



OXFORD  
ECONOMICS

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# Impacts of airport infrastructure investment

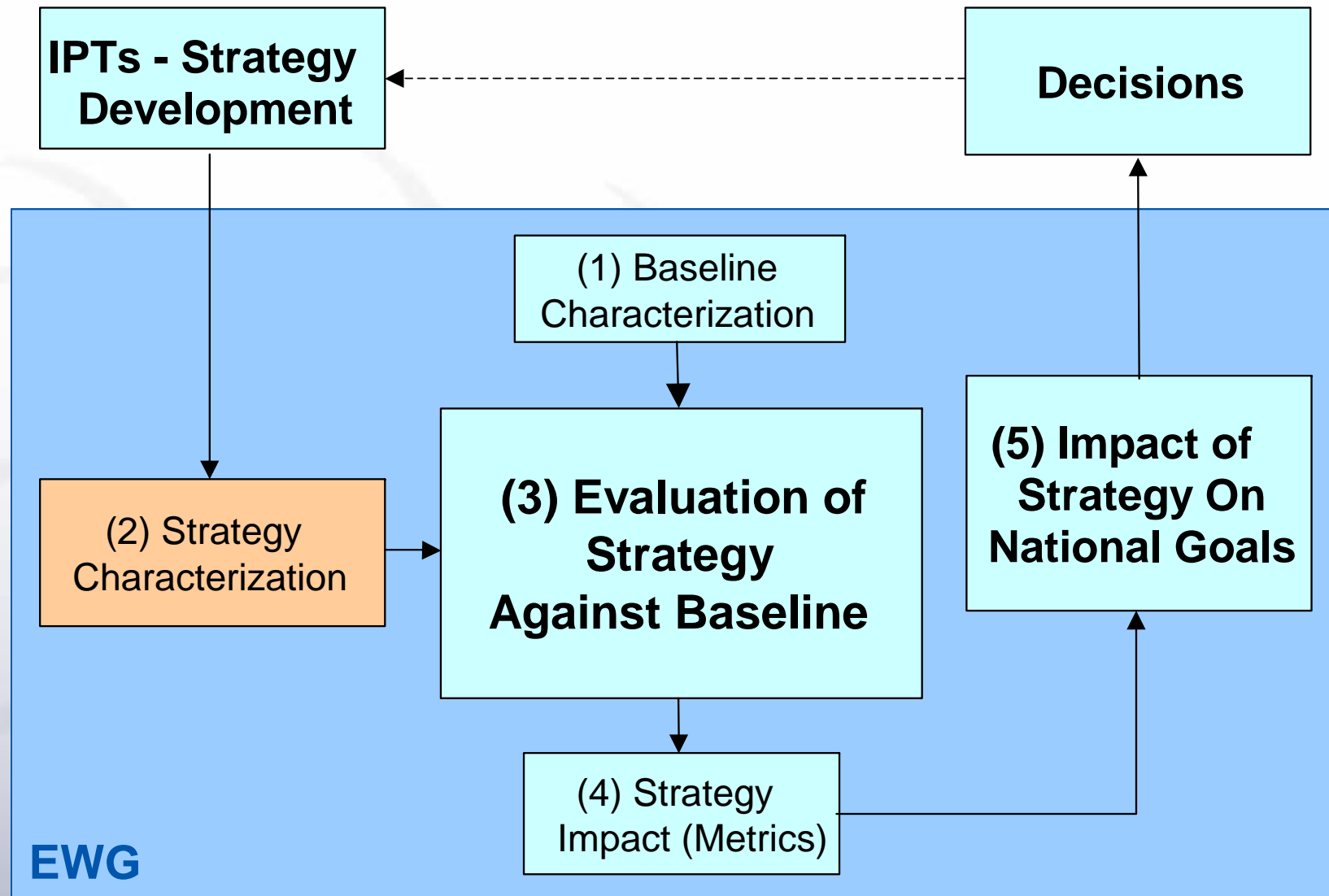
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# Oxford Economics

