

# The Environmental Impacts of the EU-US Open Skies Agreement

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THE ECONOMIC AND  
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# Outline

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- Introduction
- Literature and context
- Hamburg Tourism Model (HTM)
- Scenarios
- Results
- Sensitivity Analysis
- Conclusions



# Introduction

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- Implication of Open Skies for carbon dioxide emissions and passenger numbers
- Partly liberalised market leading to falling ticket prices
- Direct impact on travel between EU-US and displacement from other destinations
- *International* travel by *tourists*



# Literature and context

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- Impact of an OAA
- Brattle Group (2002) find fare reductions of between 2% and 6%
- Booz Allen Hamilton (2007) consequences of Open Skies on passenger volumes, fares, consumer benefits, airline costs, productivity
- Both use price elasticities of demand of between 1.0 and 2.5



## Literature and context (2)

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- Aviation's contribution to GHG emissions in context of climate policy
- Fitzgerald and Tol (2007) aviation in European Trading System
- Tol (2007) carbon tax on international tourism
- Here, look at changes in emissions due to OAA



# Hamburg Tourism Model (HTM)

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- Predicts number of domestic and international tourists from 207 countries
- Time steps of 5 years, 1995 base year, show results for 2010
- Assumption: reduction in cost of travel leads to increased travel to destinations affected by cost fall



# Data and assumptions (1)

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- Source: WTO (2003) and EuroMonitor (2002)
- Travel time and cost assumed to be linear in the distance between airports
- Does not take account of changes in quality of travel, intra-EU travel, business travel
- Issue: US as a destination (East vs. West Coast)



## Data and assumptions (2)

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- CO<sub>2</sub> emissions of 6.5kg C per passenger for take-off and landing and 0.02kg per passenger-km (Pearce and Pearce, 2000)
- Modelled emissions in 2000 are 140M metric tonnes of carbon = 2.1% total emissions from fossil fuels
- Total international aviation: 3% of global emissions



# Elasticities

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- Price elasticities used by HTM lower than other studies and fall with income per capita
- Brattle and BAH this is not the case
- Duration and cost of flight
- Trade-offs between *countries*
- Not for price competition on the same route
- Total cost of the holiday

