

Trade-led Growth in Times of Crisis  
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**Session 3**

Trade and Sectoral Impacts of the Financial Crisis: A  
Dynamic CGE Analysis

**Anna Strutt & Terrie Walmsley**

# Trade and Sectoral Impacts of the Financial Crisis: A Dynamic CGE Analysis

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# Introduction

- The Global Financial Crisis (GFC)
  - Led to a significant downturn in the global economy
  - Impacts felt throughout the world
- Recent signs that the worst may be over
  - But the global economy remains fragile with many uncertainties
- We explore the effects of the GFC using a dynamic global CGE model
  - Particular focus on trade and sectoral impacts

# Overview

- Model and baseline
  - Data and calibration
  - Baseline projection
- Simulations
  - Calibration simulation
  - Three alternative scenarios representing different policy responses and severity of the crisis
- Tentative results

# Model

- We use GDyn: a dynamic global CGE model
  - Maintains many features of the GTAP model
  - Also tracks foreign ownership of capital and investment behaviour, including errors in expectations
  - We can model consecutive periods of the crisis
  - We can also track the time path of adjustment for each country/region
- Modified for our purposes e.g.
  - Inclusion of unemployment
  - Incorporation of extensive historical data
- First job is to get an appropriate baseline

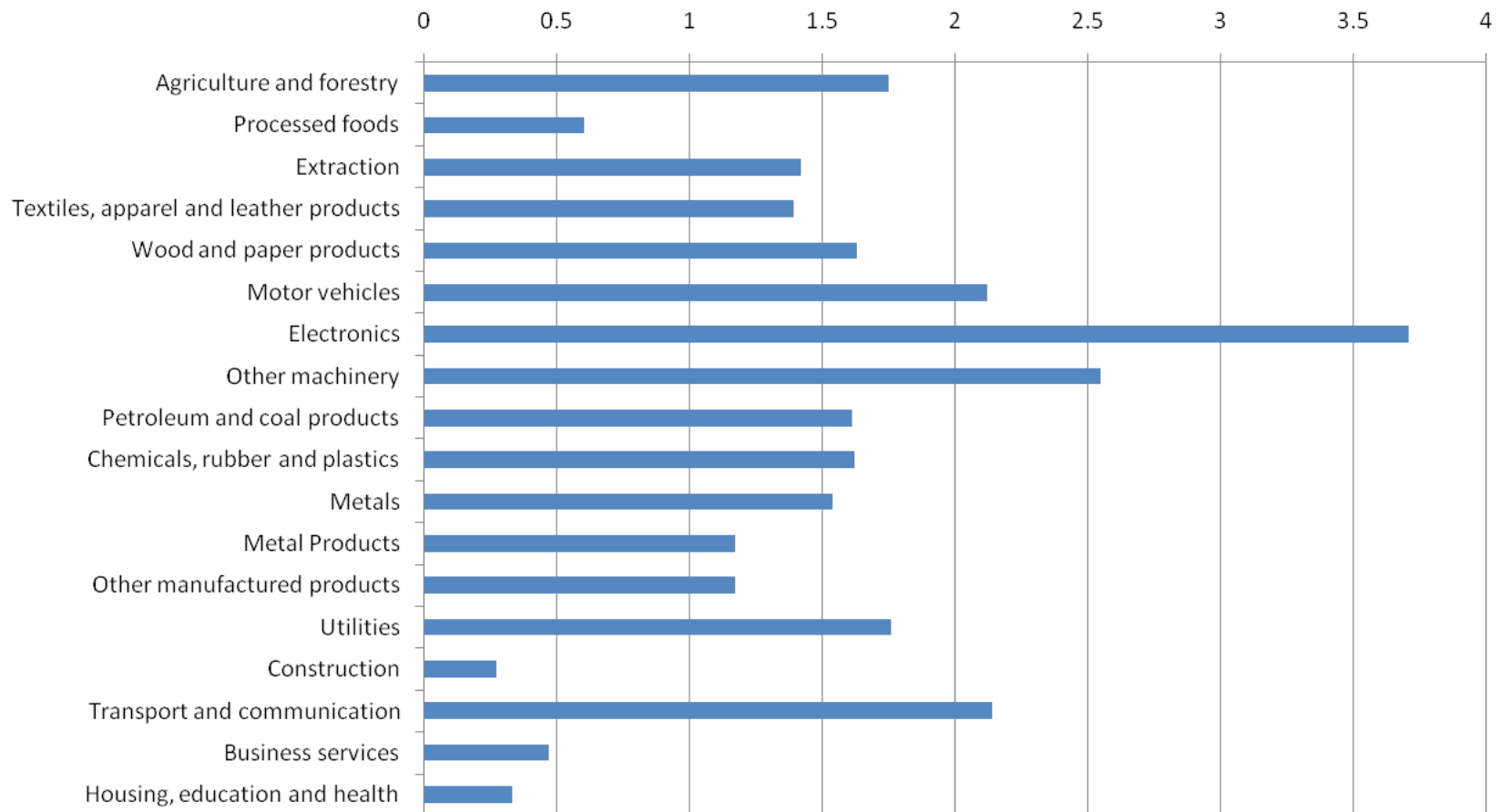
# Baseline

- Baseline represents how the global economy might look in the absence of the crisis
  - An important but very challenging task
- Previous approaches have focused on
  1. Projections for a few key macro variables (Walmsley 2006)
  2. A series of simulations covering historical, decomposition and forecasting (Dixon and Rimmer, single country models)
    - We use a combination of these approaches