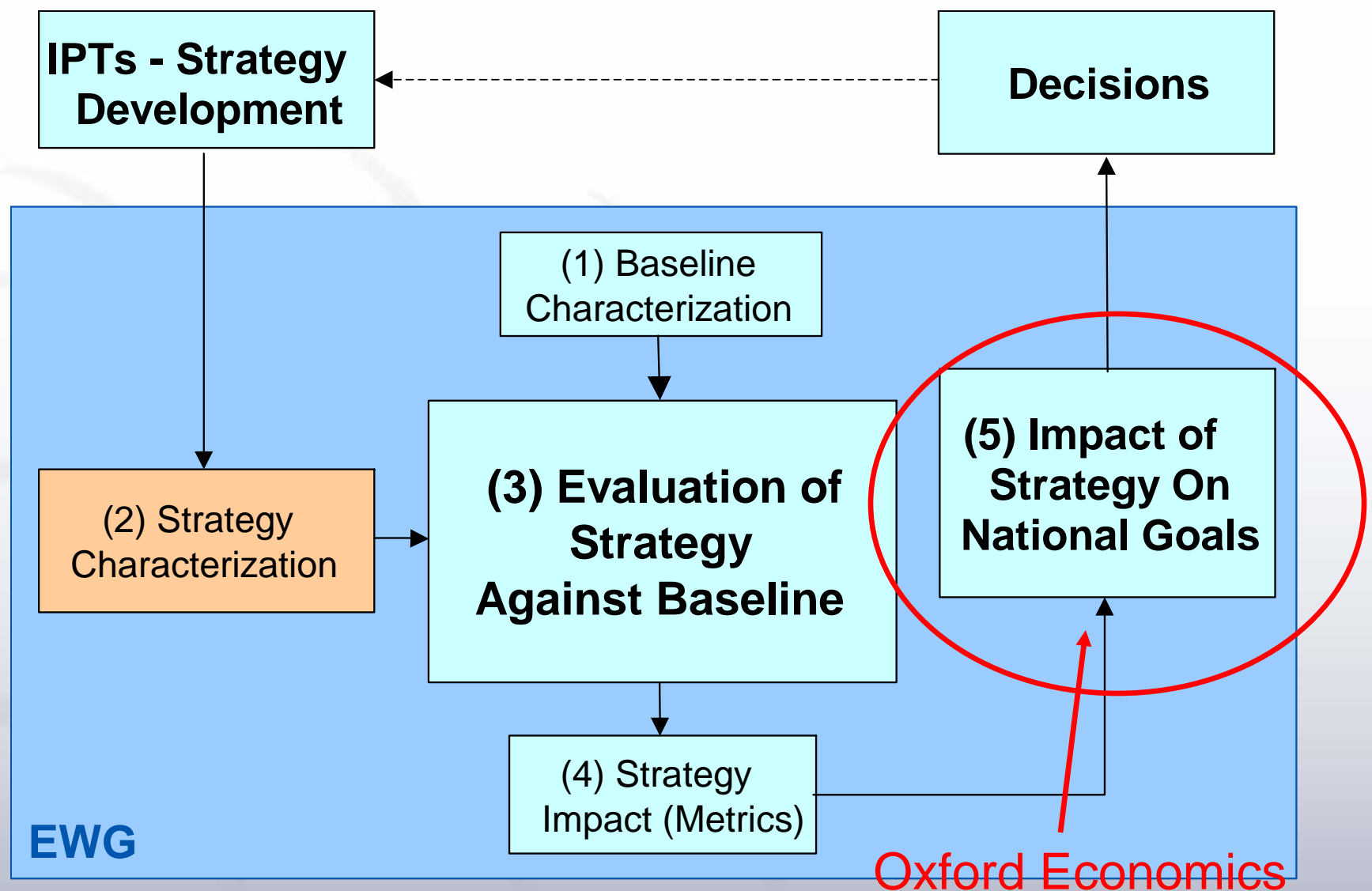
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- **Founded in 1981**
- **Over 300 clients**
- **Global industry and economic analysis**
- **Extensive experience in aviation / aerospace sectors**
- **Offices in USA and Europe**

# Where would we fit into NGATS strategy?



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# National Goals...

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- Promote economic growth and create jobs
- Expand system flexibility and deliver capacity to meet future demands
- Tailor services to customer needs
- Ensure national defense readiness
- Promote aviation safety and environmental stewardship
- Retain and enhance U.S. leadership and economic competitiveness in global aviation

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# Options for meeting demand for air transport

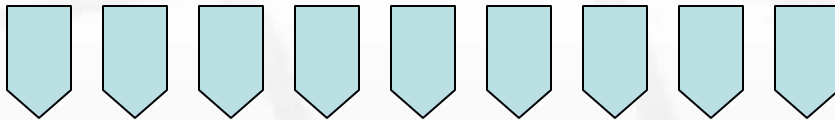
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- **The expected growth in demand for air transport exceeds planned capacity**
- **Different approaches to expanding the capacity of the air transport network have different effects on the aviation industry and on the rest of the economy**

