

Lecture 4a: Taxation and income distribution

Economics 336/337

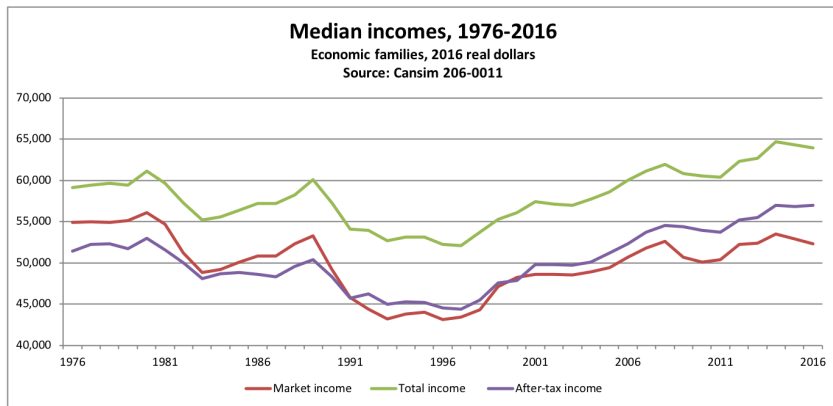
“Ye have the poor always with you,” says the Bible.

Some observations closer to home

- Market income inequality is high and rising
 - average person in the top 10 per cent earns 20 times that of average in bottom 10 per cent
- Tax/transfer policies reduce inequality a lot – but not the trend towards greater inequality
- Economic growth has favoured the rich
 - have earnings grown for the median family? depends on your baseline...
 - earnings fell in bottom decile 1979-1999
 - income growth concentrated in top 1% and above

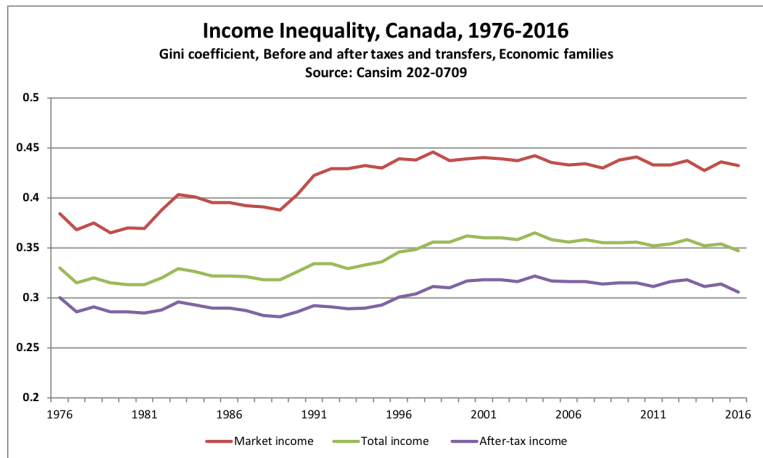
See following graphs.

The average family is doing better in Canada recently...



Pre-tax income of average family has been rising more slowly than total income – why?

... but inequality has risen



Gini coefficient is a common index of inequality – it rises when incomes of poor fall relative to the median.

When we evaluate fairness of tax system, we typically look to two principles.

- ① **vertical equity:** individuals with higher wellbeing (income) should pay higher tax
 - can be justified by ethical notions of fairness, diminishing marginal utility of income, etc.
- ② **horizontal equity:** individuals who are equally well off before taxes should pay the same tax
 - taxation should not be arbitrary or capricious
 - some preferences and choices should not be considered – e.g. “chocolate vs. vanilla ice cream lovers”
 - defining this is hard...

Measuring progressivity

How do we measure vertical equity/progressivity of tax system? How is it related to work disincentives?

For any tax system, let $T(Y)$ be tax paid at pre-tax income Y . Define:

- average tax rate: $A(Y) = T(Y)/Y$
- marginal tax rate: $M(Y) = dT(Y)/dY$

Definition: A tax system is:

$$\left. \begin{array}{l} \text{progressive} \\ \text{proportional} \\ \text{regressive} \end{array} \right\} \text{ if } A(Y) \text{ is } \left\{ \begin{array}{l} \text{increasing in } Y \\ \text{independent of } Y \\ \text{decreasing in } Y \end{array} \right.$$

A *flat-rate income tax* has a constant marginal tax rate on income t , and it pays a lump-sum benefit $G > 0$ to all taxpayers regardless of income.

Graded exercise

Write down $A(Y)$. Show that this tax progressive.

A higher tax rate reduces after-tax income inequality. So, to reduce inequality, why not simply set the marginal tax rate to 100%?