# Data sources

- GTAP/GDyn version 6 and version 7 databases
  - Benchmark year of 2001/2004
  - Aggregated to 27 sectors and 29 countries/regions
- Supplementary data collated
  - Extensive historical data
  - Macro projections of the GFC impact
  - Estimates of sectoral productivity growth

# Estimated sectoral productivity growth differentials

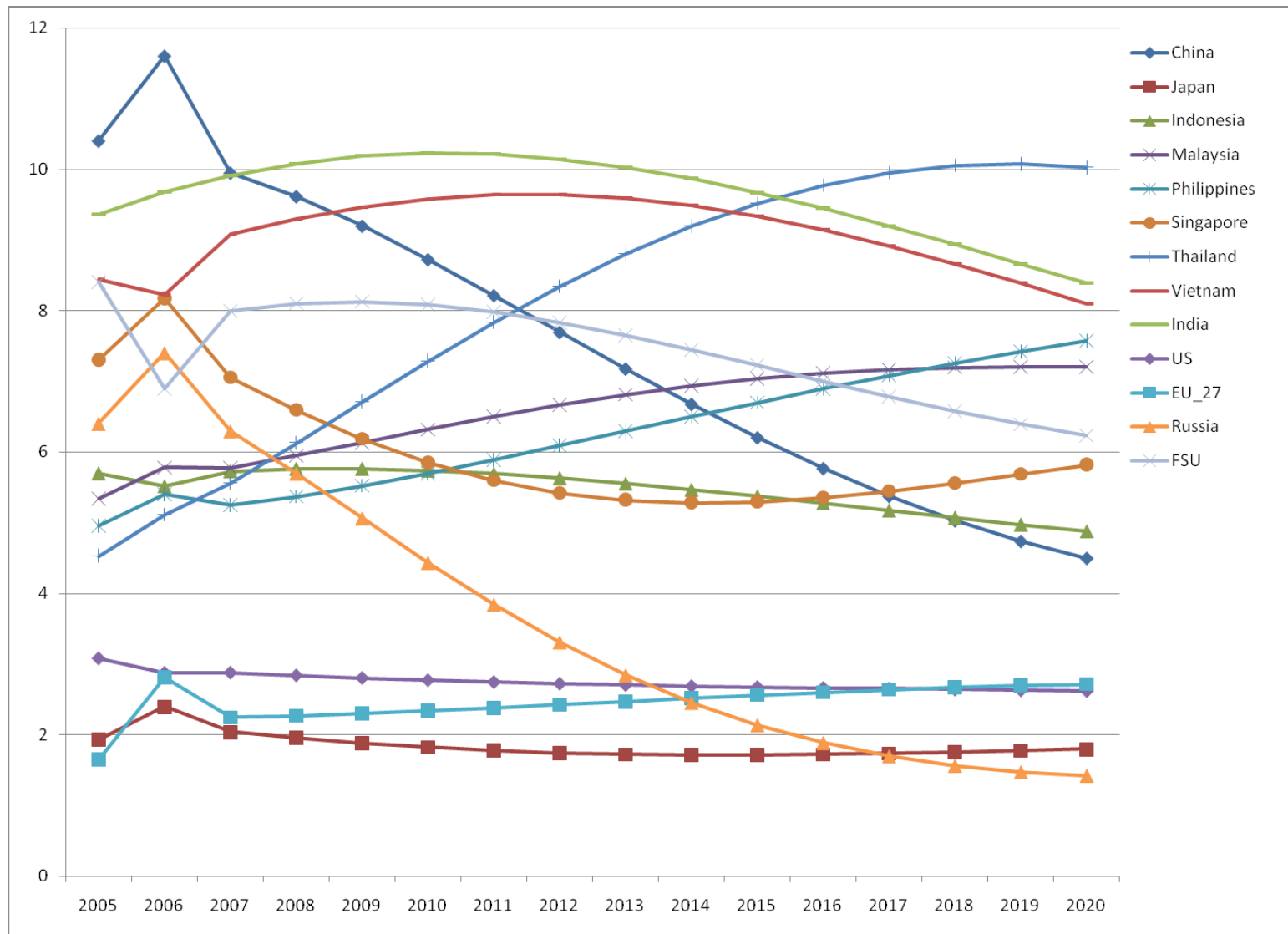




# Historical simulation

- Historical period was simulated, with data on the following used as an input to the modelling:
  - Real GDP; population; skilled and unskilled labour; employment of land and unskilled labour; investment; consumption and government spending; foreign income payments
- Data were used to generate trends, some of which we assume continue in the 2020 baseline
- Data were also used calibrate errors in expectation and economy-wide technological change over time
  - Sectoral productivity differentials also estimated