# What kind of investment?

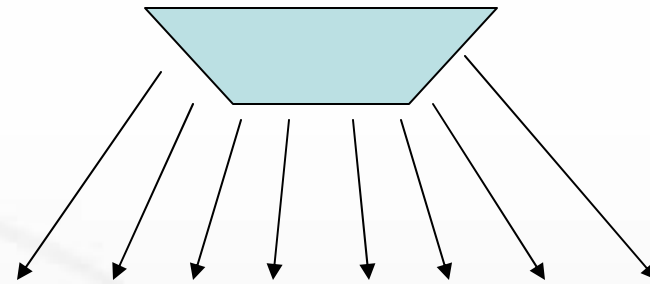
Direct effects on construction

Lots of new runways, lots of small costs



Boosting air transport capacity in many airports

R&D, one big cost



Efficient techniques spread around the whole air transport industry

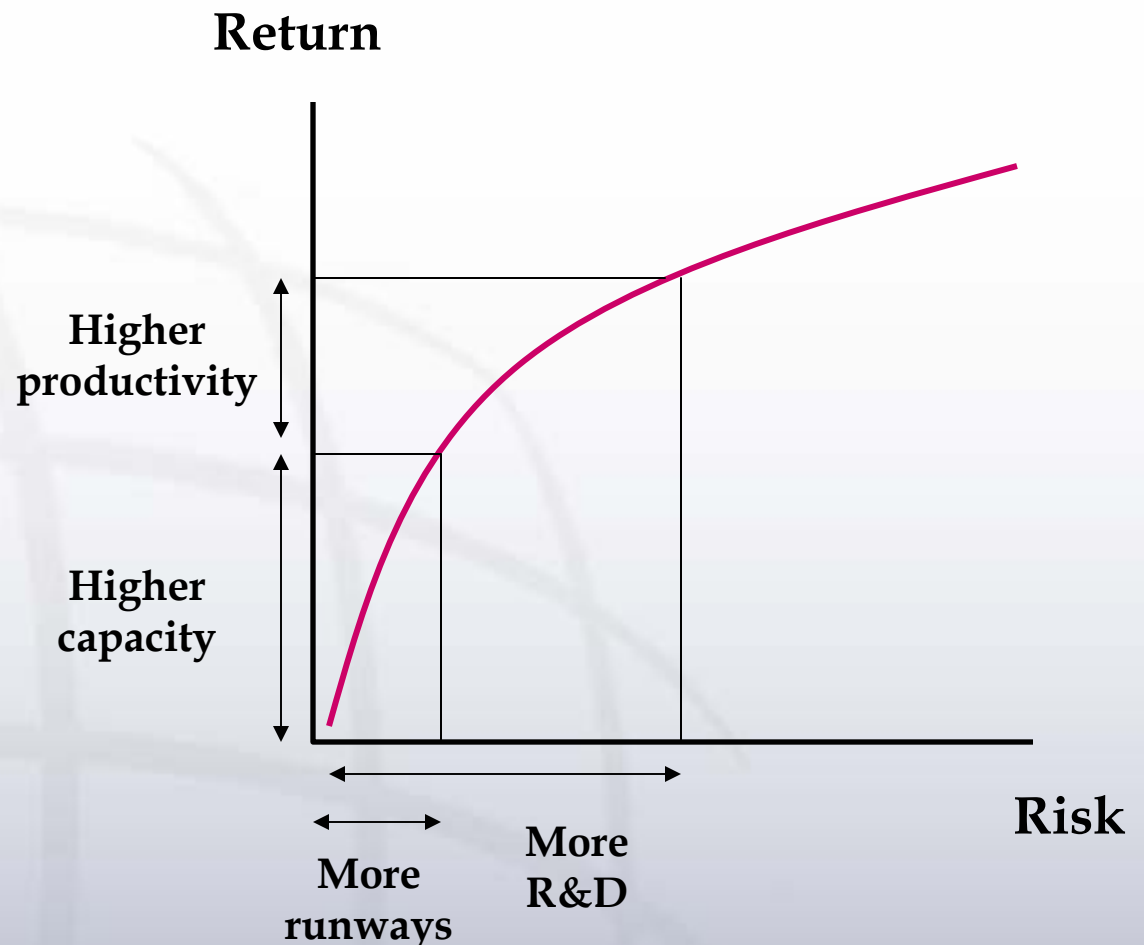
Effects on total air transport capacity

Spillover effects of increased air transport capacity - investment and productivity

Other direct, indirect, induced effects

# Weighing up the different options for expanding air transport capacity

1. Both options might have the same 'expected' impact on aviation capacity
2. Investment in new runway capacity is low-risk: the new capacity will definitely be created.
3. R&D to increase efficiency is riskier, but the returns are greater. Boost to aviation productivity and to productivity in other sectors

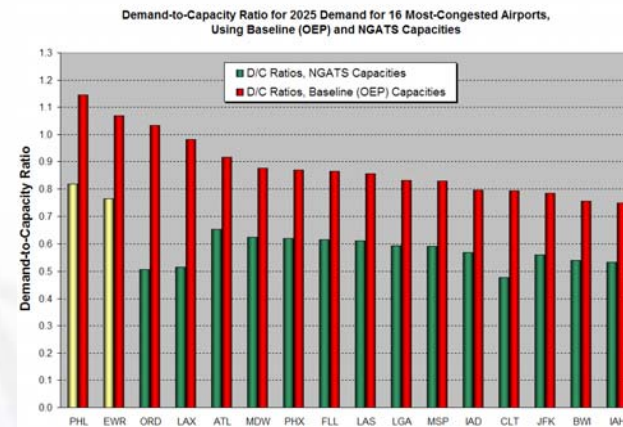


# Is R&D worth the risk?

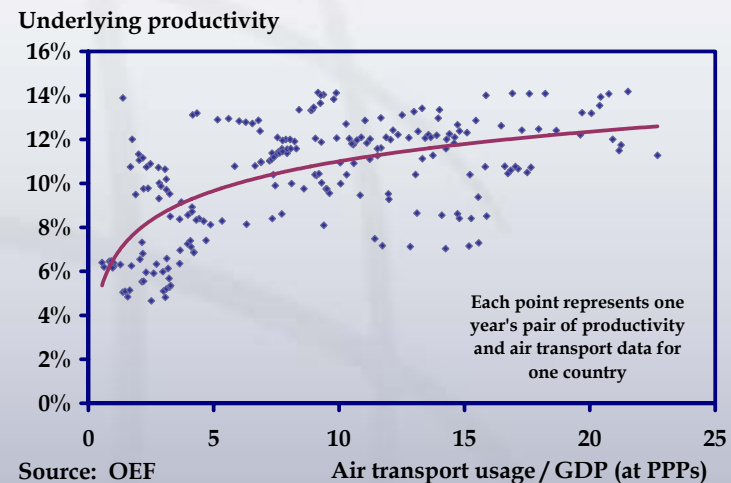
## Depends on:

- How costly, how effective and how risky is NGATS R&D? How likely is it to deliver required capacity?