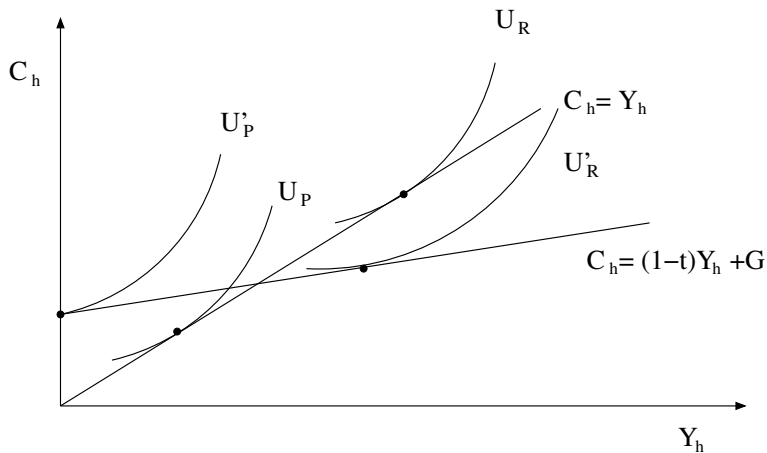


Figure: Income and consumption under a flat tax

The flat-rate tax system above results in a **negative tax payment** for those with lowest market incomes – there, it is actually a benefit, not a tax.

We can model any income support program this way. If $B(Y)$ is cash benefit received as a function of market income Y , the budget constraint is

$$C = Y + B(Y)$$

Examples of income support programs in Canada:

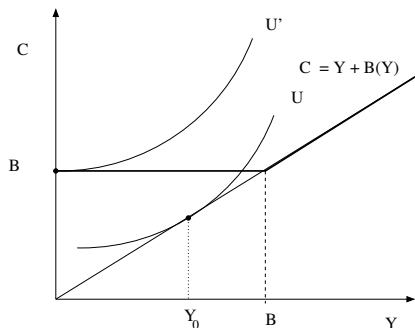
- Ontario Works (cash welfare)
- Canada Child Benefit (federal cash benefit to low-income families with children)
- Canada Workers Benefit (working income subsidy)

If benefits are targeted to only those with lowest incomes, then $B(Y)$ is a decreasing function over some income ranges. We say that “benefits are clawed back” when recipient earns more market income. That is:

- higher market income leads to lower benefit
- benefit clawback is exactly like a tax – it has the same incentive effects
- we can analyze effects of the benefit on labour supply in our standard model

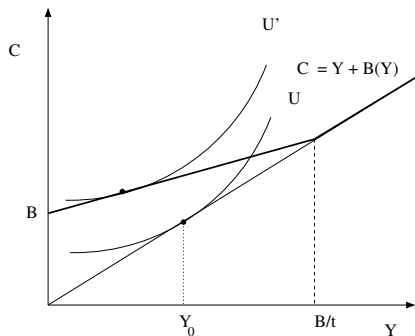
See examples for different benefit programs in following slides.

Traditional welfare program



- all labour earnings up to target benefit B are clawed back
- what is the marginal tax rate on earnings $Y < B$?
- what is the predicted effect on labour supply of those with $Y_0 < B$? $Y_0 > B$?

Negative income tax

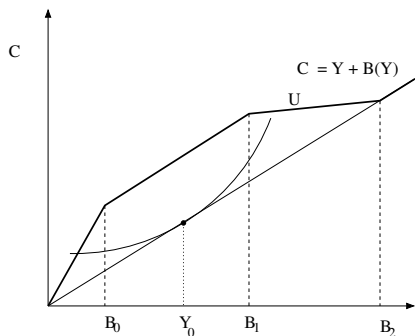


- to reduce disincentive effects, set $B(Y) = B_0 - tY$ where t is the clawback rate
- sometimes called a “negative income tax” program (why?)
- example: Canada Child Benefit payments are reduced by 7-23% of incomes over \$30,000
- relative to no benefits, what is the predicted effect on labour supply due to substitution effects? income effects?

Compared to welfare, NIT is less targeted on the poorest

- unless incentive effects are very strong, it is either more expensive than welfare – or benefits are reduced, so that it is less redistributive