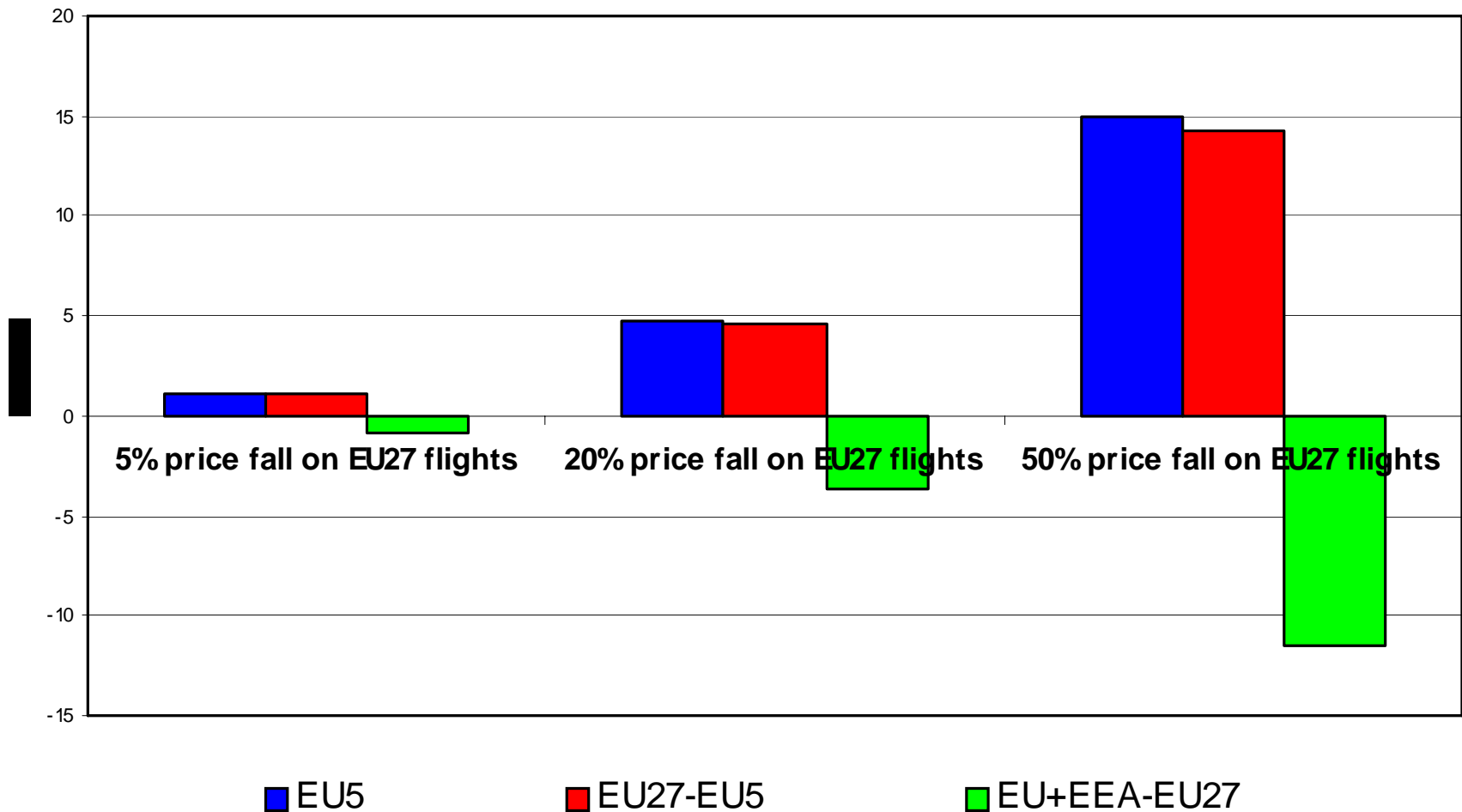


# Scenarios

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- Assume price falls of 5%, 20% and 50%
- Three groups of EU countries: EU5, EU27 and EU30
- EU5 = UK, Ireland, Greece, Spain and Hungary
- EU30 = EU27, Switzerland, Iceland and Norway

