# Economics of the Public Sector

## Tutorial 4 (May 22, 2024)

Utrecht School of Economics
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# Recap

# Principles of taxation

- Two broad categories of taxes: (i) **Direct taxes** on individuals and corporations; and (ii) **indirect taxes** on a variety of goods and services.
- The five accepted properties of a "good" tax system:
  1. **Economic efficiency**: the tax system should not interfere with the efficient allocation of resources.
  2. **Administrative simplicity**: the tax system ought to be easy and relatively inexpensive to administer.
  3. **Flexibility**: the tax system ought to be able to respond easily, in some cases, automatically, to changed economic circumstances.
  4. **Transparent political responsibility**: the tax system should be designed so that individuals can ascertain what they are paying, and evaluate how accurately the system reflects their preferences.
  5. **Fairness**: the tax system ought to be fair in its relative treatment of different individuals.
  6. In many developing countries (and even in some developed countries) there is an important sixth attribute: the tax system should be "**corruption resistant**."

# Economic impacts of taxation

1. **Behavioural effects**: (i) Work, education, retirement; (ii) savings, investment, risk taking; (iii) Energies devoted to avoiding taxes instead of creating wealth; (iv) Marriage and divorce.
2. **Financial effects**: Fringe benefits, financial structure of firms.
3. **Organisational effects**: Corporations versus unincorporated enterprises; intertwined with financial effects (banks versus insurance versus other forms of finance).
4. **General equilibrium effects**: Often important indirect effects, especially with broad-based taxes, such as on wages or interest.
5. **Announcement effects and capitalisation**: Future taxes on an asset reflected ("capitalised") in the price of the asset at the time the tax is announced.

# General framework for taxation

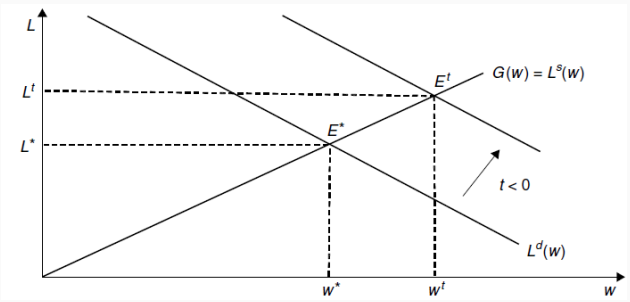
1. **Pareto efficient taxation**: tax structures such that, given the revenue raised, no one can be made better off without making someone else worse off. Choice among Pareto efficient tax structures depends on values, reflected in the social welfare function.
2. **Utilitarian social welfare function**: chooses the Pareto efficient tax structure that maximises the sum of utilities of individuals; marginal loss of utility per dollar of revenue raised must be the same for all individuals.
3. **Rawlsian social welfare function**: chooses the Pareto efficient tax structure that maximises the utility of the worst-off individual.

# Tax incidence

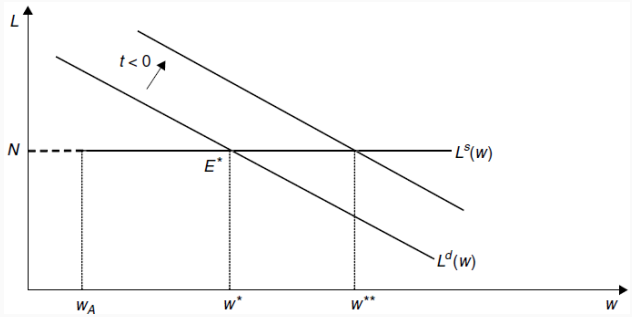
1. The essential point about tax incidence: investigating who the **end payer** of the tax or the **end recipient** of the subsidy is.
2. Understanding market behaviour is critical in the investigation. Main ingredients: elasticities of supply and demand.

# Tax incidence

1. The essential point about tax incidence: investigating who the **end payer** of the tax or the **end recipient** of the subsidy is.
2. Understanding market behaviour is critical in the investigation. Main ingredients: elasticities of supply and demand.
3. Another perspective from labour economics, e.g. the effects of a reduction in payroll taxes ($t < 0$):




(a) Competitive labour market




(b) Inelastic labour supply

Knowledge of the elasticities of labour supply and demand proves to be of primary importance: a policy of lowering payroll taxes with the aim of **reducing the cost of labour in order to stimulate hiring** may lead in the end to **a wage rise** that leaves the level of employment where it was.