# Baseline annual GDP growth (%)



# Crisis Scenarios

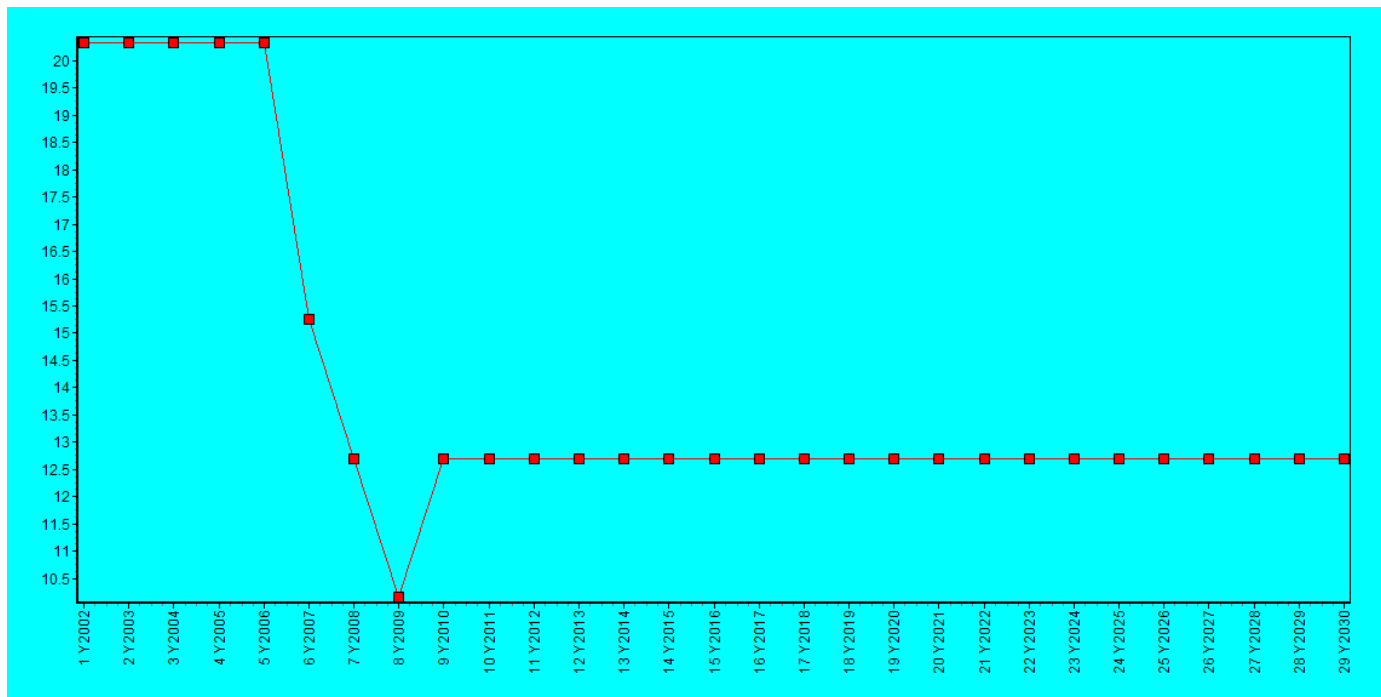
- Once we have generated a baseline, we are ready to model the impacts of the financial crisis in terms of deviations from this
- We undertake four simulations:
  - Simulation to calibrate the model to the global financial crisis
  - Followed by three 'policy' simulations representing different policy responses to the crisis (and consequent severity)

# Financial crisis calibration simulation

- GDyn does not include debt obligations or money
  - We cannot directly model the GFC
  - Therefore aim to mimic the behavior of the crisis to assess the likely impact on production and trade
  - Using a combination of technical change shocks, elimination of errors in expectation and unemployment to model the macro effects of the crisis
- First we undertake a calibration simulation
  - Needed to estimate the effective loss in productivity of capital over the period of the crisis
  - Many elements are the same as for modelling GFC

# Elements of the calibration simulation

1. Investors re-adjust their expectations of US and EU returns on investment
  - Assume errors in expectations fall from 2007 until 2011, however, do not return to baseline level



## 2. Allow for unemployment of skilled and unskilled labour and capital

- Employment equals the natural rate, unless real wages fall by more than 1%, then employment adjusts endogenously
- Provided that economy doesn't continually get hit by negative shocks, it will gradually move back to full employment

### 3. Include fiscal stimulus packages announced

Region	2007	2008	2009 <sup>a</sup>	2010 <sup>a</sup>
<b>Advanced economies</b>	<b>2.7</b>	<b>0.6</b>	<b>-3.4</b>	<b>1.3</b>
US	2.1	0.4	-2.7	1.5
EU	3.1	1.0	-4.2	0.5
Japan	2.3	-0.7	-5.4	1.7
<b>Emerging &amp; developing economies</b>	<b>8.3</b>	<b>6.0</b>	<b>1.7</b>	<b>5.1</b>
Central & eastern Europe	5.5	3.0	-5.0	1.8
Russia	8.1	5.6	-7.5	1.5
China	13.0	9.0	8.5	9.0
India	9.4	7.3	5.4	6.4
ASEAN-5	6.3	4.8	0.7	4.0
<b>WORLD</b>	<b>5.2</b>	<b>3.0</b>	<b>-1.1</b>	<b>3.1</b>

