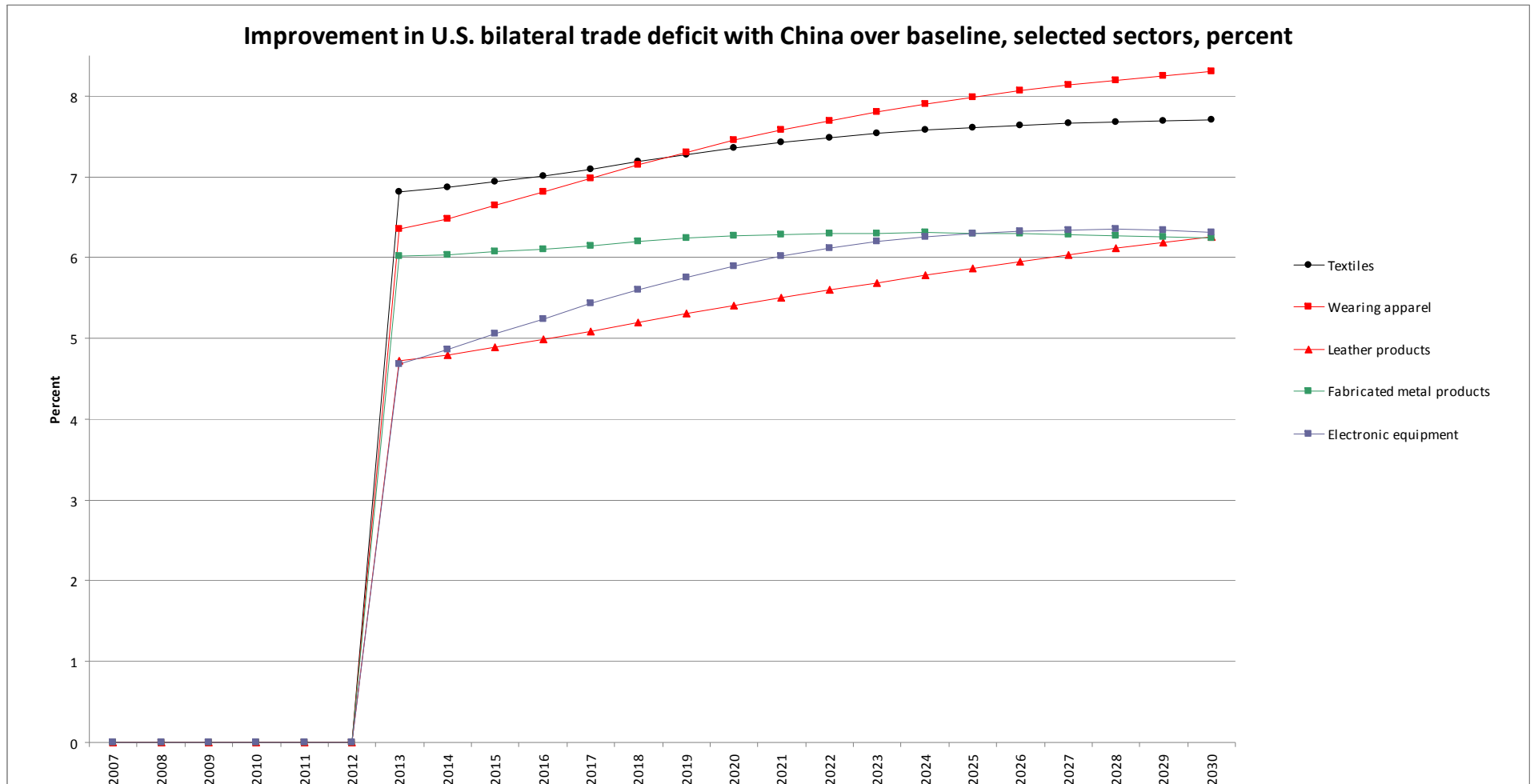
Selected simulated results from a 50 percent productivity improvement from the employment of unskilled labor in selected sectors/countries