## How Effective is the NGATS?



## Relationship between air transport usage and underlying productivity



- How big are the productivity gains from air transport? Our previous research suggests they are large.

# Elements in risk and return to investment

## 1. Return to airports: profits



- Impact on air transport industry as a whole, not just individual airports
- Threat of new environmental restrictions
- Threat of high fuel prices
- Competition from other forms of transport
- Competition from other communications media
- Threat of terrorist attacks

How robust are demand forecasts?

- Impact of increase in number of flights on ticket prices

How risky is the pass through from demand to revenue?

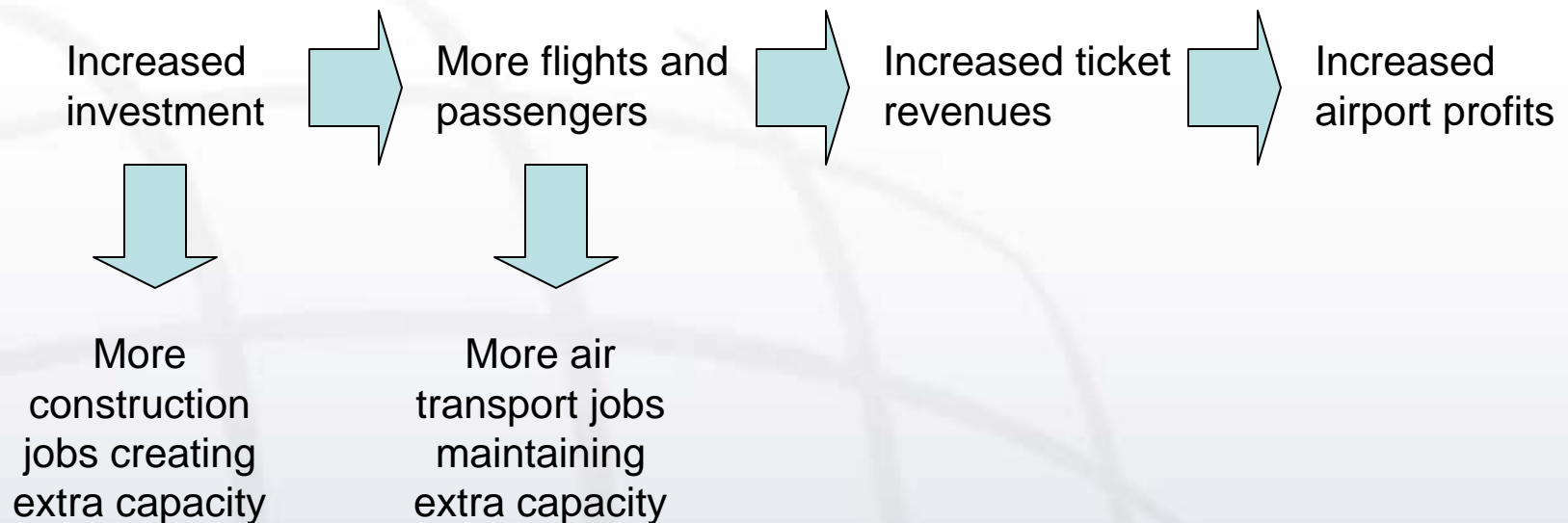
- Impact of increase in # flights on costs per passenger – airport congestion
- Impact of increase in # flights on tax on profits, aviation fuel prices (including tax wedge)
- Impact on bargaining power of airports v airlines
- Impact on bargaining power of airports v workers

How risky is the pass through from revenue to profits?

# Elements in risk and return to investment

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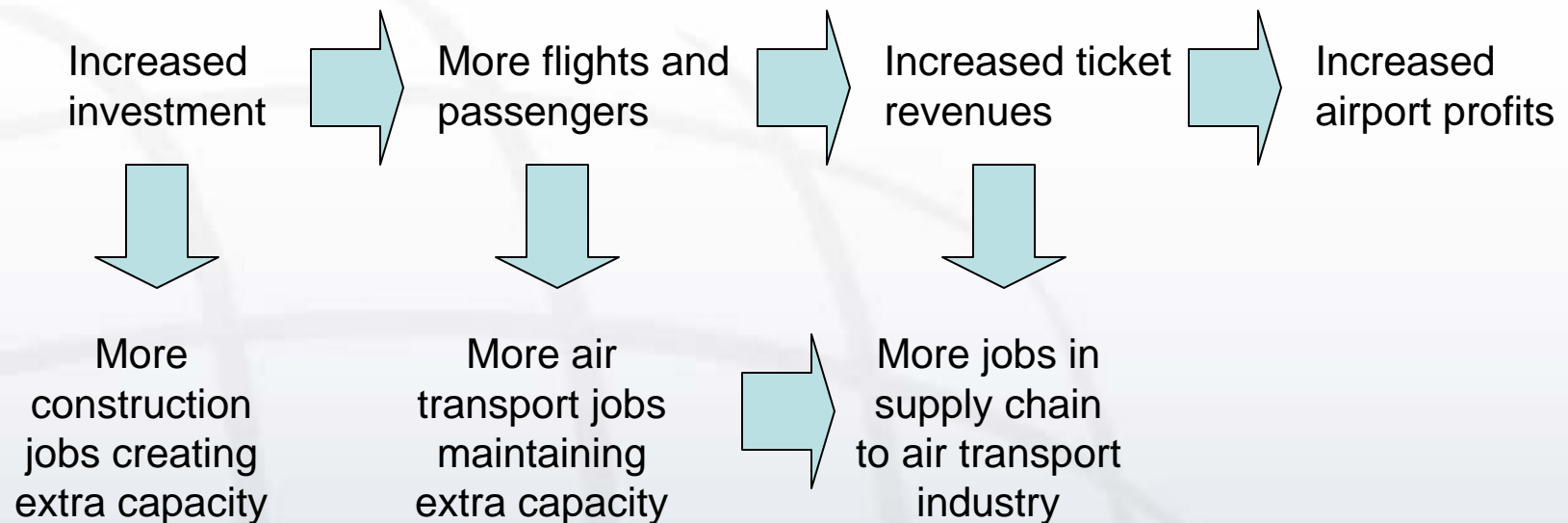
## 2. Return to wider economy: direct economic impacts



