



The methodological challenge of CGE impact studies of mega events

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Introduction: an economist reads the newspaper

il Giornale.it
milano

Expo, un business da 25 miliardi di euro per l'Italia

Le stime delle ricadute economiche dal 2012 al 2020 per l'economia italiana e il "sistema Paese" e per per Milano generate dall'Esposizione universale secondo una ricerca commissionata da Camera di commercio di Milano ed Expo 2015 a un team di analisti della Bocconi. Circa 200 mila i posti di lavoro diretti e indiretti generati fino al 2020. Il ruolo trainante dei flussi turistici provenienti dai grandi mercati internazionali

Alberto Taliani - Lun, 18/02/2013 - 17:33

Una produzione aggiuntiva di **25 miliardi di euro** (con un incremento di valore del **lavoro**). Sono queste le stime dell'indotto economico che Expo 2015 produrrà: investimenti della società di gestione e dei Paesi partecipanti, aumento delle assunzioni, creazione di nuove imprese.



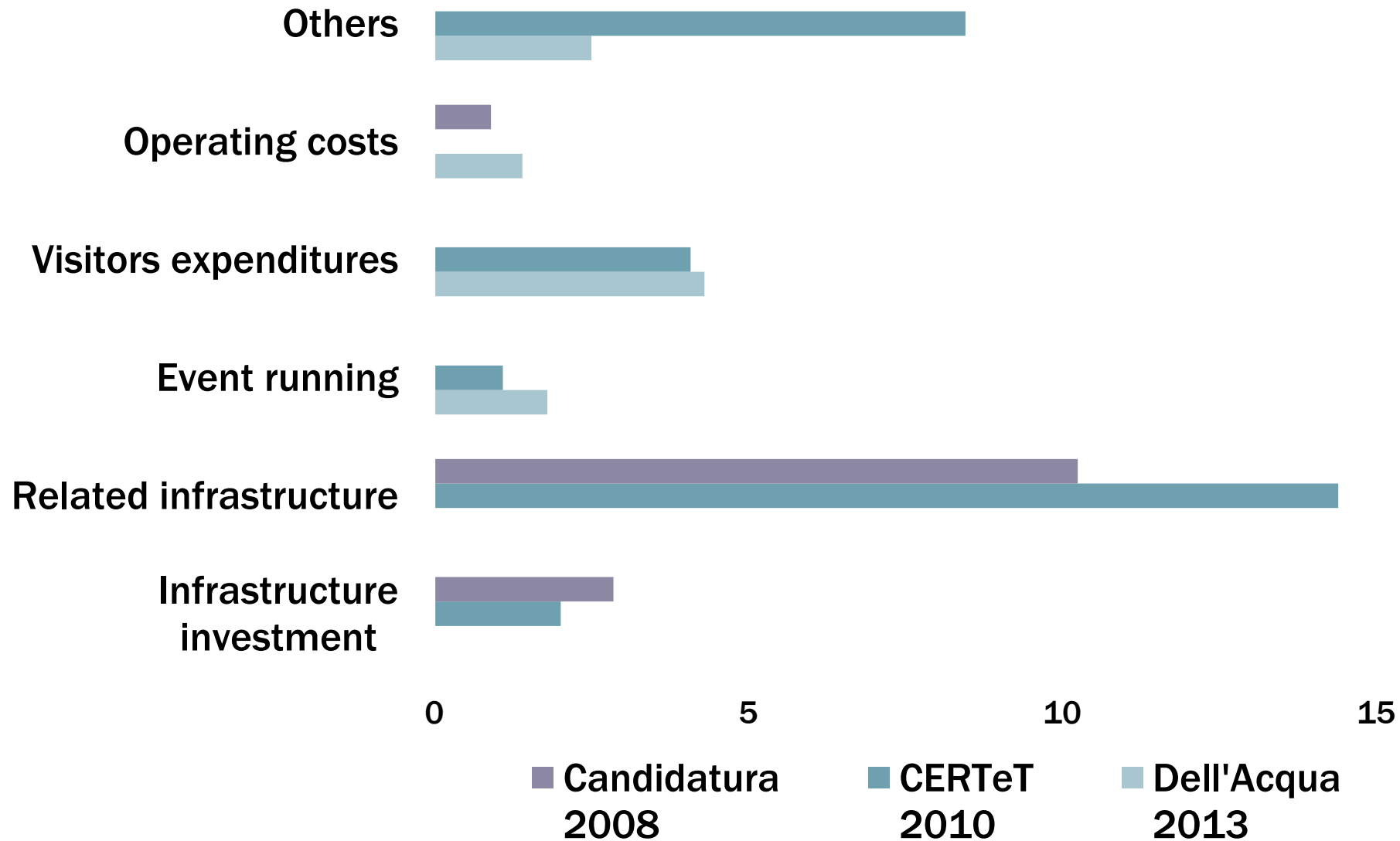
CAMERA DI
COMMERCIO
MILANO

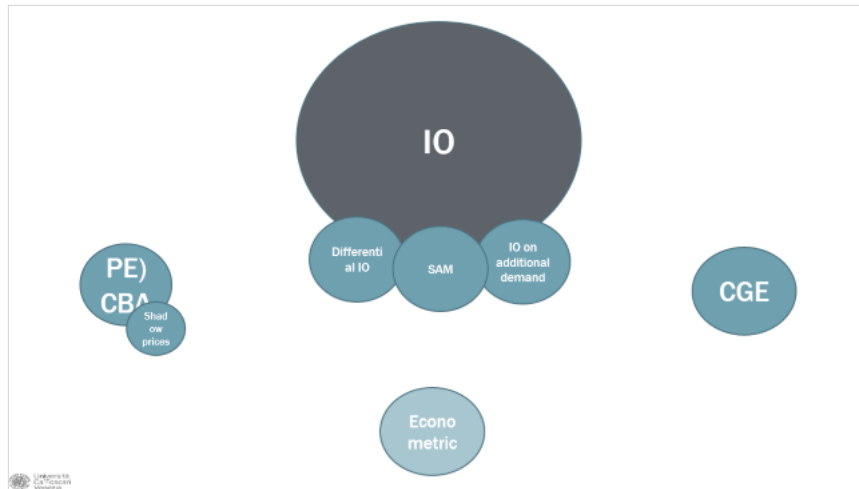


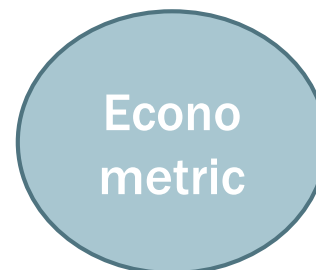
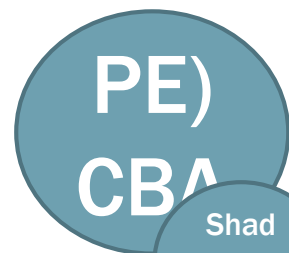
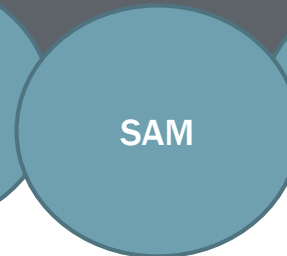
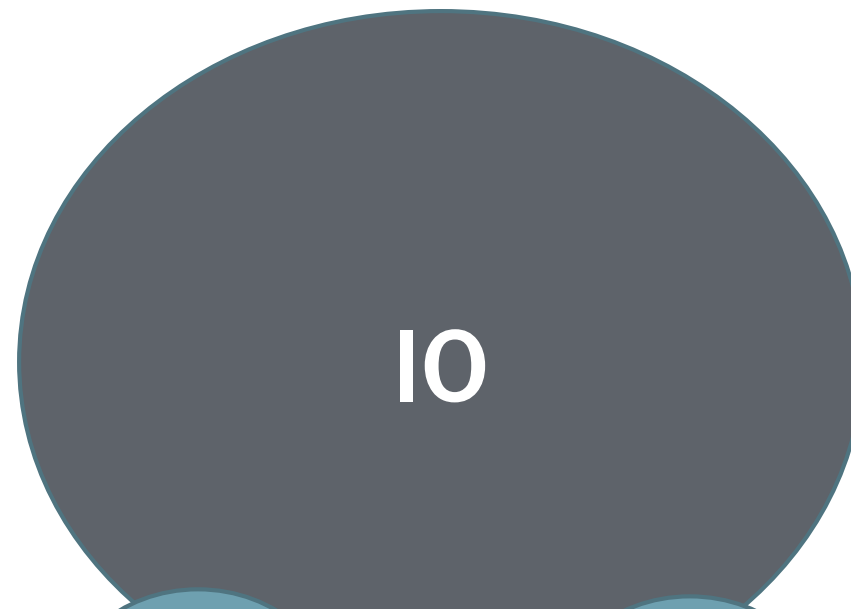
Expo 2015, un impatto da 25 miliardi di produzione e 200 mila unità di lavoro