# Arrivals from the US



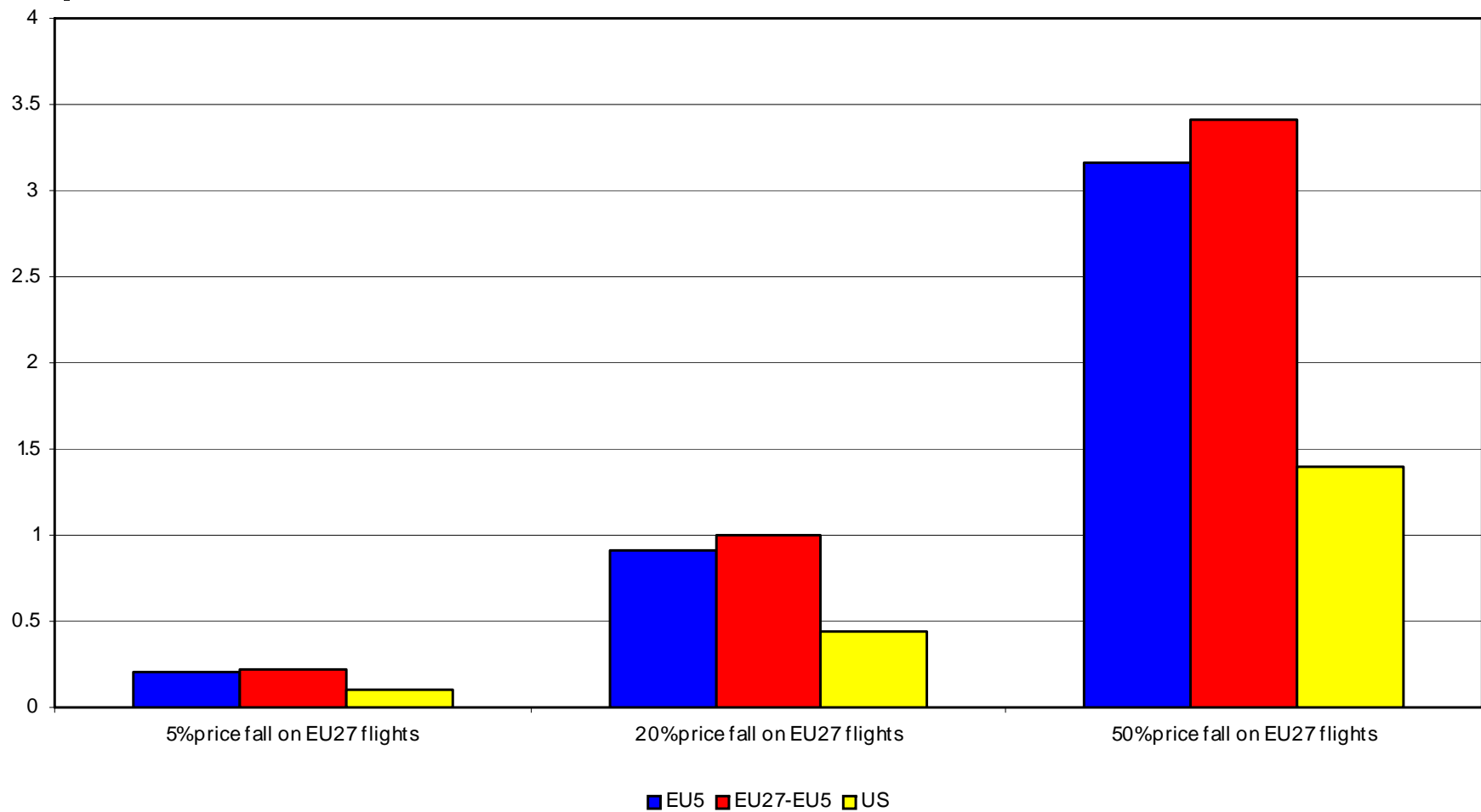


## Effect on arrivals

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- As flights to EU27 become cheaper, US tourists substitute away from other European countries towards cheaper destinations
- Slightly higher for EU5 countries
- Cheaper fares, more travel, effect on emissions

