Urban Commerce and Security Study (U-CASS)

Homeland Security University Programs
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Homeland Security

BENEFITS & COSTS OF COUNTER-TERRORISM SECURITY MEASURES IN URBAN AREAS

Adam Rose & Sam Chatterjee

CREATE

University of Southern California

MINETA TRANSPORTATION INSTITUTE
Created by Congress in 1991

NTSCOE National Transportation Security Center of Excellence

CREATE HOMELAND SECURITY CENTER

CCICADA
Command, Control, and Interoperability Center for Advanced Data Analysis

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BENEFIT-COST ANALYSIS

- Costs
  - direct & indirect (through the market)
  - spillovers (beyond the market)
  - avoid double-counting (flows only; no transfers)

- Benefits
  - *losses from a terrorist attack that can be prevented by the security measures*
  - positive spillovers too (improved business environ)

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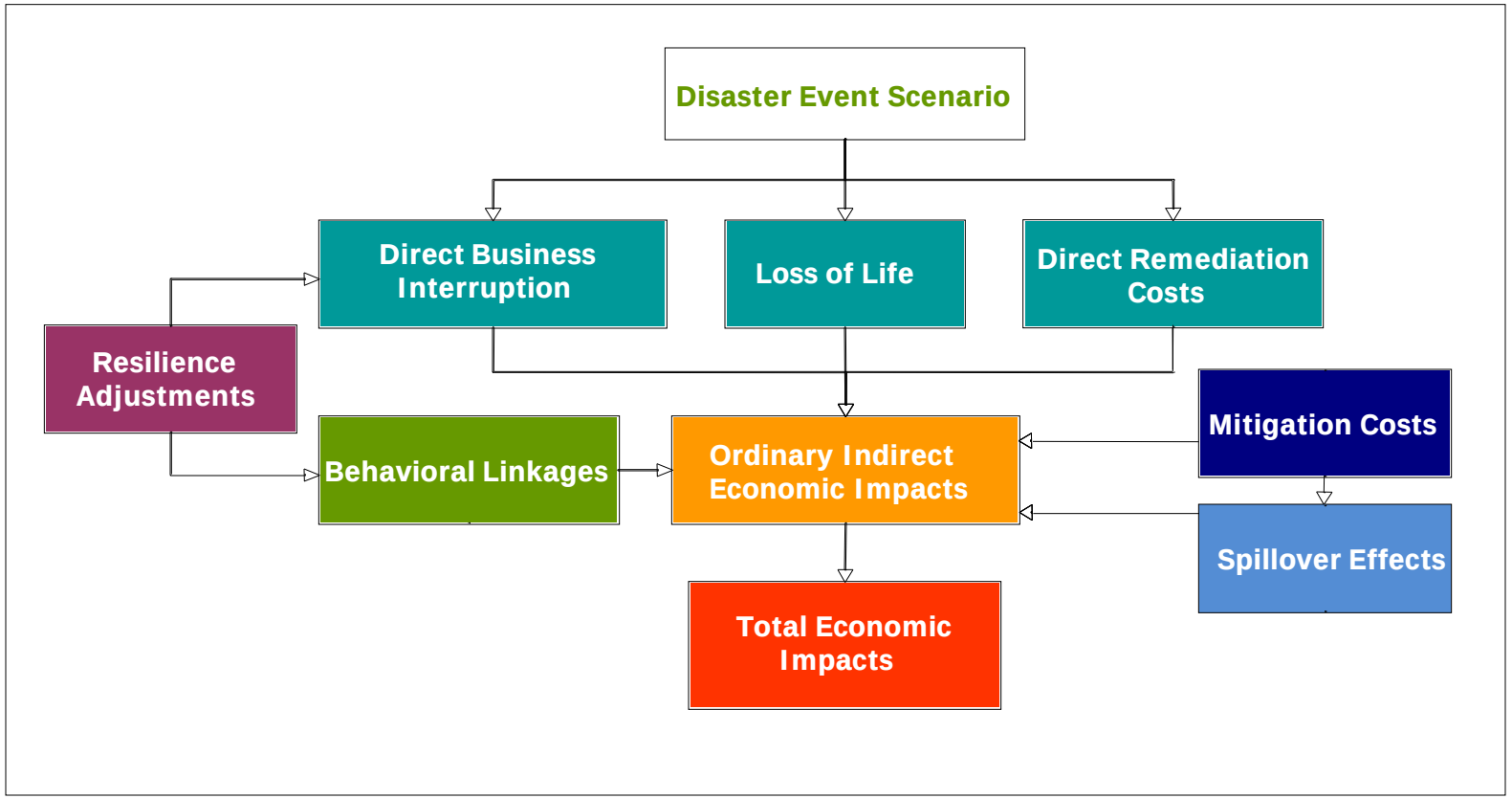

CREATE ECONOMIC CONSEQUENCE FRAMEWORK

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BEHAVIORAL LINKAGES

- Post-event, and often offsite, responses arising from skewed risk perceptions that translate into losses
  - social amplification of risk in S-R
  - stigma effects in L-R
- 9/11: 80% of BI from 2-year fear of flying
- LA RDD Attack: Behavioral 16X ordinary losses

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RESILIENCE EXAMPLE

- 95% of 1,100 WTC area firms relocated after 9/11
- If all of firms in the WTC area went out of business, direct business interruption (BI) loss would = $58.4B
- If all relocation were immediate, then BI = 0
- Businesses relocated within 8 months, BI = $16.1B
- Resilience Metric: Avoided Loss ÷ Max Potential Loss

