



The University of Sydney
Integrated Sustainability Analysis TM



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Student topic

Social indicators, distributive effects,
and a SAM time series for Australia

1. Brief rationale

1.1 *Social indicators within the Triple Bottom Line*

The Triple Bottom Line (TBL) is a concept in which organizations such as companies and government agencies can measure their impact and performance in terms of the “three pillars of sustainability”. These three pillars are the economy, the society and the environment. Recently, TBL reporting for organizations has been advanced by applying quantitative methods. While economic and environmental indicators are readily available, only few social issues/indicators have been quantitatively conceptualised. The first aim of the project is to add a range of quantitative social indicators to the existing TBL indicator suite (for a list of indicators available in the ISA framework see http://www.isa.org.usyd.edu.au/research/ISA_TBL_Indicators.pdf).

1.2 *Social Accounting Matrices (SAMs)*

In order to allow further analysis, social indicators are conveniently arranged in a Social Accounting Matrix (SAM). The SAM concept has been around for a few decades. The second aim of the project is to integrate the quantitative social indicators from task 1.1 with an existing time series of input-output tables in order to create a time series of SAMs.

1.3 *Multipliers in semi-closed models*

Using input-output tables, impact analyses are conveniently done using Leontief’s open, demand-driven multiplier model. The resulting *type-I multipliers* represent the ripple effects of an exogenous final demand stimulus throughout the entire industrial economy. These ripple effects include all inter-industry supply chains, however they exclude earning-spending cycles that proceed via private households. Such earning-spending cycles can be enumerated using SAMs, and by endogenising previously exogenous final consumption. The resulting *semi-closed* system is characterised by significantly higher internal feedback, and by significantly higher *type-II multipliers* (Lenzen and Schaeffer 2004a). The third aim of the project is to calculate type-II multipliers for the Australian economy.

1.4 *Distributive effects and re-distributive cycles*

Open and semi-closed SAM models can be used to examine the effect on price rises or taxes on commodity prices. Considering the commodity structure of private final consumption, commodity price impacts can then be translated into distributive effects on purchasing power. Coupling purchasing with earning effects finally allows enumerating complete re-distributive cycles following a tax or price “shock” (Lenzen and Schaeffer 2004b). The fourth aim of the project is to examine such re-distributive cycles and possible “trickle-up” or “trickle-down” effects for Australia.

2. Knowledge, tasks and skills

- Data mining
- Constrained optimization techniques, data reconciliation
- National Accounting, open and semi-closed models
- Matrix algebra
- Modelling consumer behaviour, estimating demand functions

3. Supervisor

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4. Literature

On the Triple Bottom Line: www.isa.org.usyd.edu.au

On social indicators:

Brown 1993; Alarcón *et al.* 2000; Australian Bureau of Statistics 2001

On SAMS:

Stone 1966; Pyatt and Round 1979; Chander *et al.* 1980; Ghosh and Sengupta 1984; Gregory and Sinha 1984; Osman 1984; Round 1984; Drud *et al.* 1986; Stone 1986; de Melo 1988; Pyatt 1988; Cohen 1989a; Pyatt 1991; Keuning 1994; Bigsten 1995; Hewings and Madden 1995; Kilkenny and Rose 1995; Round 1995; Cohen 1997; Thissen and Löfgren 1998; Golan and Vogel 2000; Lenzen and Schaeffer 2004a

On re-distributive cycles:

Miyazawa and Masegi 1963; Miyazawa 1976; Henry and Martin 1984; Skolka 1984; Rose and Beaumont 1988; Cohen 1989b; Rose and Beaumont 1989; Willumsen 1990; James and Khan 1993; Sinha *et al.* 2000; Cavalcanti 2001; Lenzen and Schaeffer 2004b

On distributive effects of prices and taxes:

Berndt and Morrison 1979; Gianessi *et al.* 1979; Pyatt and Round 1979; Gianessi and Peskin 1980; Herendeen and Fazel 1984; Common 1985; Lager 1988; Smith 1992; Casler and Rafiqui 1993; Cornwell and Creedy 1995b; a; Hamond *et al.* 1999; Speck 1999

5. References

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