Source: IMF 2009

## 4. Target projected growth rates in real GDP from 2007 to 2010 to calibrate technological change shocks for the crisis

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Source: IMF 2009



# Global financial crisis scenarios

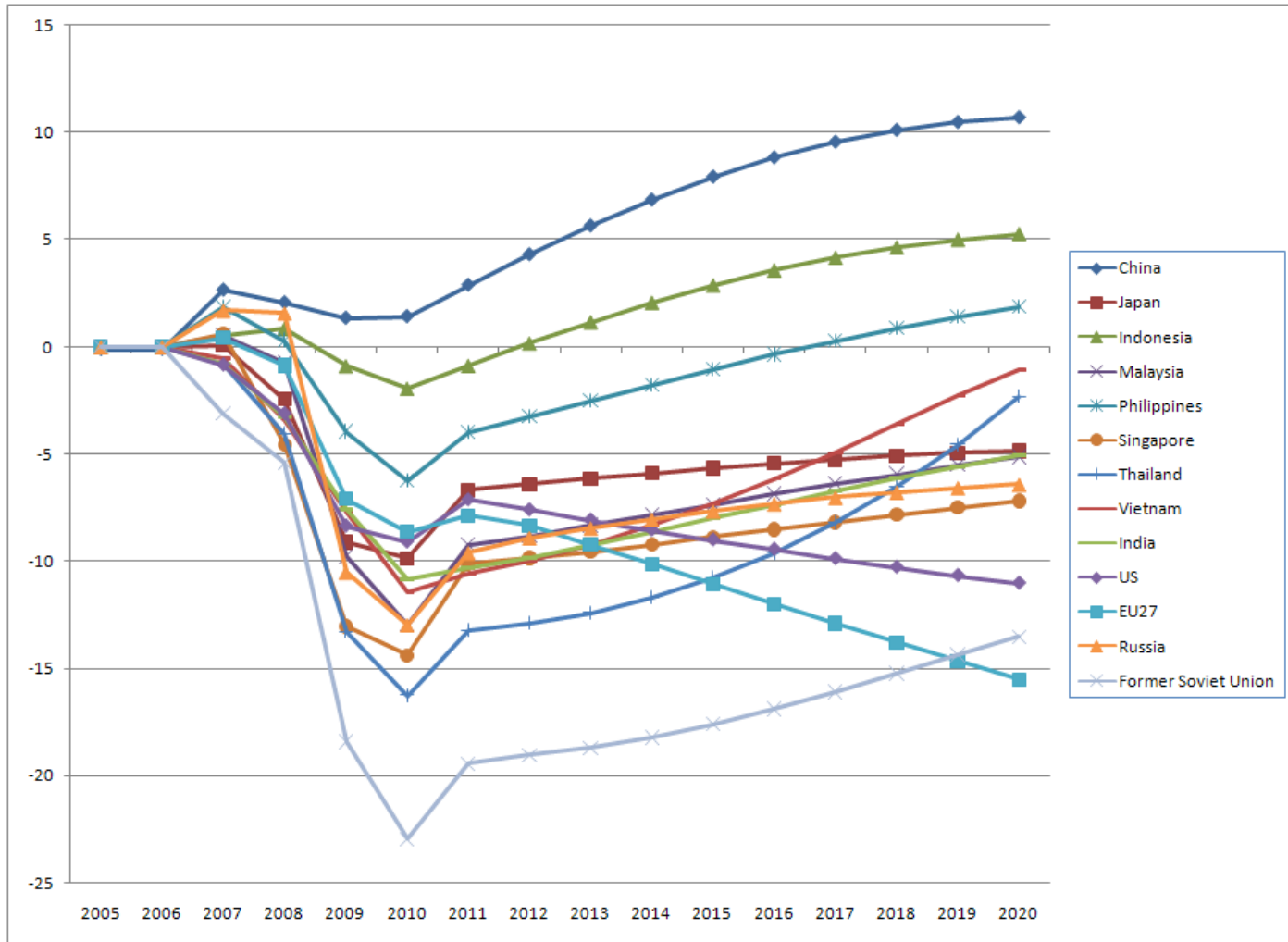
We model three scenarios:

1. GFC (including fiscal stimulus packages)
  - Reduced errors in expectation in the US and EU
  - Temporary decrease in efficiency and return to capital in all countries (from calibration simulation)
  - Unemployment of labour and capital
2. GFC without fiscal stimulus packages
3. GFC with an increase in protection
  - Impact of increasing tariffs 20% towards the bound rates