# Tax incidence: Some ideas for your $3^{rd}$-year empirical project

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COMMUTING AND TAXES: THEORY, EMPIRICS ANI
WELFARE IMPLICATIONS*

*David R. Agrawal and William H. Hoyt*

We examine the effect of interstate differences in income taxes on commuting times. Our theoret
model introduces a border into a model of an urban area and shows that differences in average
rates distort commuting patterns, but the sign of the effect depends on whether taxes are reside
based or employment-based. Empirically, tax differentials have a large effect on commuting times
affluent households and mobile households. We show that commuting times are a sufficient stati
to measure the spatial welfare effects of tax policy. The model and empirical design can be used
economists to study other policy differences.

Urbanisation provides many benefits such as improved economic mobility
opportunity, agglomeration and productivity gains, environmental benefits
density, and cultural and educational amenities. Not surprisingly, urbanisatio
comes with substantial costs. One of the most significant costs is associated with
related travel. In 2011, the average one-way commute in the United State
25.5 minutes for all workers and 44.8 minutes for workers commuting across
lines. Eight per cent of workers have one-way commutes of over one hour. In
European countries, average commutes exceed 20 minutes. With the value of
associated with commuting estimated to be in the range of $20.00 to $40.00 an
(Brownstone and Small, 2005), commuting entails substantial costs.

Can government policy affect commute times and patterns? Glaeser and
(2004) argues that government policies, including 'bad' urban planning, play a li
role in generating urban sprawl. However, Baum-Snow (2007), Baum-Snow (2010
Duranton and Turner (2012) find evidence that the development of the inte
highway system increased employment and suburban populations at the expe
populations in central cities. Shoag and Muehlegger (2015) shows that lan
regulations increase commuting times and, consistent with our results, that the
are largest for highly educated individuals. In addition to these studies, a
theoretical literature examines the impact of tax policies on the spatial structu



The Economics and Empirics of Tax Competition: A Survey and Lessons for t EU

Thushyanthan Baskaran & Mariana Lopes da Fonseca*

**Abstract**

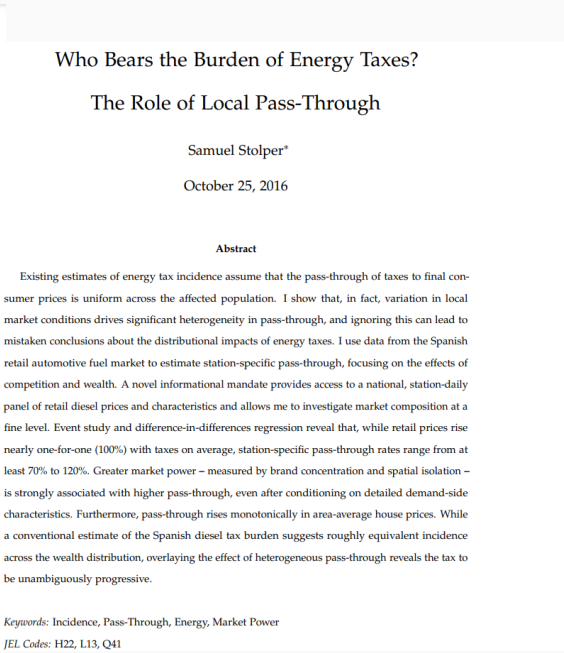
We survey the theoretical and empirical literature on local and international tax competition in Economics. On the basis of this survey, we discuss whether EU countries should harmonise tax policies to prevent a race to the bottom. Much of the evidence suggests that tax competition does not lead to significant reductions in tax revenues. Therefore, we conclude that tax coordination is in all likelihood unnecessary to prevent inefficiently low levels of taxation in the EU. But since the evidence against the adverse effects of tax competition is not unambiguous, we also discuss whether intergovernmental transfers might be a less invasive means than outright tax harmonisation to prevent a race to the bottom.

**Keywords:** tax competition, tax coordination, European Union, fiscal federalism

## 1 Introduction

One of the professed goals of the European Union (EU) is to create an ever closer union. In the last few decades, European governments have made considerable progress in pursuing this goal. They have established a free trade zone, a common currency and harmonised educational and vocational standards. One area, however, where harmonisation is markedly absent is tax policy. been taken, such as the EU Commission's Common Consolidated Corporate Tax B which is intended to facilitate the harmo bases.[3] One of the rationales cited by the increased coordination is that national causes harmful tax competition and a ra tom. Indeed, if tax competition constrain governments to raise revenues, part of t the recent budgetary problems may ap more coordinated tax policies.