**Dal 2012 al 2020 le ricadute della Esposizione Universale per l'economia
milanese e italiana secondo una ricerca commissionata da Camera di**

Forecast
Economic
impact of Expo
2015 bln Euro)







10

			Eventi One Shot														Eventi Ricorrenti	Analisi Settoriali				Strutture ricreative/sportive		
			Barcellona 1992	Atene 2004	Vancouver 2010	Vancouver 2010	Vancouver 2010	Rugby WC 2011	Londra 2012	Sochi 2014	Brazil WC 2014	Tokyo 2020	Tokyo 2020	Roma 2024	Calgary 2026	Coffee County 2005	Bloemfontein 2005	Lord's 2007	Montréal 2017	Gold Coast 96-Lan7	County 2013	Dubai 2015	Yellowstone 2006	Santa Clara 2007
Info Transpare nt	available methodo.																							
	detailed methodo.																							
	Replicable																							
	explicit assumption	private exp. public exp.																						
Info rme d	recognizes existing works																							
	substantially																							
Crit ic	overcost risks																							
	rigourous income Forecast																							
Realistic	inj diff. From reassignment	infr. Exp. Susbt. local exp. partially) substitutive																						
	Realist ex post	indipendent data checkeble methodo sufficient number of cases																						
	Considers negative results	ex post touristic flows Ex post Direct invest																						
	Attribuibility criteria																							
	considers costs and benefits																							
	same level of detail																							
	increased costs reduces outcome																							
Conceptuall y consistent	No prescriptive value																							
	No omitted major costs																							
	No doubel counting																							
	distinction Added Value and Production																							
Territorial and temporal consistency	Territorial consistency	area of interest discussed																						
		area of interest = financing																						
		lo matrix of adequate territorial level																						
		first stage leakages																						
	Temporal consistency	impact of matrix age																						
		temporal distribution of benefit explained.																						