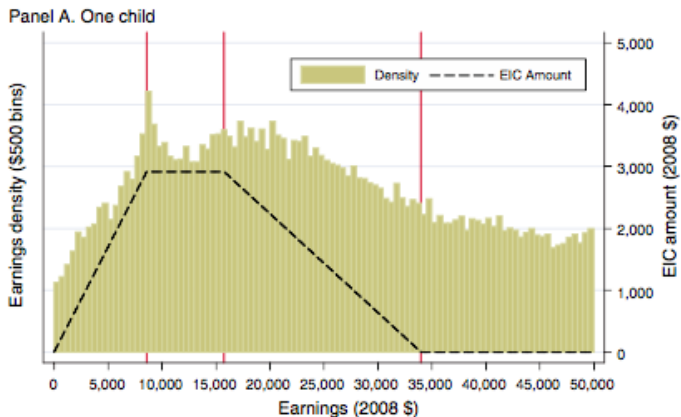
Working income benefit



- now benefits are **phased in** at low earnings $Y < B_0$, then clawed back again at higher earnings $Y > B_1$, until they are eliminated for $Y > B_2$
- for $Y < B_0$, this is a **subsidy**
- example: Canada Worker Benefit/Earned Income Credit (EIC) in US
- what is the predicted effect on labour supply of those with $Y_0 < B_0$? $Y_0 > B_0$?
- **which program design do you think makes sense?**

Saez (2010) looked at impact of US EIC on reported incomes. If people respond to incentives, they should “bunch” at kink points B_0 and B_1 (why?).

Evidence of bunching



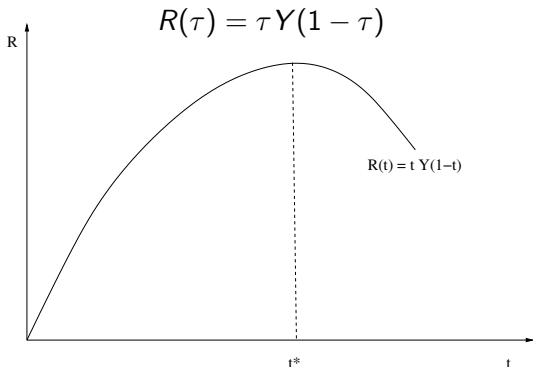
There is bunching at the first but not second kink. Saez shows this effect is driven by the self-employed, not wage earners. **Why do you think this is so?**

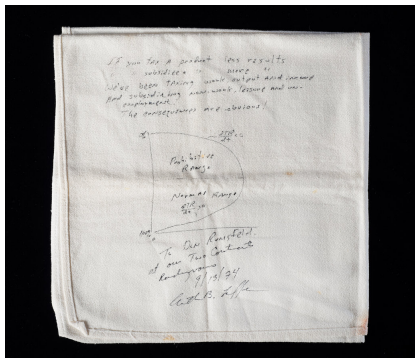
Back to a general analysis of (linear) income tax systems and their effects on the economy.

Let total income be a function $Y(1 - \tau)$ of the taxpayer's "take-home share" $1 - \tau$ of earnings.

- we expect $Y'(1 - \tau) > 0$ because of behavioural effects

Let government revenue be the function





The revenue function is sometimes called the **Laffer curve**.

In 1974, economist Arthur Laffer met senior White House officials to argue that cutting income tax rates would cause government revenue to **rise** due to behavioural effects.

To make his point, he says he sketched $R(\tau)$ on this restaurant napkin – which is now in a museum!

(Those senior White House officials went on to propose tax cuts, and were Donald Rumsfeld and Dick Cheney. What else are they most famous for?)

Marginal revenue from tax increase is

$$\frac{\partial R}{\partial \tau} = Y - \tau Y' = Y - \frac{\tau}{1 - \tau} eY$$

where

$$e = \frac{(1 - \tau) \partial Y(1 - \tau)}{Y \partial(1 - \tau)} \approx \frac{\Delta\%Y}{\Delta\%(1 - \tau)}$$

is the **elasticity of taxable income**

To interpret this expression, define

$$M = Y \quad \text{and} \quad B = -\frac{\tau}{1 - \tau} eY$$

The **mechanical effect** M is the additional revenue from increasing the rate if the tax base does not change. The **behavioural effect** B is the loss in revenue as the base shrinks due to behavioural (tax avoidance) responses.

Laffer argued that e was so high that $\partial R/\partial \tau < 0$. So a tax cut would actually increase revenue, as well as reducing excess burden.

Graded Exercise

Suppose that $Y = 100$ and $\tau = 0.25$. Calculate the mechanical and behavioural effect of a one-percentage point tax rate increase, assuming that $e = 0.75$. At what tax rate is revenue maximized?

Faced with higher tax rates, taxpayers may reduce taxable incomes through

- 1 real responses: e.g. work less, invest less, migrate out of jurisdiction
- 2 avoidance responses: e.g. reclassify income, evasion

Incorporating all these responses, taxable income is a function $Y(1 - \tau)$, and ETI measures the magnitude of avoidance responses.

Note ETI lets us measure excess burden of taxes, not just revenue effects:

- When people avoid taxes, the money they save is money lost to the government – which is a wash
- But the costs they bear to avoid taxes (changes in work, consumption, accountants' fees) are a real loss to the economy
- For “real” or “avoidance” responses, excess burden is the same.