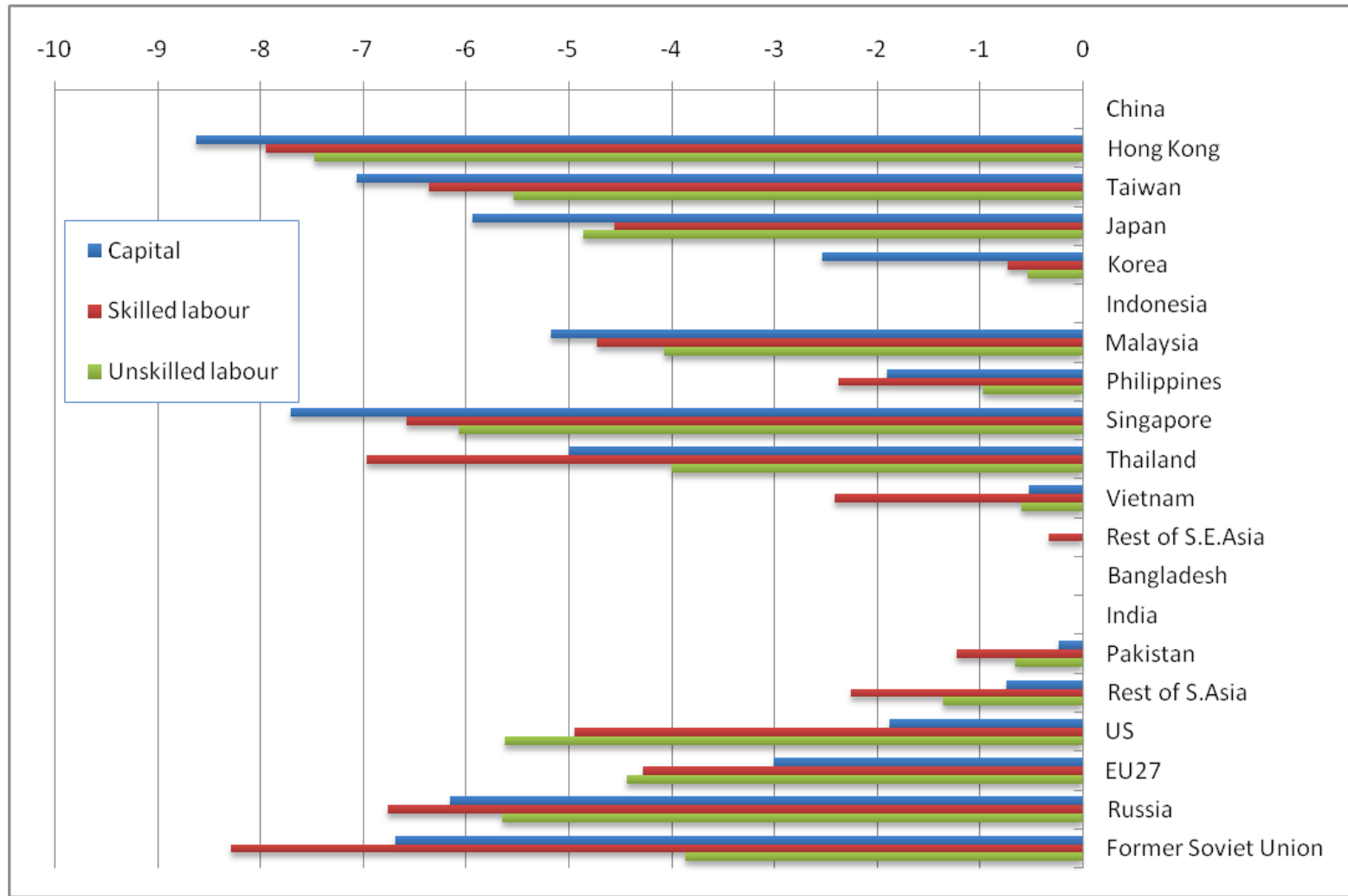
# Impact of the GFC, including fiscal stimulus

- Real GDP is lower for most countries, relative to the baseline
  - Prior to 2010, the decline in capital efficiency and unemployment cause real GDP to fall in most economies (even though capital stock rises outside of the US and EU)
  - After 2010, permanently lower risk premium in the US and EU results in lower investment and real GDP growth in these economies
    - Rest of the world tends to gain from relocation of savings to their shores