CBA

Author	Event	stadium	transport infra	Infr benefits	CBA?	NPV	currentcy
McHugh, D.	Vancouver 2010 Olympic Games)	n.applicable	n.applicable		2	-102,00	MIn CAD 2002)
M M Keim	Sydney 2000 Olympics Games	n. available	n. available		1	NA	MIn \$
Marvin Shaffer, Alan Greer, and Celine Mauboules	Vancouver 2010	stadium and village + infra	Sea-to-Sky upgrade 720)		1	-1229,00	MIn CAD
ACT Auditor General.	V8 Car Races in Canberra	capital expenditure			2	-7,44	MIn \$AUS
Ta B. De	ships Windsor 2005	considered 0	n. applicable		2	-2,42	MIn CAD
Lo De Hu	n Junior Athletic	inv.t. cost	?		2	-7,18	MIn CAD
Ec de C.(Ap Olk P. Mi Af Pil		stadium costs	no		2	326,70	MIn €
		inv.t. cost	??		2	-4549,00	MIn €
		stadium	motorway construction		1	-10259,63	MIn \$
		no?	no?		2	-112,26	MIn AUD
		stadium	no		2	-154,90	MIn €
		no	no		2	-6,60	MIn AUD
					0	NA	MIn €
		no	no		1	0,34	MIn €
		no?	no?		2	NA	MIn €
		Stadium	event infra		2	916,00	MIn DKK
		road works	road construction		2	-5754,10	MIn \$
Ce		stadium	?		2	422,00	MIn €
Ov	ing Olympic Games:	yes	yes		1	-14257,00	MIn \$
Access Economics PTY Limited	What can Beijing Expect from its2008 Games?	yes	yes		2	-1477,40	MIn AUD
Ramirez Hurtado, Ordaz Sanz, & Rueda Cantuche,	Campeonato de Tenis femenino de la ITF en Sevilla en 2006	no	no		1	0,30	MIn €
Mathew Gomes Menezes	FIFA World Cup on South Africa 2010	yes	yes		1	-8448,00	MIn Rbn
Cambridge Policy Consultants	The Commonwealth Games 2002: A Cost and Benefit Analysis	yes	yes		1	2068,50	MIn £

- Some studies only on “holding the games”
- Negative outcomes
- Transport infra present as costs, but not as benefits for their own sake.

Is the CGE the solution ?

Promising
Flourishing
Moderately supportive
Questionable
Improvable

CGE

Promising

Flourishing

Moderately supportive

Questionable

Improvable

“all agents in the economy make mutually consistent plans, such that no agent (...) has an incentive to revise his or her plan. The approach is called general in contrast to partial because all market interactions are taken account of. (...), there are no “black holes” for payments to vanish in, nor mysterious fountains spitting money which agents receive. (...), all agents balance their budget; they expend exactly what they obtain. This does not preclude debt and credit, of course; but any debt and credit must be explicitly handled in the model, like sales and purchases of goods, services and factors of production.”

Promises

(Bröcker, 2003)