Avoidance responses: An example

www.collinsbarrow.com/en/cbn/publications/ontario-high-income-earners-to-be-hit-by-new-tax-effective-july-1-2012

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Ontario High Income Earners to be Hit by New Tax Effective July 1, 2012

June 20, 2012 saw the Ontario Liberal government legislate an additional 2% "wealth tax" on individuals and their taxable income in excess of \$500,000. The additional tax will be phased in over 2012 and 2013 and the combined federal and Ontario top marginal rate of income tax on income over the new threshold will rise to 47.97% in 2012 and 49.53% in 2013. The current top rate is 46.41%. The Ontario government anticipates that the additional tax will generate approximately \$470 million in revenues each year to be applied against the province's current \$15 billion deficit. The "wealth tax" is expected to be eliminated when the provincial budget is balanced, which is projected to occur in 2017/2018.

As with any new income tax proposals, individuals should consider the impact on their own circumstances and evaluate their tax planning options as applicable.

Income Splitting with a Trust

Simple income splitting strategies can help you both avoid the 'wealth tax' in the short term, but may also provide long term benefits by taxing income in the hands of a family member who may be in a lower tax bracket.

Establishing a family trust to transfer investment income to lower income family members is a commonly used alternative to split income with children, grandchildren or nieces and nephews. In Ontario, an individual with no other sources of income may earn approximately \$10,500 of interest, \$21,000 of capital gains, or \$50,000 of eligible dividends each year tax free. It is important to consult a professional advisor with respect to setting up any family income splitting structure as the 'attribution' and/or 'kiddie tax' rules in the Income Tax Act ('Act') may nullify any tax benefit sought.

- Farm Alert
- NPO Alert
- Budget Reports
- Capital Markets
- Credit Unions
- Presentations
- Technical Bulletins and IFRS
- Français - Bulletins
- Français - Budgets

Service Categories

- Audit & Accounting
- Entrepreneurial Services

We can estimate the ETI to learn about two separate but related questions:

- If we raise tax rates by 1 per cent, how much will revenue go up?
- If we raise \$1 more in revenue, how much will excess burden go up?

A natural way to estimate ETI is to examine actual taxpayer responses to real-world tax reforms: do people increase their reported income when tax rates go down?

Martin Feldstein was Ronald Reagan's chief economist when the 1986 US Tax Reform Act (TRA86) was developed – leading to big tax rate cuts on the richest people.



In Feldstein (1995), he estimates ETI by looking at changes in income for individual taxpayers around TRA86, from 1985 to 1988.

Standard problem in empirical research: knowing the “counterfactual” outcome if the reform had not been enacted. We need a control group.

Unlike medical research, randomized trials are rare in public finance. Next best is a **difference-in-difference estimation**: compare change in outcomes for a “treatment” group affected by the reform to another, similar “control” group who were relatively unaffected.

TRA86 was a “tax-flattening” reform: top MTR was 50% in 1985, but only 28% in 1988. Because of progressivity, tax rates fell a lot more for the very rich than for middle class. This suggests a treatment group and two possible controls:

bracket	1985 MTR	1988 MTR	observations
highest	49–50	28	57
high	42–45	28	197
medium	22–38	15–28	3538

We want to estimate how a taxpayer's taxable income responds to tax rate changes. A regression model:

$$\Delta\% Y_i = \alpha + e\Delta\%(1 - \tau_i) + u_i$$

The change in income depends not only on tax rates, but on *unobservable* changes in the economy, α . If all taxpayers i faced the same tax change, we cannot estimate e .

If treatment and control groups affected differently by tax reform, but **in the same way by underlying economic changes**, then we have a valid difference-in-difference model.

Consider two groups L, H with different tax rate changes. Averaging over individuals in brackets L, H and differencing gives the difference-in-difference estimator

$$\hat{e} = \frac{\Delta\% Y_H - \Delta\% Y_L}{\Delta\%(1 - \tau_H) - \Delta\%(1 - \tau_L)}$$

Estimates (dependent variable is adjusted taxable income):

bracket	$\Delta\%(1 - \tau)$	$\Delta\%Y$
highest (49-50)	+42.2	+44.8
high (42-45)	+25.6	+20.3
medium (22-38)	+12.2	+6.4
differences:		
highest-high	+16.6	+24.5
high-medium		
highest-medium		

Estimated elasticities (fill in the blanks yourself):

- for highest-high: $\hat{\epsilon} = 24.5/16.6 \approx 1.48$
- for other control groups: and

All estimated elasticities exceed one, implying much stronger responses to taxation than previously believed. There is a lot more to tax avoidance than just changing your labour hours!

Key concepts

measures of income inequality
horizontal and vertical equity
marginal and average tax rate
tax progressivity
benefit clawback
negative income tax
working income benefit
Laffer curve
elasticity of taxable income