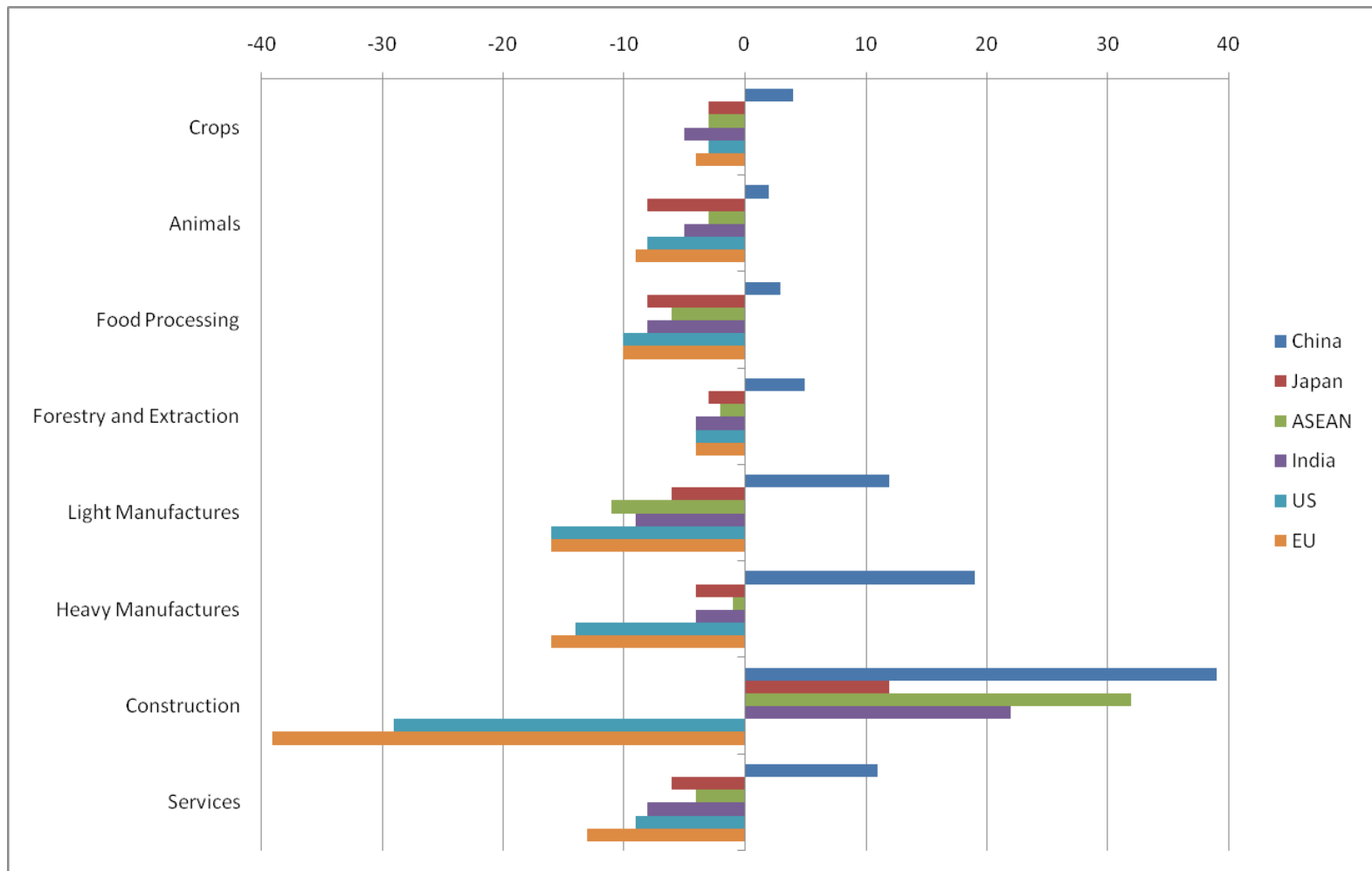
# Cumulative differences in real GDP, relative to baseline (%), GFC



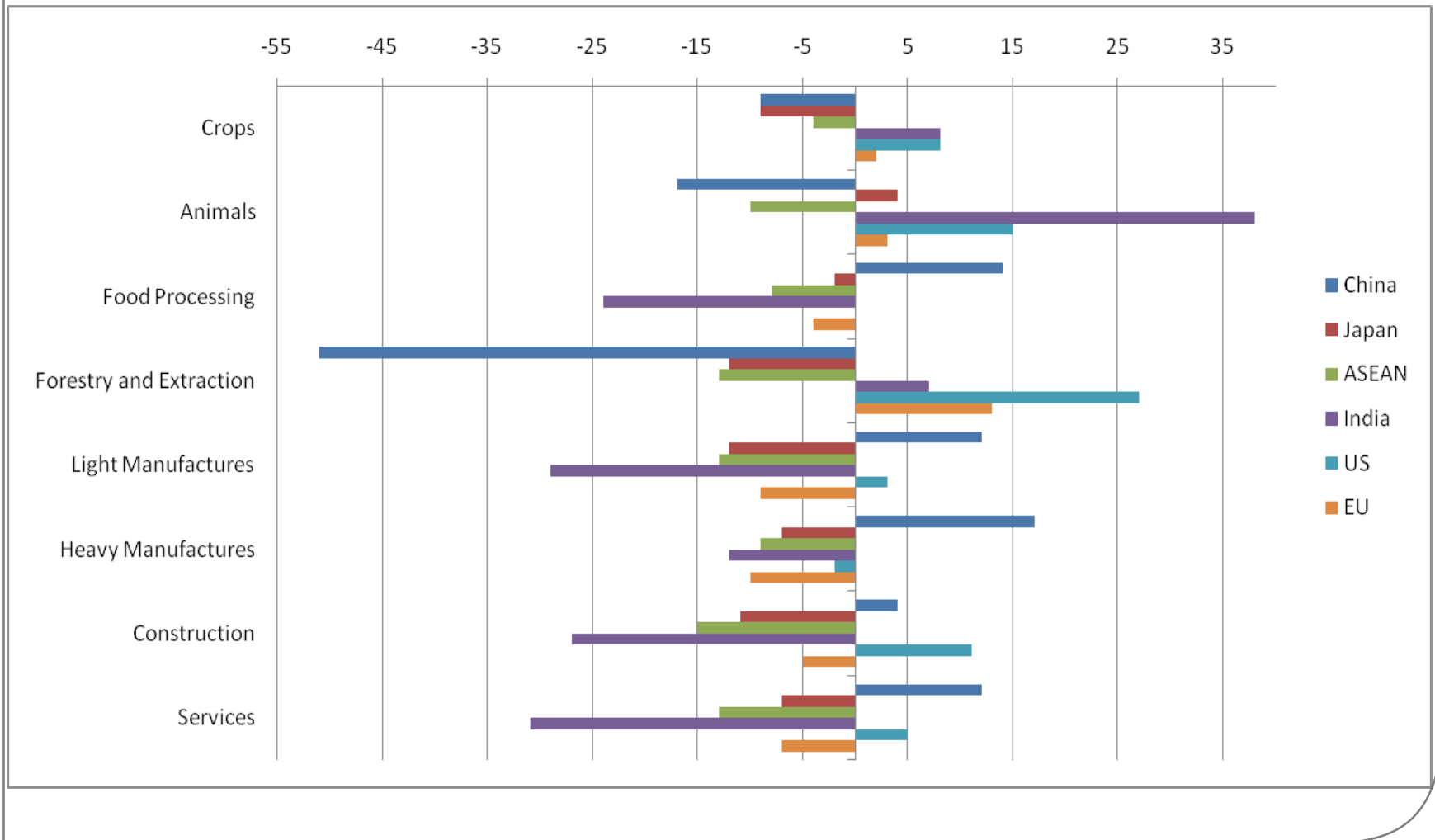
# Cumulative percentage change in employment, 2009