CGE

Promising

Flourishing

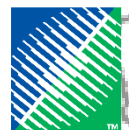
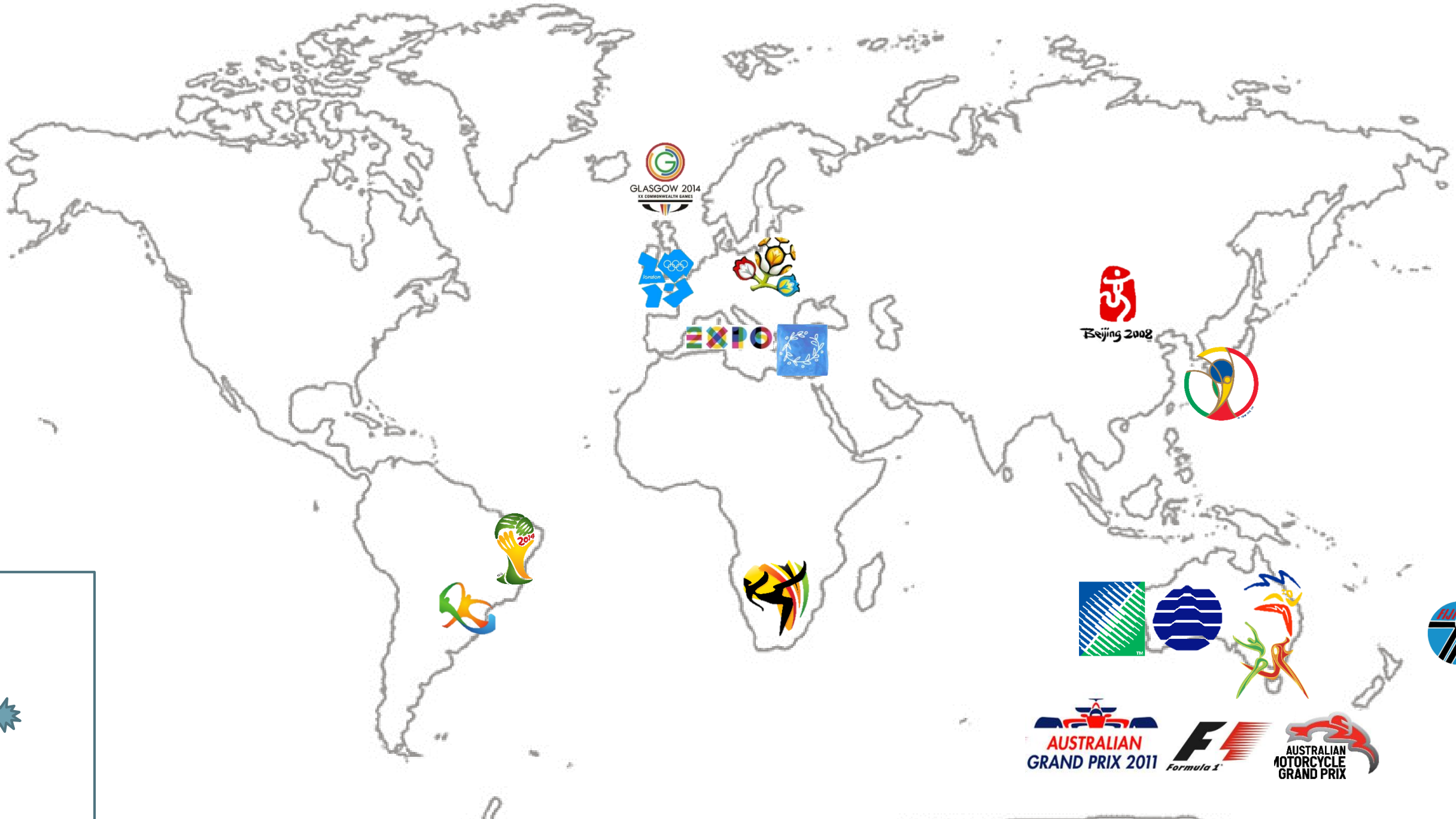
Moderately supportive

Questionable

Improvable

Existing studies





CGE

Promising

Flourishing

Moderately supportive

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Positive but ...

- ... relatively small
- ... or deceptive

Sydney Olympics impact on Household Real Consumption
(bln AU\$ discounted value)
based on year of publication

