

Treating Intangible Inputs as Investment Goods: the Impact on Canadian GDP

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Definition of Intangibles

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All capital goods which have a knowledge component to them. These goods are produced from firms' spending on activities such as

- ▶ Development of software and computerized databases
- ▶ Scientific and non-scientific R&D
- ▶ Training
- ▶ Advertising
- ▶ Organizational design and change

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- ▶ Yet, these are treated by national income accounts as intermediate inputs which get fully used up in the production process
- ▶ Question: What is the impact of capitalizing intangible investment, as opposed to expensing it, on GDP growth in Canada?

Literature

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- ▶ US: Nakamura (1999, 2001, 2003) Corrado, Hulten and Sichel (2005, 2006)

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- ▶ UK: Haskel and Marrano (2006, 2007)
- ▶ Netherlands: Van Rooijen-Horsten, van den Bergen and Tanriseven (2007)
- ▶ Japan: Fukao, Hamagata, Miyagawa and Tonogi (2007)
- ▶ France & Germany: Hao, Malone and van Ark (2007)

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 1. Calculate the bias in estimates of real GDP growth
 2. Analyze impact on growth accounting

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- ▶ Economic competencies:
 - ▶ brand equity
 - ▶ human capital created inside firms
 - ▶ organizational change and design

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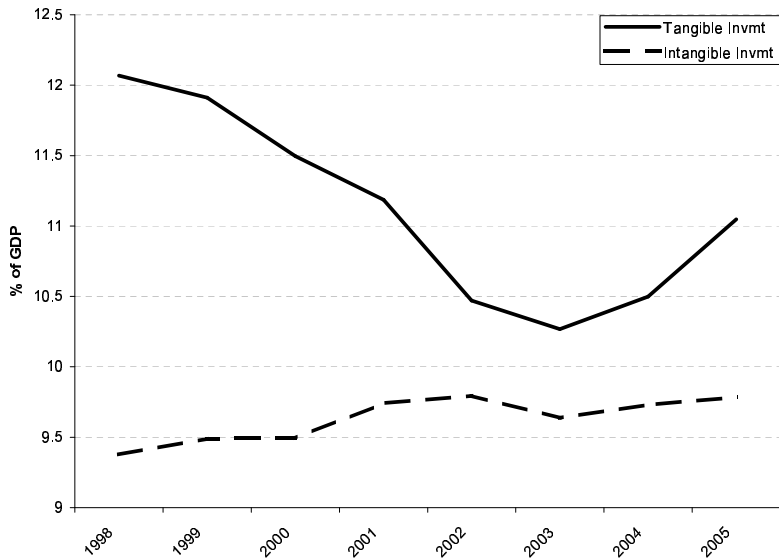
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- ▶ When all else fails: “educated” guess! [e.g., own-account spending on organizational change and design]

Intangible Expenditure by Item

Type of intangible investment	Spending as a % of Reported GDP							
	1998	1999	2000	2001	2002	2003	2004	2005
Computerized information	1.09	1.07	1.02	1.19	1.11	1.11	1.06	1.03
Computer Software	0.97	0.95	0.87	0.98	0.89	0.89	0.85	0.83
Computerized databases	0.12	0.12	0.15	0.21	0.22	0.22	0.21	0.20
Innovative property	4.30	4.35	4.49	4.72	4.78	4.80	4.83	4.97
Scientific R&D	1.65	1.68	1.79	1.97	1.91	1.86	1.87	1.90
Mineral exploration	1.04	1.03	1.00	1.08	1.10	1.06	1.09	1.11
Non-Scientific R&D	1.61	1.64	1.70	1.68	1.77	1.87	1.88	1.96
Copyright and license costs	0.03	0.03	0.03	0.05	0.05	0.09	0.10	0.11
New product development costs in financial industry	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03
R&D in remaining service industries	1.57	1.60	1.66	1.61	1.70	1.76	1.75	1.82
Economic competencies	3.99	4.07	3.98	3.83	3.90	3.73	3.84	3.79
Brand equity	0.56	0.54	0.54	0.54	0.52	0.48	0.48	0.50
Advertising expenditure	0.47	0.45	0.45	0.45	0.42	0.39	0.39	0.41
Market research	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Firm specific human capital	2.38	2.40	2.36	2.15	2.23	2.13	2.26	2.16
Direct firm expenses	1.19	1.20	1.18	1.08	1.11	1.06	1.13	1.08
Wage and salary costs of employee time	1.19	1.20	1.18	1.08	1.11	1.06	1.13	1.08
Organizational structure	1.04	1.13	1.08	1.14	1.16	1.12	1.10	1.13
Purchased	0.66	0.71	0.68	0.72	0.73	0.70	0.69	0.71
Own account	0.39	0.42	0.40	0.42	0.43	0.41	0.41	0.42
Total	9.38	9.49	9.49	9.74	9.79	9.64	9.73	9.78

Expenditures on Physical and Intangible Investment Goods



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- ▶ Canada's investment in intangibles is lower than the U.S. and the U.K.
- ▶ GDP growth in Canada is on average understated by 0.1% per year for the period considered with a standard deviation of 0.23%.