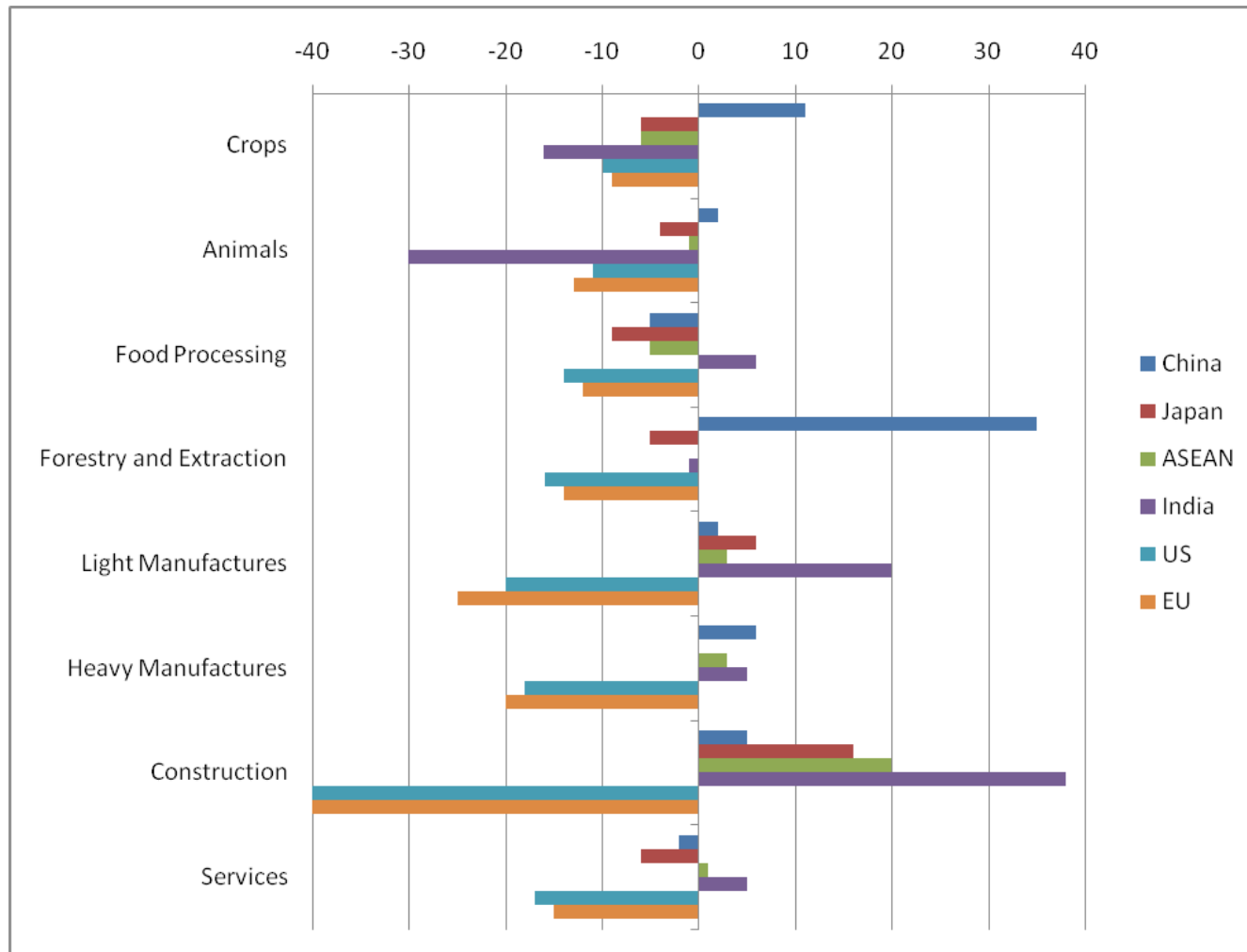
# Cumulative difference in 2020 output due to Financial Crisis (%)