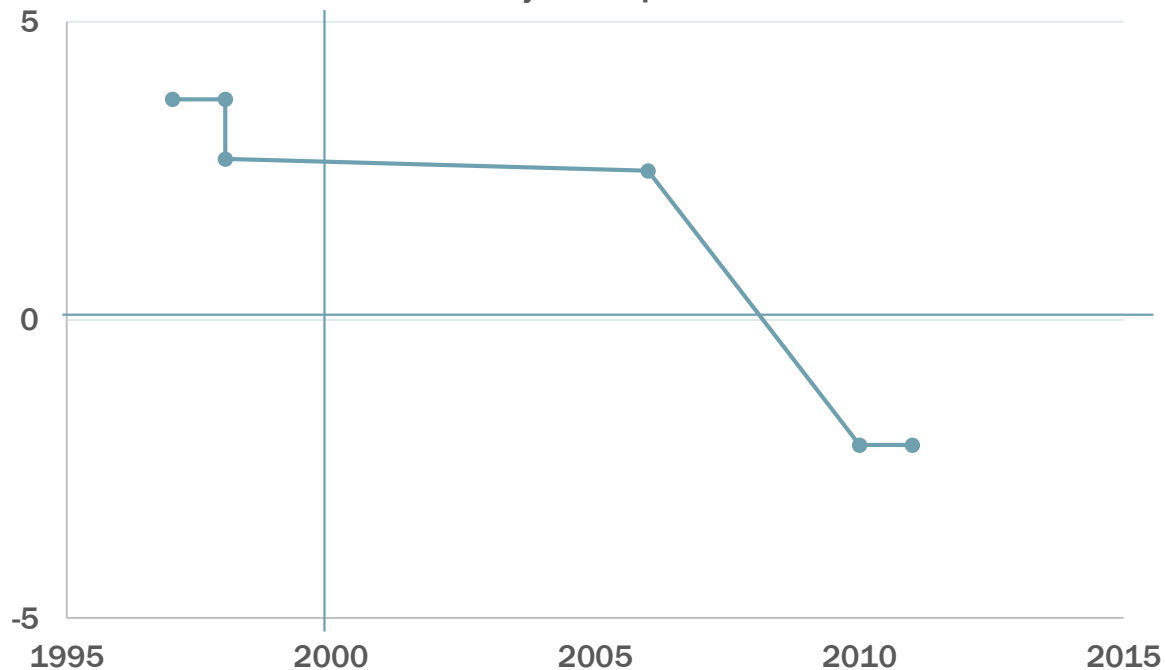


Table 1. Effects of Olympics on Australian Macroeconomic Variables (Percentage Deviation from the Base Case)

Variable	1997/ 1998 (1)	1998/ 1999 (2)	1999/ 2000 (3)	2000/ 2001 (4)	2001/ 2002 (5)	2002/ 2003 (6)	2003/ 2004 (7)	2004/ 2005 (8)	2005/ 2006 (9)
1. Real consumption	-0.12	-0.15	-0.07	-0.01	-0.03	-0.02	-0.02	-0.02	-0.01
2. Real investment	0.31	0.35	0.17	0.09	0.02	0.01	0.01	0.01	0.01
3. Real state government consumption	-0.22	-0.16	-0.33	-0.29	0.01	0.01	0.01	0.01	0.01
4. Real federal government consumption	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5. Export volumes	-0.06	-0.07	-0.02	-0.01	0.01	0.01	0.01	0.01	0.01
6. Import volumes	0.03	0.01	0.10	0.18	0.01	0.01	0.01	0.01	0.01
7. Real GDP	-0.04	-0.04	-0.06	-0.06	-0.01	-0.01	-0.01	-0.01	-0.01
8. Employment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9. Capital stock	0.00	-0.02	-0.04	-0.05	-0.06	-0.05	-0.04	-0.04	-0.03
10. Real wage index	0.19	0.18	0.13	0.10	-0.04	-0.04	-0.03	-0.03	-0.02
11. GDP deflator	0.06	0.05	0.04	0.04	-0.01	-0.01	-0.01	-0.01	-0.01
12. Terms of trade	0.10	0.08	0.12	0.18	0.00	0.00	0.00	0.00	0.00
13. Real exchange rate	0.09	0.06	0.15	0.27	0.00	0.00	0.00	0.00	0.00

Giesecke and Madden 2011

CGE

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Promises and compromises

■ Respects accounting identity	Not for govt. For instance Socci et al 2016
■ Consistent with optimisation of consumers and producers. A micro founded representation of behaviour	Almon critique
■ Room for non linearities in economic mechanisms (like non -fixed technical coefficients)	Constant Return to Scale
■ Considers intersectoral linkages	Fair, but no more than IO
■ Considers constraints on resources, typically factors	Unrealistic representation when factors are shocked on a very concentrated duration
■ Substitution effects: for private spending for public spending	Poor in Cobb Douglass function Often undocumented
■ Considers opportunity costs corresponding to alternative use of resources	Alternative use sometimes absent. If present rarely founded on welfare measures
■ Balance of payment constraints and currency effects	Sometimes used to shift the problem foreign debt)
■ Price effects (prices react and affect other variables)	Fine, but often unjustified rigidities like fixed wages

CGE

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Modelling

Pre modelling

Closure

A MONASH model can be represented as a system of m equations in n variables:

$$F(X, Y) = 0, \quad (2.13)$$

where F is a vector of m functions, X is the vector of $n - m$ variables chosen to be exogenous and Y is the vector of m variables chosen to be endogenous.