# Emissions from EU and US



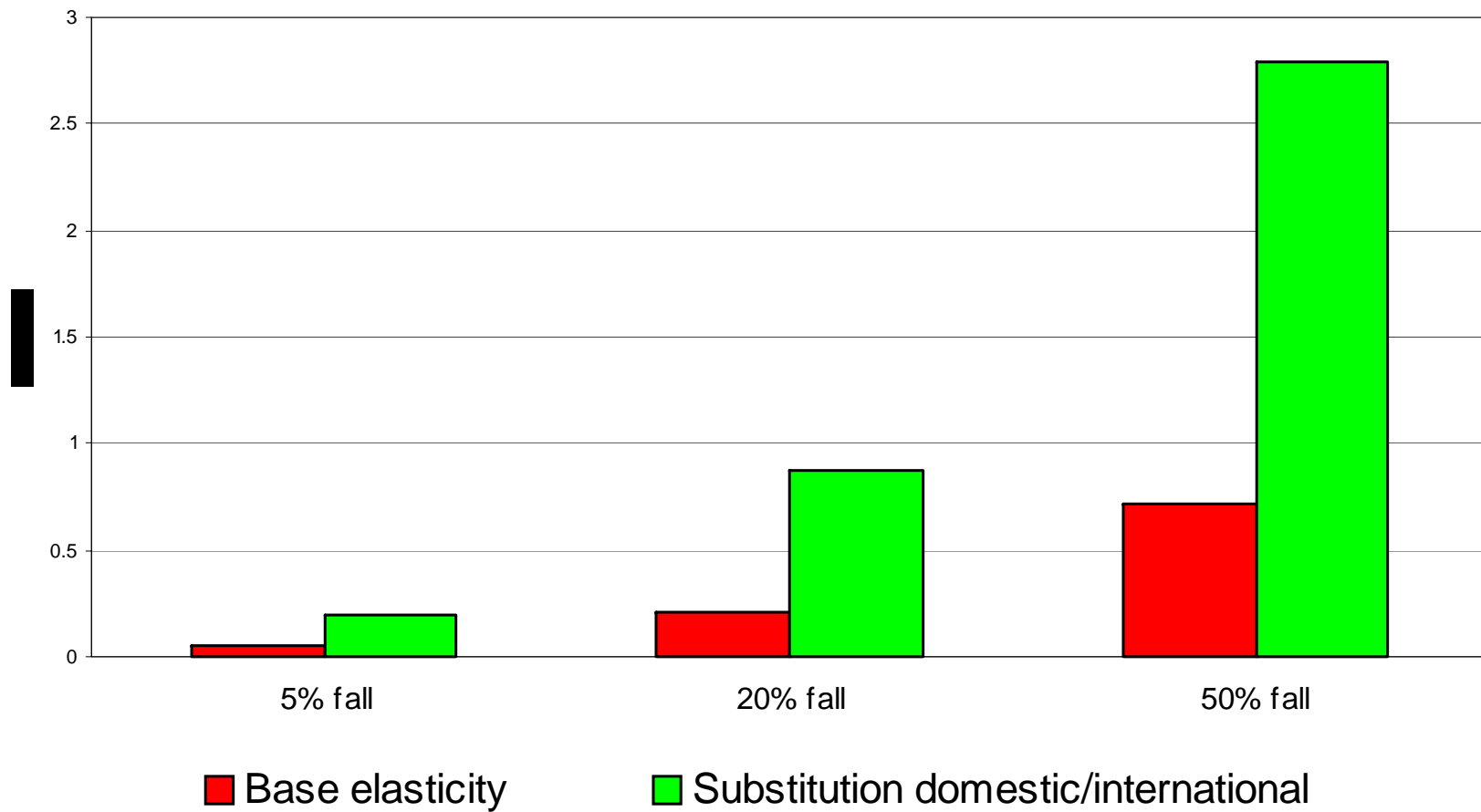


# Effect on emissions from EU and US

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- Increase in emissions from all EU countries between 0.2% and 3.4%
- Effect from the US: rise in emissions ranging from 0.1% to 1.4%
- Effect of the price reductions on emissions and passenger numbers is not large