# Cumulative difference in 2020 exports due to Financial Crisis (%)

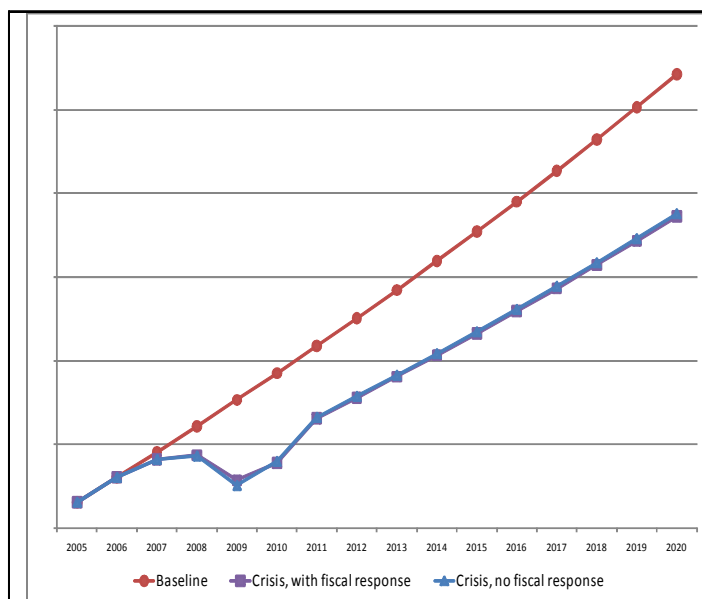


# Cumulative difference in 2020 imports due to Financial Crisis (%)

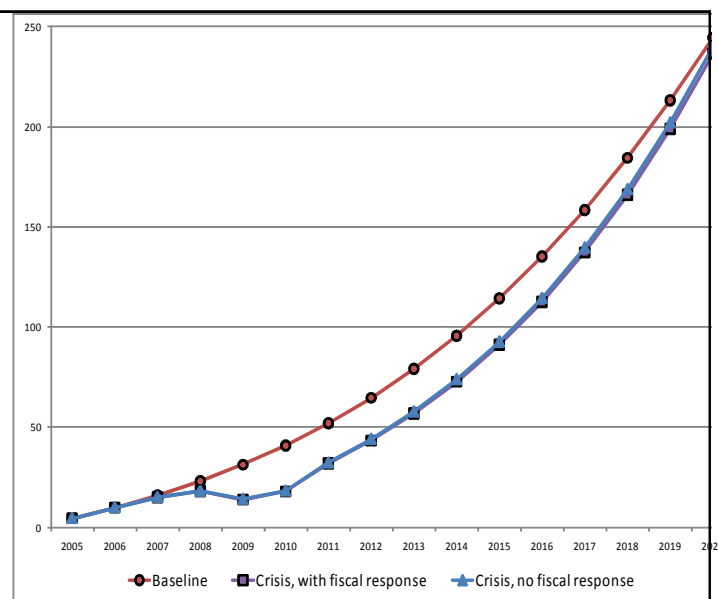


# Second scenario: excluding fiscal stimulus

- We find this doesn't have a very significant overall economic impact:
  - Cumulative GDP with and without fiscal response



(a) USA



(b) Thailand



- However, fiscal stimulus reduces some of the flow of investment out of e.g. US and EU
- And fiscal stimulus does reduce unemployment, e.g. maximum fall for the US in 2009:
  - 5.71 (skilled) and 6.04 (unskilled) – no stimulus
  - 4.94 (skilled) and 5.63 (unskilled) – with fiscal packages

# Financial crisis with increased protection

- There has been some evidence of countries raising protection in an effort to dampen the impact of the crisis on their domestic industries
  - We assumed tariffs increase 20% towards bound rates
- Global exports now fall by a cumulative 8.9%, relative to the 2020 baseline
  - Contrasting with a 6.5% fall when there was no increase in tariffs
- Therefore increasing protection in response to the crisis is likely to further harm the global economy

# Tentative conclusions

- We estimate the crisis causes global trade to reduce by 6.5% from the 2020 baseline
- The composition of trade also changes quite markedly
  - Due in part to the changes in capital flows resulting from the re-allocation of savings across regions
- Fiscal stimulus packages that we model do not appear to have a strong overall impact
- However, increasing protection has the potential to significantly further harm the global economy