Possible corrections

Pre modelling

- **Attribuibility**
- **Exhaustivity**
 - All costs
- **Costlyness**
 - Overcosts
- **Substitution**
 - **Public investment:**
 - increased taxation or displaced public expenditures
 - **Private investment**
 - Substitute other private investment

Modelling

- **Productivity effects**
 - **Potentially negative impact on productivity or public capital**
 - Conrad 1997, Glomm and Ravikumar 1994, Seung and Kraybill 2001, Chen and Haynes 2013
- **Time pattern**
 - Concentrated shock
 - The model should be multiperiod if not dynamic
- **Space concentration**
 - Strong territorial concentration
- **Non-linearities**
 - Labour market des)equilibrium
- **Valid welfare measure**
 - EV is uncomplete
 - - - can be isguiding

Reference Model

MARTIN.a

Model for the Assessment of
Regional and Territorial INpacts*

- Sartori 2017a, 2017b
- Two periods model
- GAMS
- Based on GTAP SAM for Italy aggregated on 10 sectors
- CES, CET, Armington elasticities based on GTAP and text books' values
- LES demand
- Unemployment with Philipps curve

	shock in Sartori (2017b)
Pre	+ 21 140 k€ (+5%) investment expenditure (Manuf; Cons; GovSer; Trade Serv)
Event year	+ 7 960 € (+2%) of (local) population consumption (Trade, Tran, Comm, Recr) + 4 722 k€ of capital (0,5 %) compared with base situation

Table 2. Results from an illustrative simulation exercise

Macroeconomic Variables	Pre-event phase		Event phase (sim. 2)
	(sim. 1A)	(sim. 1B)	
Household consump. (%var)	-1.36	-1.29	0.53
Total investment (%var)	4.04	2.68	-2.40
Govern. spending (%var)	0 (exog.)	0 (exog.)	0 (exog.)
Exports (%var)	-0.12	1.18	1.27
Imports (%var)	0.15	0.23	-0.62
(Exports - Imports)/GDP (%var)	-0.08	0.3	0.6
(Taxes - Spending)/GDP (%var)	0.02	≈0	0.04
Consumer price index (%var)	0.05	-0.15	-0.31
Return to capital (%var)	0.07	-0.25	-0.49
Exchange rate (%var)	0 (exog.)	0 (exog.)	0 (exog.)
Industry output (%var)	-0.03	0.25	0.44
Real GDP (%var)	-0.06	0.20	0.65
Unemployment (%var)	0.45	-1.53	-3.06