$42.3B ÷ $58.4B = 72%

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ECONOMIC COMPONENTS OF SECURITY

Costs of Mitigation		Costs of Attack		Transfers	
Direct	Indirect	Direct	Indirect	Within region	Outside region
Capital	Mitigation stimulus (+?)	Death		Tax revenues	FEMA assistance
Operating		Injury		User fees	Insurance
Spillovers	Congestion (-)	Property damage			Subsidies for mitigation
	Delays (-)	Business interruption	Business interruption		
	Inconvenience (-)	Iconic values			
	Change in business environment (+,-)				
	Property values (+,-)				
	Fear factor (-)				

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COSTS OF MITIGATION

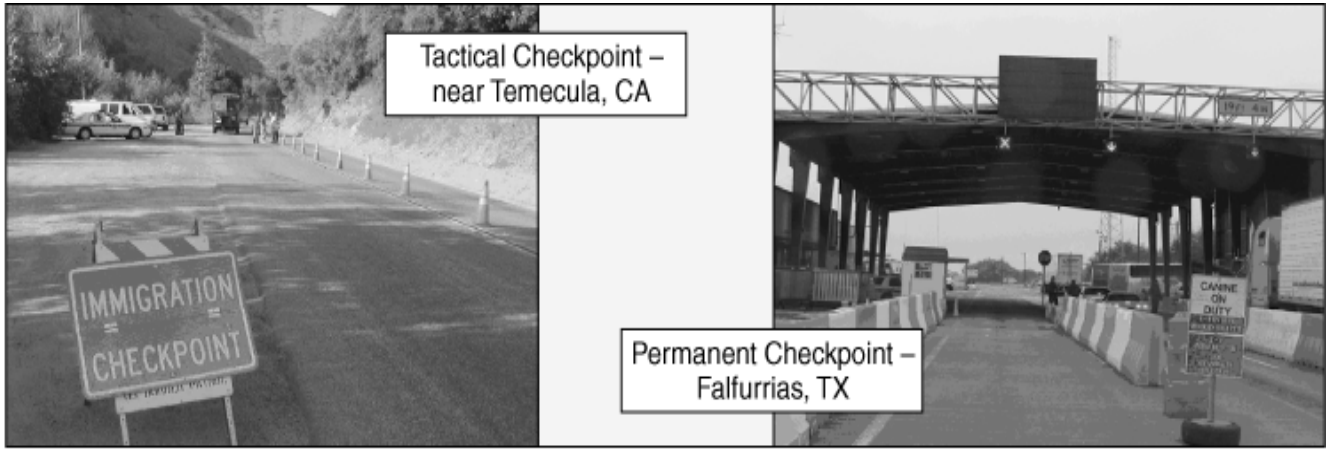
- Capital & Operating Costs -- *direct* stimulus (+?)
  - depends on alternative use of the resource
  - likely to be positive for NY Metro area if attracts outside investment or federal gov't subsidies
- Capital & Operating Costs -- *indirect* stimulus (+?)
  - urban security may have higher multipliers than alternative uses
  - depends in part on where inputs are produced

SPILLOVER (EXTERNALITY)

- Congestion (-): value of lost time
- Delays (-): value of lost time
- Inconvenience (-): willingness to pay to avoid it
- Change in Business Environment (+,-): output/sales
- Property Values (+,-): capitalized values of profits
- Environmental Quality (-): air pollution

TRAFFIC CHECKPOINTS

- Prevent unauthorized or undesired movement of traffic and personnel
  - U.S. Border Patrol: Permanent and Tactical



  - Urban Areas: Tactical (e.g., sobriety, security)

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BENEFITS AND COSTS OF TRAFFIC CHECKPOINTS

- RAND Study (2004): suggested adding permanent vehicle security checkpoints with bomb detection capability at the Los Angeles International Airport
  - Low-cost ($12 million annually)
  - Greatly reduces vulnerability to large vehicle bombs

- Local law enforcement, community, business leaders agree that benefits of checkpoint operations include reduction in crime & vandalism

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TRAFFIC CHECKPOINTS SUMMARY

- Some residents & business owners feel more secure, leading to positive impacts on property values or quality of life

- May raise concerns about the overall safety of the region and instill perceptions of fear, possibly leading to decreased business, real estate values & tourism

- Traffic congestion results in cost increases passed along in terms of price increases to customers of trucking companies & ultimately to consumers

- Improvements in the business environment result in increased direct economic activity & multiplier effects

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COMPUTABLE GENERAL EQUILIBRIUM ANALYSIS

Definition: Multi-market model of behavioral responses by individual producers & consumers to price signals & external shocks, subject to resource constraints.

- H1N1 Epidemic (Dixon et al. 2010)
- RDD Attack (Giesecke et al. 2011)
- September 11 Attacks (Rose et al. 2009)
- ARkStorm Scenario (Sue Wing et al. 2010)
- FMD (Oladosu et al. 2009)

CGE ADVANTAGES

- Individual behavior
- Market behavior
- Non-market considerations
- Economic disequilibria
- Economic resilience at micro, meso, macro levels
- Macroeconomic repercussions
- Distribution of impacts across socioeconomic groups

CONCLUSION

- *Benefit-Cost Analysis* is a comprehensive approach
- Supplemented by *CREATE Consequence Analysis*
- Not without challenges, especially *spillovers*
- *CGE* is an excellent empirical framework