

## Appendix B

# Some Regressions

I present here, for illustrative purposes, some OLS tests on contentions made in the main body of this work.

1) Relationship between regional subsidies, relative per capita GDP and relative per capita personal income

Testing how these series are related presents some problems. All three series have an upward trend, as would be true of virtually any GDP-related series or government-expenditure related series in any developed country over the last 35 years. This work has argued that regional subsidies suppress economic growth, but also acknowledged that lower relative economic growth would be likely to spark increased subsidies. Thus any negative relationship found between the two begs the question. However, it is worth noting that between 1961 and 1972, subsidies and relative GDP are positively correlated (.33) and, after 1972, they are negatively correlated (-.43). This implies that adjustment mechanisms do not necessarily lead to a negative relationship between subsidies and relative GDP, and it supports the contention made in this work that a relatively low level of regional subsidies in the 1960s may have helped Atlantic Canada economically, but that their growth thereafter introduced distortions in the economy which inhibited economic growth.

Using a simple linear regression, I took the trend on all three series; the t-stat is in brackets.

	Intercept	Trend	adjusted R <sup>2</sup> = .81
For GDP:	0.55 (61.2)	0.0045 (11.6)	
For regional subsidies:	1282.86 (5.9)	64.33 (5.8)	adjusted R <sup>2</sup> = .51
For personal income:	0.65 (191.4)	0.0047 (27.0)	adjusted R <sup>2</sup> = .95

Then, I ran regressions on the residuals to test the impact of departures from trend in subsidies on departures from trend in GDP and personal income. Given that subsidies had very large policy-driven departures from trend, any contention that subsidies suppressed (promoted) GDP growth should show up in departures from GDP trend, while the contention that subsidies supported personal income growth implies departures from trend in this series in response to departures from trend in the subsidies series.

When unlagged variables are used, tests on the detrended series showed that regional

subsidies have a negative relationship with GDP, but this, as noted, just begs the question. I lagged subsidies to test impact on the following year's GDP and found that an increase in transfers in year t-1 was negatively associated with GDP in year t.

Detrended GDP (t)	Intercept -0.00096	Detrended -0.000028 (-4.7)	adjusted R <sup>2</sup> = .41 subsidies (t-1)
For regional subsidies:	1282.86 (5.9) (not significantly different from zero at the 95% level)	64.33 (5.8)	adjusted R <sup>2</sup> = .51

Similar regressions on personal income found that the impact of movements of regional subsidies off trend on the movement of personal income off trend was insignificantly different from zero. Given the large departures from trend of subsidies, the fact that the impact on detrended personal income was insignificantly different from zero at the 95 per cent level lends some support to the contention that regional subsidies have had little if any impact on personal income.

Detrended personal income GDP (t)	Intercept -.1E-16 (not significantly different from zero at the 95% level)	Detrended subsidies -3.7E-6 (not significantly different from zero at the 95% level)	adjusted R <sup>2</sup> = .05
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Differing lag structures also produce results which are insignificantly different from zero in tests on personal income.

## 2) Transfers

The argument was made in this work, particularly [Appendix A](#), that changes in Atlantic Canada's GDP did not drive changes in regional subsidies. The test discussed here looks at how much of the change in subsidies can be attributed to changes in Atlantic Canada's economy relative to the "have" provinces. The way in which regional subsidies are calculated and the provinces on which these calculations are based have changed over the years. As a proxy, I used the per capita difference in own-revenues raised by, on one hand, the Atlantic provinces and, on the other hand, the three richest provinces, Ontario, Alberta and British Columbia. Provincial revenues should also serve as a rough proxy for differing

levels of economic activity in the provinces. I used a number of different specifications (raw data, percentage change, exponential growth, etc.) nothing produced anything like a fit. Here's an example:

(NT <sub>t</sub> - NT <sub>t-1</sub> )	(DR <sub>t</sub> - DR <sub>t-i</sub> )	adjusted R <sup>2</sup> = .026
54.3	-0.79	
(not significantly different from zero at the 95% level)	(not significantly different from zero at the 95% level)	

where DR represents the difference in per capita provincial revenues between rich and poor provinces; NT is per capita net transfers; and i represents year. Neither the variable or the intercept were significantly different from zero at the 95 per cent level. Thus, even if more sophisticated methods are able to coax out better results - and it unlikely the relationship is as weak as this fit would suggest - it is difficult to conclude that very much of the movements in net transfers were due to differing revenue production in the rich and poor provinces or, since this should be a good GDP proxy, that much of the movement in subsidies was due to differing GDP growth.