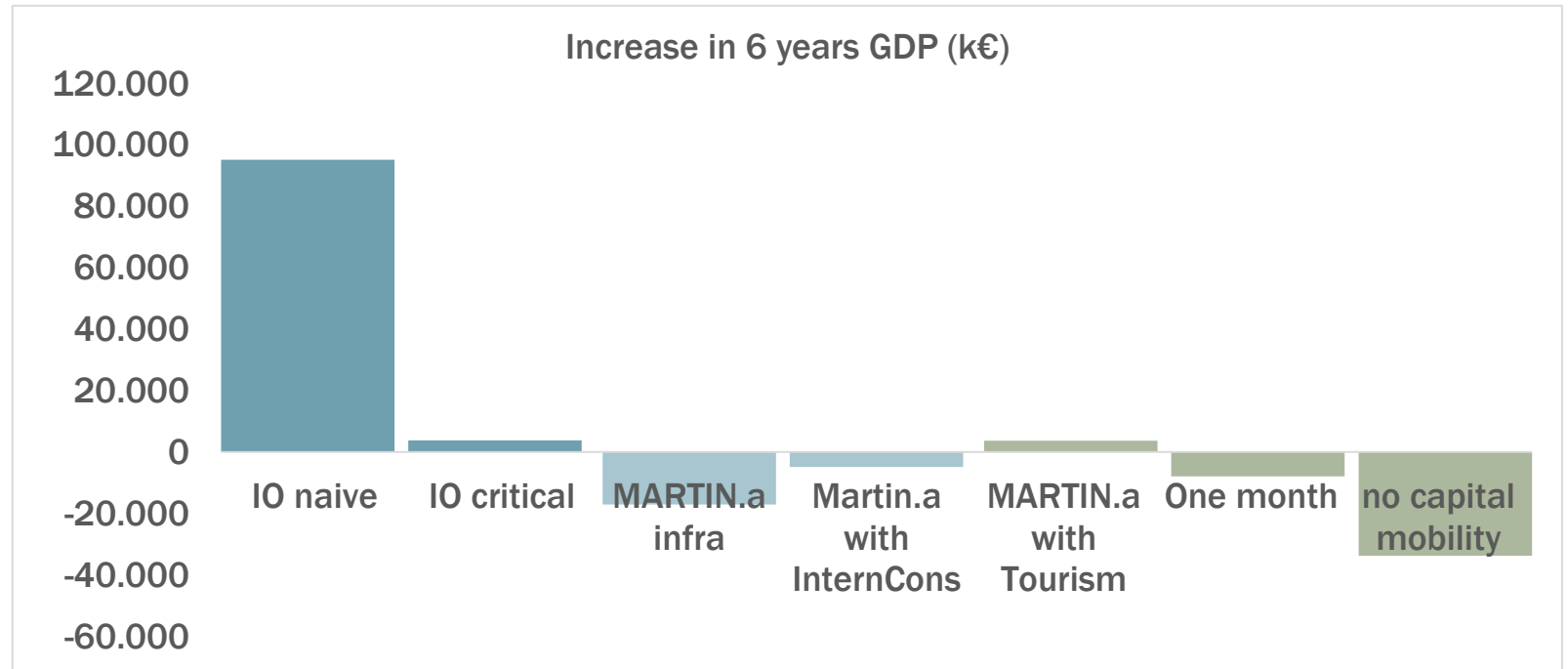
* where the N stands to record the analyst that error is waiting for him at the corner

Impacts

■ Results

- IO calculation
 - Naïve
 - Critical
- MARTIN.a results
 - Infra alone (5 years)
 - Infra + domestic consumption
- Improvements
 - MARTIN.a Package (tourism increase)
 - Time concentration
 - No capital mobility

	shock in Sartori (2017b)
Pre	+ 21 140 k€ (+5%) investment expenditure (Manuf; Cons; GovSer; Trade Serv) Extended on 5 years
Event year	+ 7 960 € (+2%) of (local) population consumption (Trade, Tran, Comm, Recr) + 4 722 k€ of capital (0,5 %) compared with base situation + 10 % of tourist expenditures on two items (Trade 4232; Recr 473)



Future developments

- **MARTIN.b**
 - Public capital
 - Realistic capital (im)mobility
 - Multiregion model
 - ...



Conclusions

CGE practionners view..

Self defeating statements

«There is no debt in CGE»

«There is no money in CGE»

«It is annual»

You cannot know what the consumption substitutes

You don't have to specify where the public spending comes, it can just be...

«There is no public capital in CGE»

«CGE cannot evaluate infrasectorial changes, it is just sensless to question this»

«there is no residual value in CGE»

Defence

«This is standard»

“This is the method”

“What else can you do ?”

“How will we shock productivity?”

Practice: post event shock

“The post-event phase is simulated through three exogenous shocks. First, the international price of exports is increased by 0.5%, to simulate the increased foreign willingness to pay for domestic goods; second, total factor productivity is raised by 0.1%, to simulate the “brand image” effect; and third...”

(Sartori, 2017b)

Conclusions

- Choosing the method is choosing the results
- Naïve IO still dominant and potentially harmful
- CGE models
 - make questions apparent (at least to the analyst)
 - if you don't hide them
- possibilities to improve realism ...