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- ▶ This work focuses only on private expenditures so no public expenditures
- ▶ Time is ripe to ask new and different questions.

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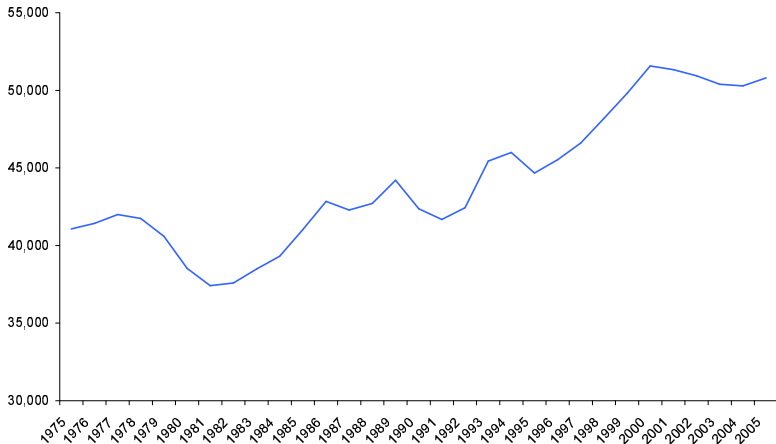
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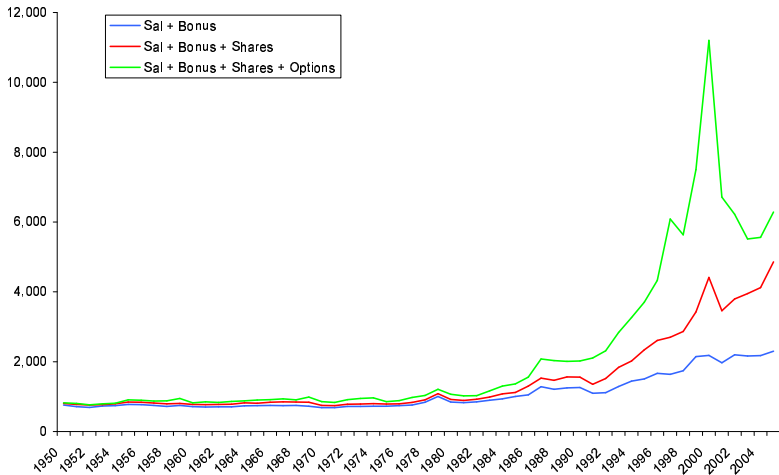
Real Mean Earnings of University Graduates

Source: U.S. Census Bureau (Current Population Survey)



Real Mean Compensation of Executives (in thousands)

Source: Frydman and Saks (2007)



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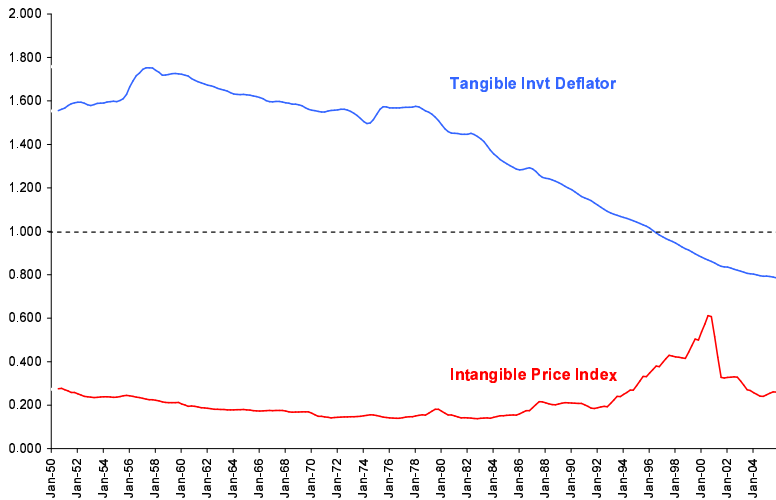
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- ▶ Calibrate ϕ_t to match findings in Corrado et al. (2006) and set θ_t equal to economy wide labor productivity.

Real Prices of Tangible and Intangible Goods

Source: NIPA and authors' calculations



New Price of Aggregate Investment

Source: NIPA and authors' calculations