# World emissions



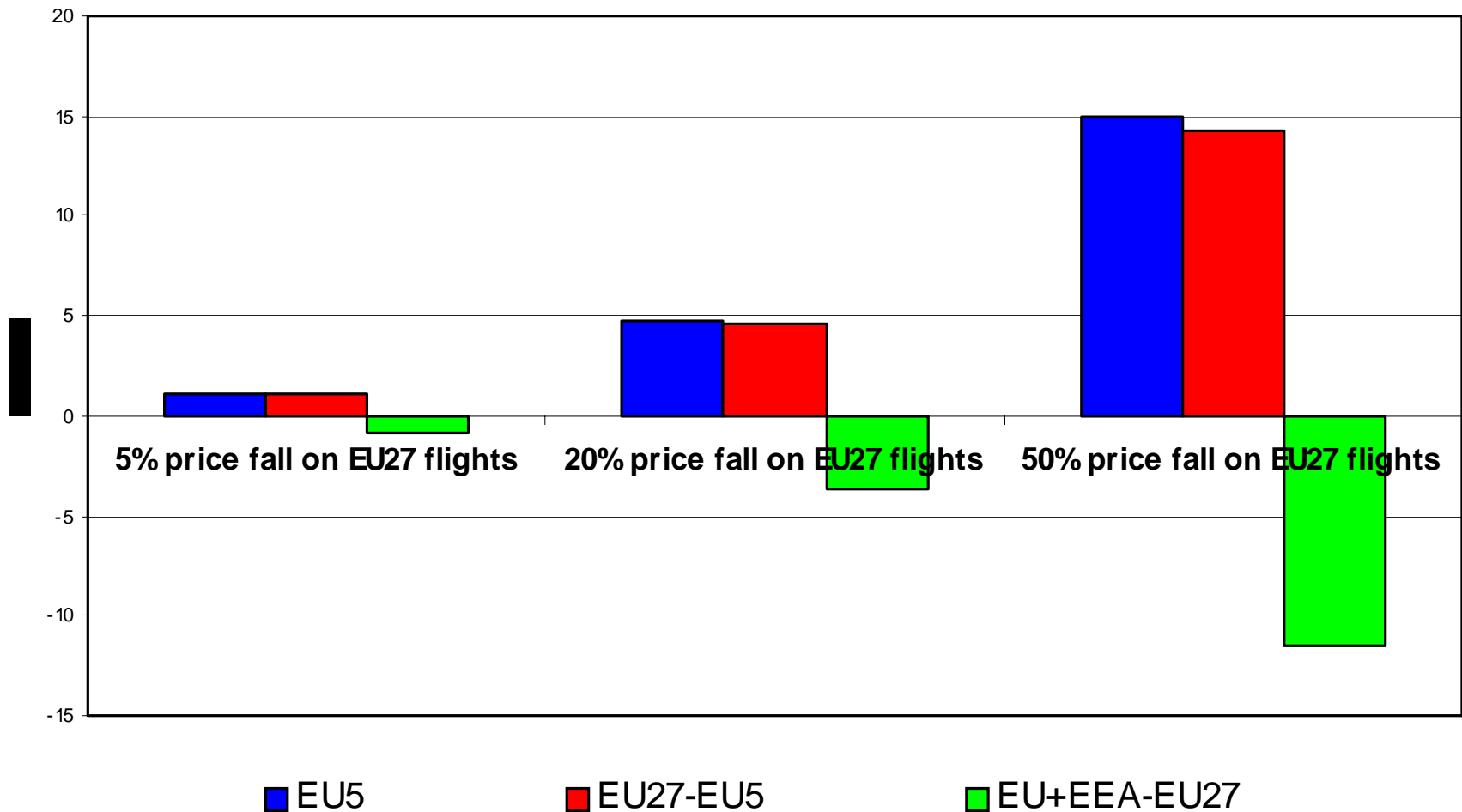


# Effect on world emissions

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- Increase in emissions ranges between 0.04% and 0.7%
- Increase in travel to Europe offset by fall in passenger arrivals for other countries
- US tourists substitute away from relatively more expensive destinations
- EU tourists go to US more often but increase in travel restricted by time off work and funds