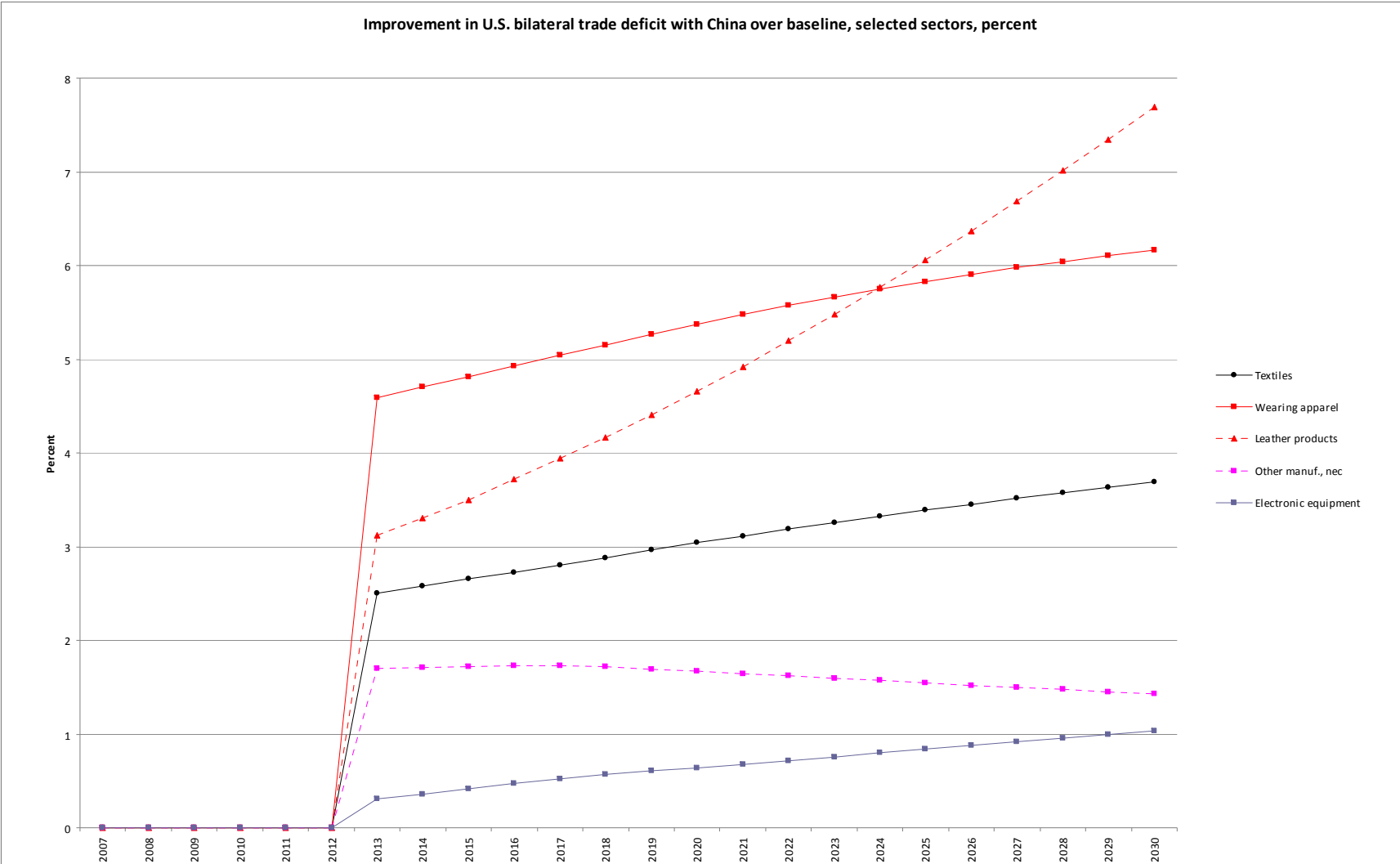
Selected simulated effects from a decline in China's saving rate from 44 percent to 36 percent



Selected simulated results from a decline in the U.S. saving rate from 5.6 percent to 7.2 percent



Selected simulated results from a 50 percent productivity improvement from the employment of unskilled labor in selected sectors/countries



Thank you!