# Elements in risk and return to investment

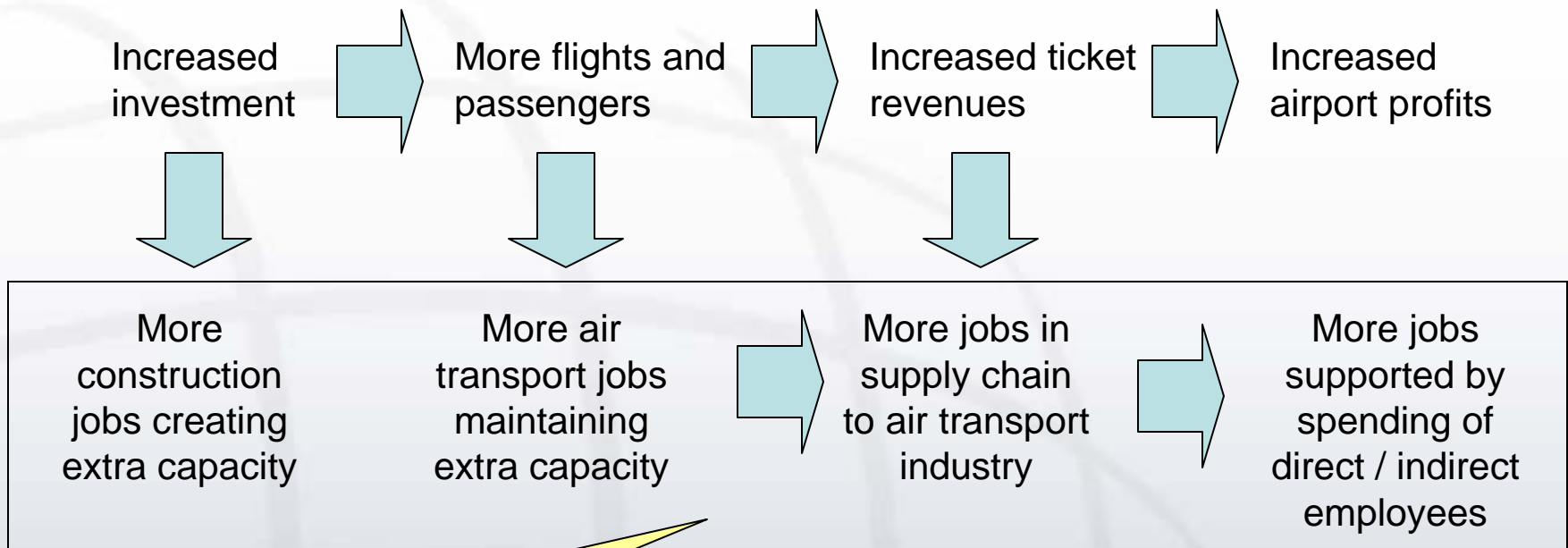
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## 3. Return to wider economy: indirect economic impacts