# Arrivals from the US



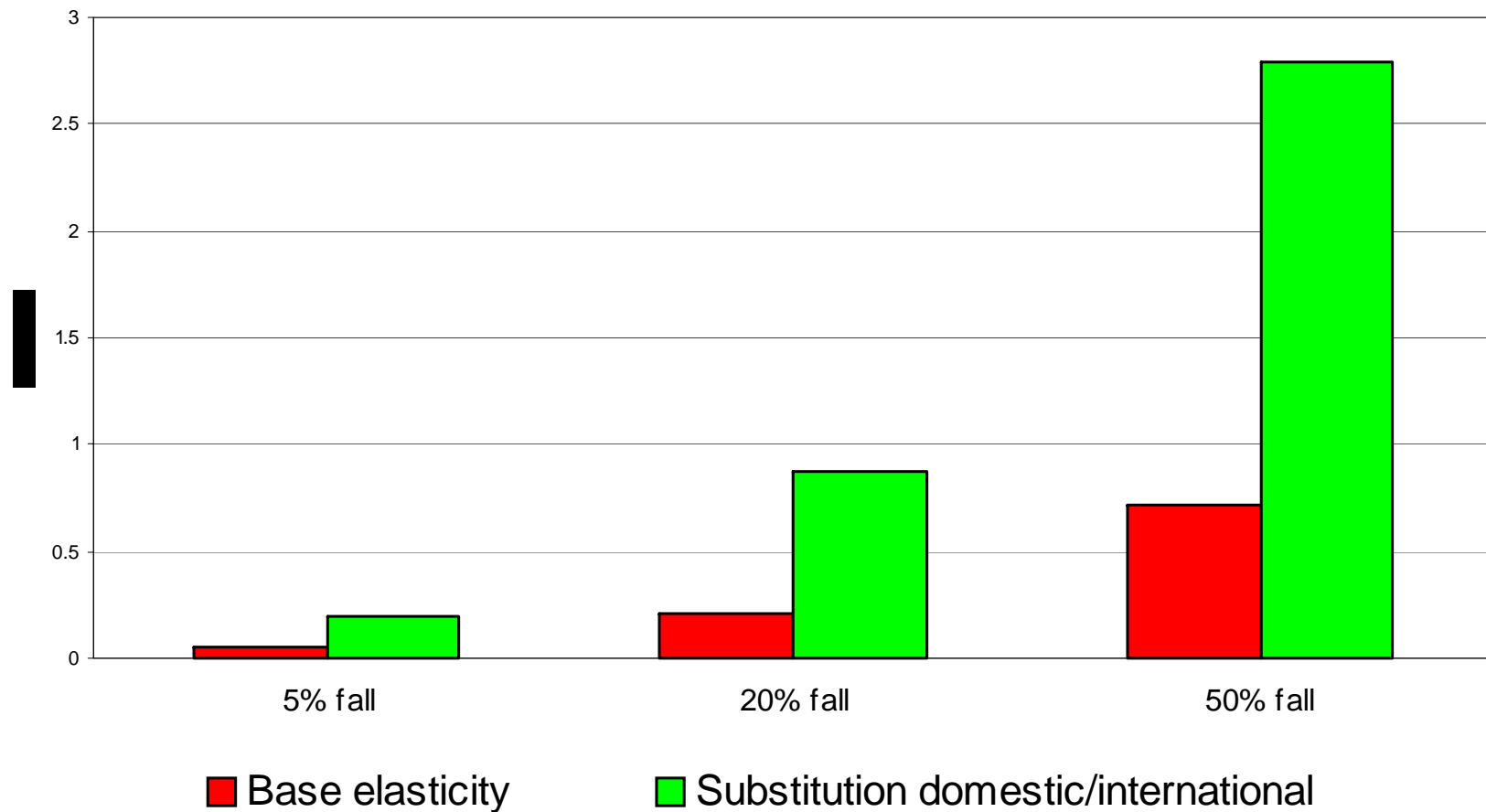


# Sensitivity analysis

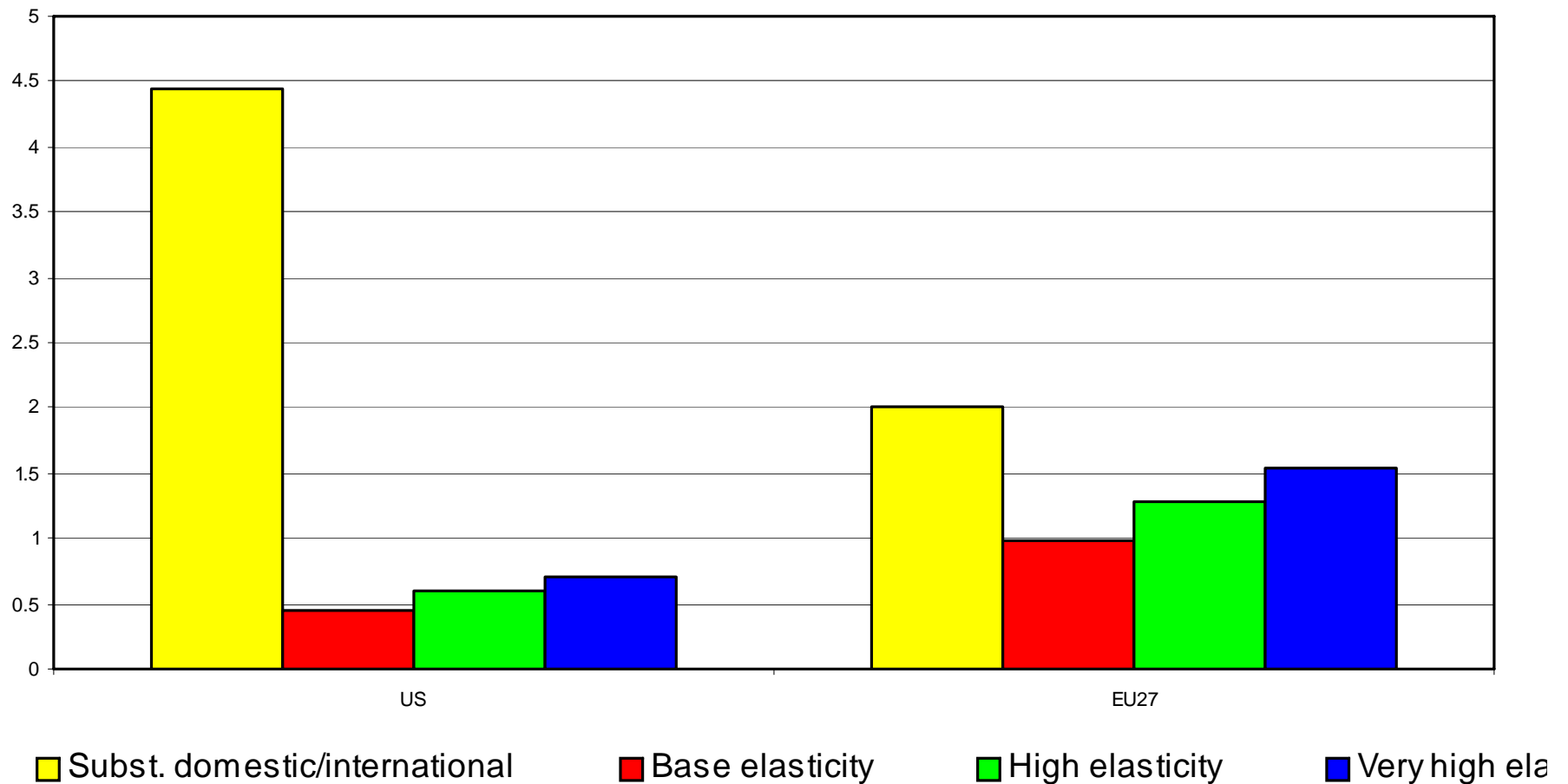
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- Results above assume substitution between foreign holiday destinations but not between domestic and international holidays
- Now assume price elasticity of substitution between foreign destinations also governs substitution between domestic and international