# Elements in risk and return to investment

## 4. Return to wider economy: induced economic impacts

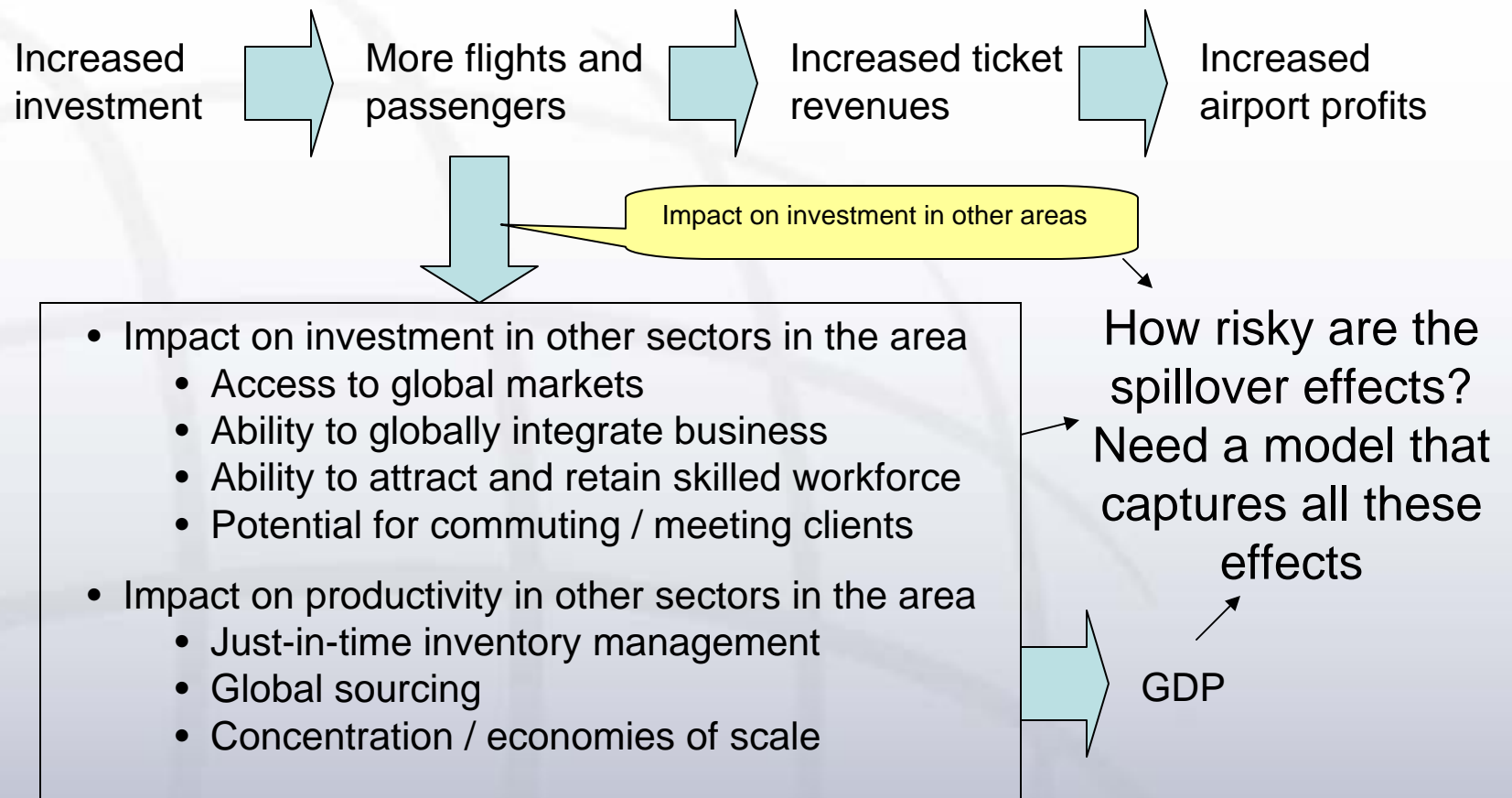


- Impact on local wages, on firms' costs, on other employment in the area
- Impact on average productivity in the area
- Impact on jobs in other areas

How risky are the labor market effects? Need a model that captures all these effects on the labor market

# Elements in risk and return to investment

## 5. Return to wider economy: spillover economic impacts



# Quantifying costs, benefits and risks

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- Quantify the costs
  - Derived from industry research into NGATS
- Quantify the benefits
  - Impact on air transport network: industry research into NGATS
  - Direct, indirect, induced, catalytic economic impacts: derived from Oxford Economics model built specifically for this purpose
- Quantify the risks
  - Risks to costs (NGATS industry research)
  - Risks to impact on air transport (NGATS industry research)
  - Risks to direct, indirect, induced, catalytic economic impacts: can be derived from confidence intervals around the parameters in the Oxford model

# Oxford model

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- Build a model that captures the full range of effects of new investment in air transport capacity
  - Effects on passengers, revenues, airport profits
  - Direct, indirect and induced economic effects
  - Spillover economic effects
- Identify the key risk factors that could influence the magnitude of those effects
- Sensitivity analysis around the central assumptions for each of those risk factors

# Analyzing the results

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- Summarize
  - Summary measures, such as the probability distribution at different horizons of the total economic impact of investment in air transport – capturing costs, benefits and risks to both.
- Distil
  - Disentangle the contributions from each component to that overall distribution
  - Disentangle the impacts across each of the key national goals
- Inferences
  - Identify and explain the implications for policy

# Summary model results

By 2025

	Parameter	Mean	S. E.	Skewness
Baseline starting assumptions	# new runways	100	10%	0%
	\$ mn per runway	100	10%	0%
	\$ mn R&D spend	10,000	20%	0%
	Income growth pa	4.0%	10%	0%
Impacts on AT demand	Income growth	0.3	10%	0%
	Industrial structure *	0.2	10%	0%
	Demographics **	0.1	10%	0%
Impacts on AT supply	1 runway	0.02%	10%	0%
	\$100 million on R&D	0.50%	40%	0%
Impact on AT prices	AT demand up 10%	0.5	10%	0%
	AT supply up 10%	-0.5	10%	0%
Impacts of 10% increase in AT on:	Investment	0.10%	20%	0%
	Productivity ***	0.02%	20%	0%
	Employment ****	0.20%	20%	0%

Baseline starting assumptions

Impacts on AT demand

Impacts on AT supply

Impact on AT prices

Impacts of 10% increase in AT on:

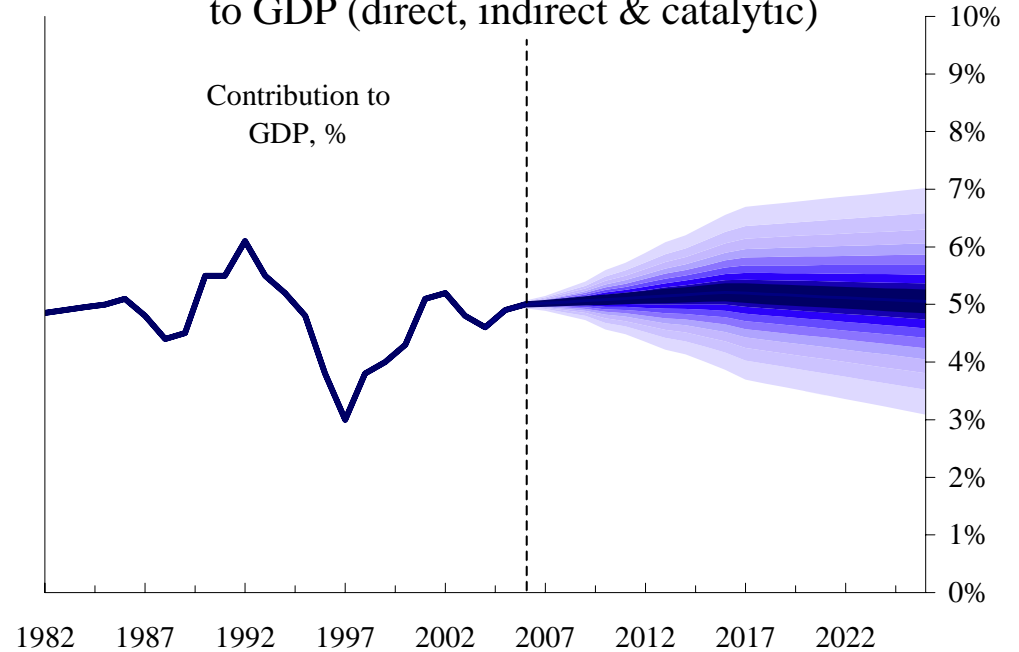
\* share of air-transport intensive industries

\*\* share of air-transport intensive age groups

\*\*\* Total Factor Productivity TFP

\*\*\*\* Short-term effect

Economic benefits of air transport: contribution to GDP (direct, indirect & catalytic)



2025 effects	% GDP	\$ billions	% return	% risk
Direct GDP	0.01%	1.0		
Indirect GDP	0.00%	0.9		
Catalytic GDP	0.05%	9.1		
<b>GDP</b>	<b>0.06%</b>	<b>11.0</b>	<b>55%</b>	<b>5.2%</b>

# Flex the starting assumptions

By 2025

Baseline starting assumptions

Impacts on AT demand

Impacts on AT supply

Impact on AT prices

Impacts of 10% increase in AT on:

Parameter	Mean	S. E.	Skewness
# new runways	50	10%	0%
\$ mn per runway	100	10%	0%
\$ mn R&D spend	20,000	20%	0%
Income growth pa	4.0%	10%	0%
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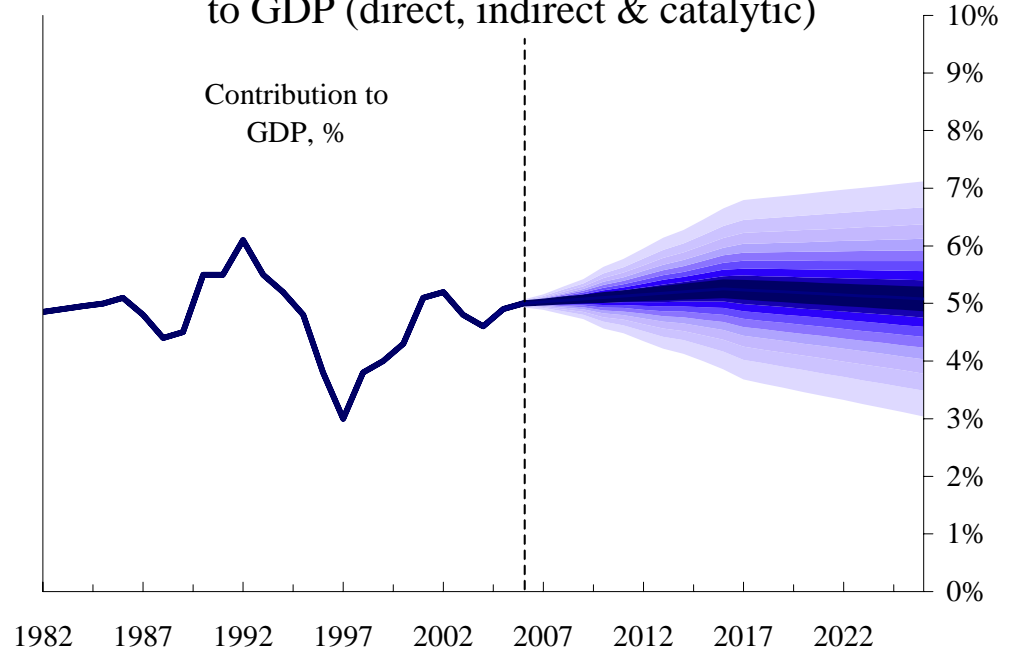
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Direct GDP	0.01%	1.3		
Indirect GDP	0.01%	1.1		
Catalytic GDP	0.07%	14.0		
GDP	0.08%	16.4	<b>66%</b>	<b>6.2%</b>

# Flex the model parameters

By 2025

Baseline starting assumptions

Impacts on AT demand

Impacts on AT supply

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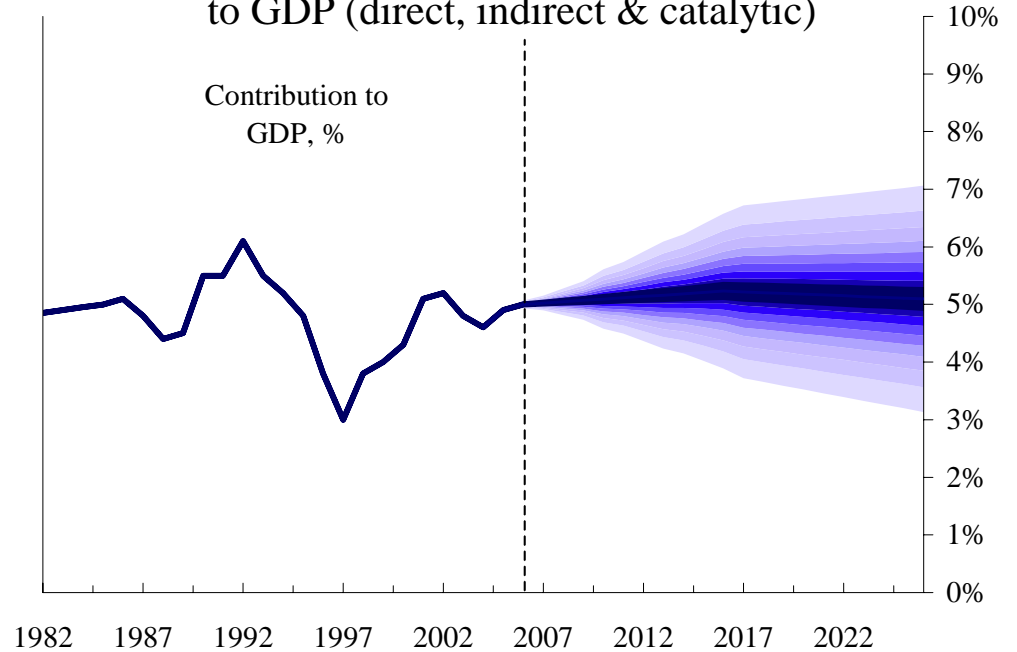
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Indirect GDP	0.00%	0.9		
Catalytic GDP	0.09%	18.3		
GDP	0.10%	20.2	<b>101%</b>	<b>5.2%</b>

# Flex the risks

By 2025

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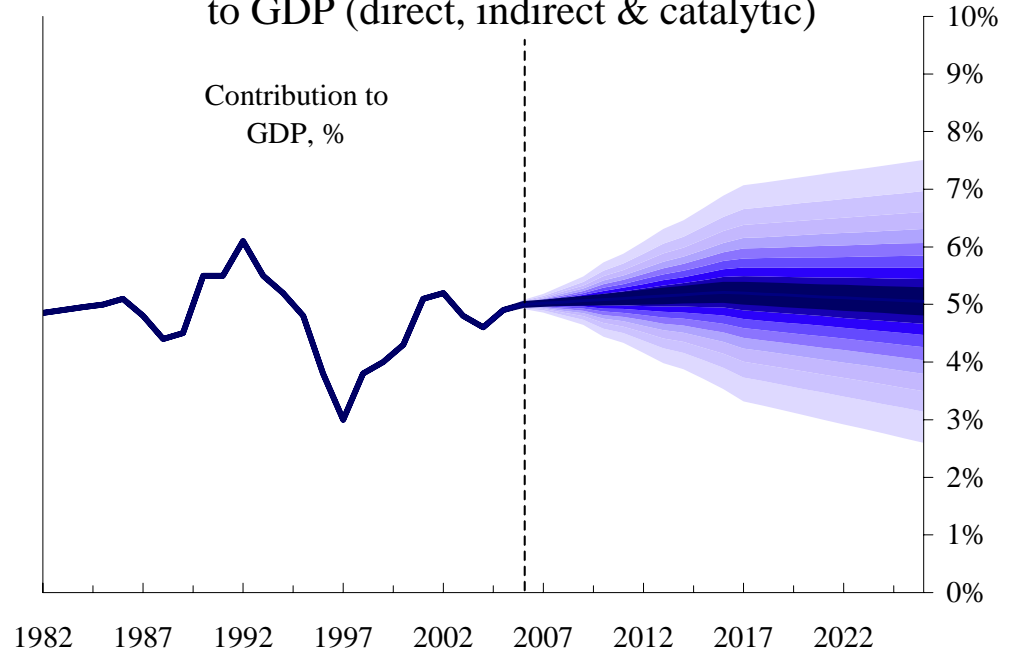
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# How can Oxford Economics help?

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**Quantify the costs and benefits of different options, reflecting industry views of the risks attached to each option:**

- For an individual airport
- For an individual metro area
- For an individual state
- For the U.S.A. as a whole

**Identify short-term and long-term economic effects**

**Identify effects on aviation sector, and on the rest of the economy**