# World emissions with substitution



# Effect of elasticity changes on emissions



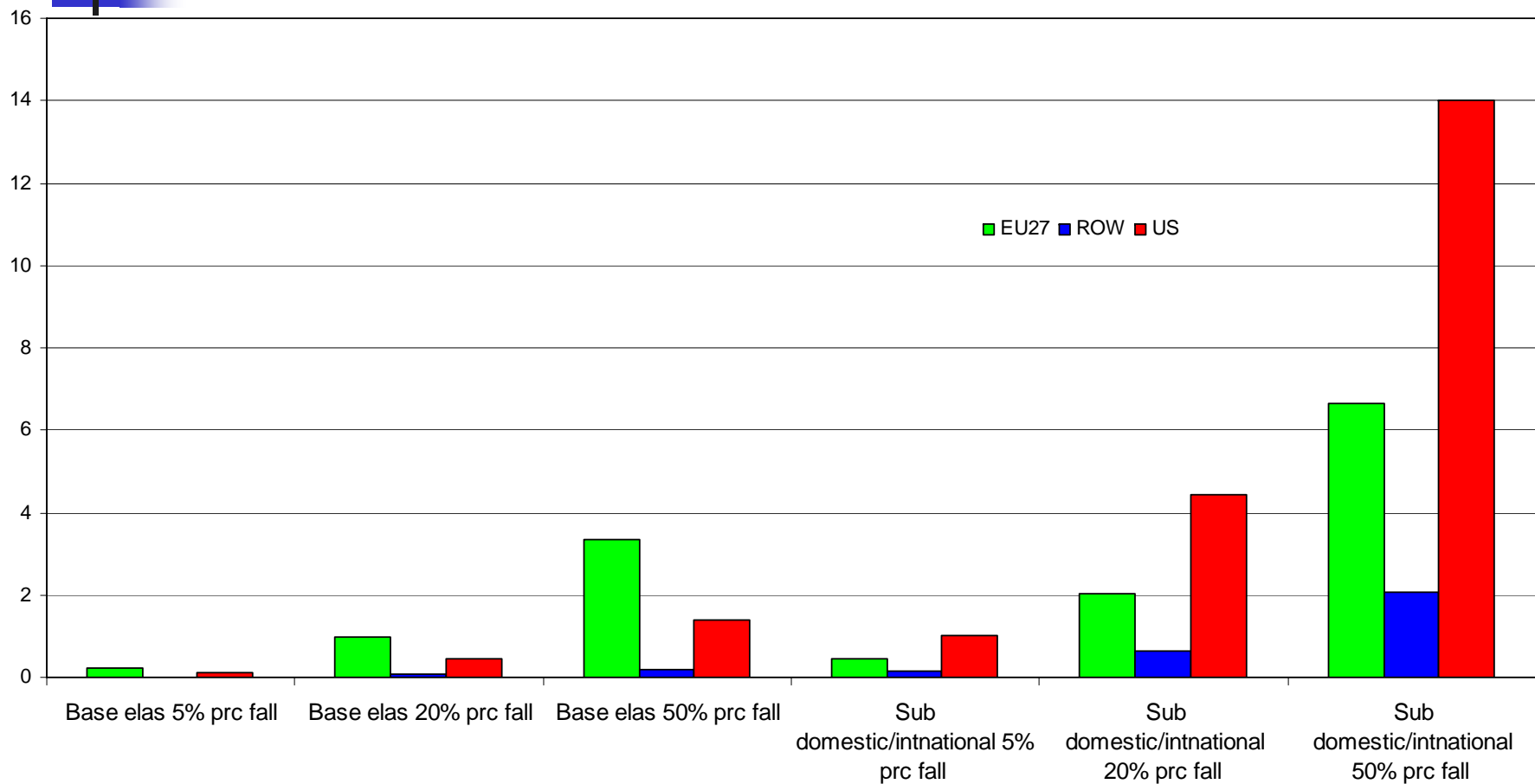


# Changes in elasticities

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- The higher the elasticity, the higher the increase in emissions
- Tourists become more sensitive to price, they travel more as the prices fall
- Substitution scenario is more important than elasticities for US, opposite for EU

# Elasticities and substitution





# EU versus US

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- LHS: Effect on EU strongest
- RHS: Effect on US strongest
  
- Substitution assumption important for large domestic US market
- Elasticity assumption has a bigger effect on EU



# Conclusions

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- Competition and lower fares will increase passenger numbers
- As expected this will result in an increase in carbon dioxide emissions
- However, increase in global emissions smaller than increase in transatlantic travel (reduction)



## Conclusions (2)

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- Effect on emissions sensitive to assumptions of the model
- Price elasticity assumption relevant for Europe
- Domestic/International assumption relevant for US
- Implications for climate policy
- Further research

Thank you