The question is whether tax competitio sents such a severe constraint as to neces tional intervention. Are European gover to raise sufficient revenues because the crumbling tax bases? Is tax competition c countries equally or only countries that characteristics? Are there no policies othe coordination that could limit incentives t competition while allowing national g retain a significant portion of their tax aut Answering such questions based on descri alone is difficult. Figure 1 presents the e marginal personal income tax rates in 2 OECD countries from 2000 until 2013 vary both between countries and over ti outbreak of the financial crisis in 2007, to rates appear to have, on average, declir there is a considerable heterogeneity. Wh was pronounced in, for example, Norway top marginal tax rates remained stable or



Who Bears the Burden of Energy Taxes?

The Role of Local Pass-Through

Samuel Stolper*

October 25, 2016

**Abstract**

Existing estimates of energy tax incidence assume that the pass-through of taxes to final consumer prices is uniform across the affected population. I show that, in fact, variation in local market conditions drives significant heterogeneity in pass-through, and ignoring this can lead to mistaken conclusions about the distributional impacts of energy taxes. I use data from the Spanish retail automotive fuel market to estimate station-specific pass-through, focusing on the effects of competition and wealth. A novel informational mandate provides access to a national, station-daily panel of retail diesel prices and characteristics and allows me to investigate market composition at a fine level. Event study and difference-in-differences regression reveal that, while retail prices rise nearly one-for-one (100%) with taxes on average, station-specific pass-through rates range from at least 70% to 120%. Greater market power – measured by brand concentration and spatial isolation – is strongly associated with higher pass-through, even after conditioning on detailed demand-side characteristics. Furthermore, pass-through rises monotonically in area-average house prices. While a conventional estimate of the Spanish diesel tax burden suggests roughly equivalent incidence across the wealth distribution, overlaying the effect of heterogeneous pass-through reveals the tax to be unambiguously progressive.

*Keywords:* Incidence, Pass-Through, Energy, Market Power
*JEL Codes:* H22, L13, Q41

(a) Commuting and Taxes: Theory, Empirics and Welfare Implications

(b) The Economics and Empirics of Tax Competition: A Survey and Lessons for the EU

(c) Who Bears the Burden of Energy Taxes? The Role of Local Pass-Through

# Select Exercises

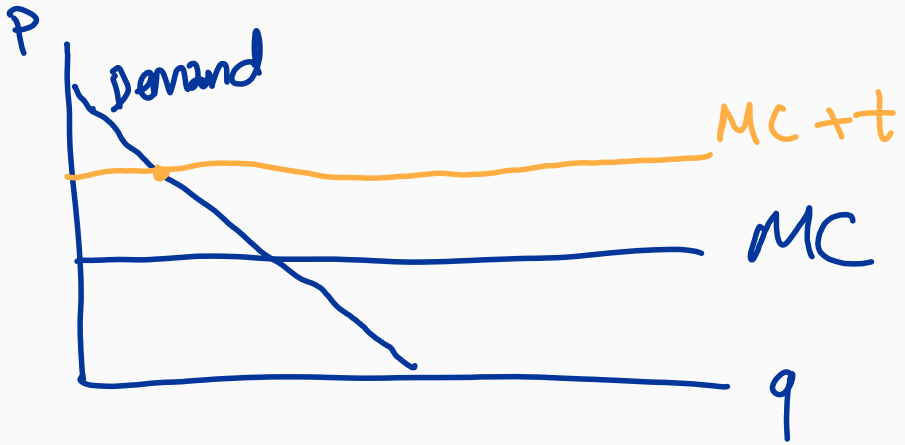
# Select Exercises

1. For a particular commodity, average cost is constant and equal to marginal cost at every level of output. The demand curve is given by $p = a - bq$. Show graphically and calculate the effects on price and quantity of a unit tax equal to $t$ paid by producers in case the market is:

   (a) Perfectly competitive

   (b) A monopoly

(a) Demand function : $p = a - bq$



Equilibrium: $P = MC$

$a - bq = MC$

$-bq = MC - a$

$q = -\frac{MC - a}{b}$

$q = -\frac{MC}{b} + \frac{a}{b}$ → a constant

$\frac{dq}{dMC} = -\frac{1}{b} + 0 = -\frac{1}{b}$

For every increase in MC by one unit, q will decrease by $1/b$.

$\Delta q = -\frac{1}{b} \cdot \Delta MC$

Because the only increase in MC is from tax, we can rewrite this as

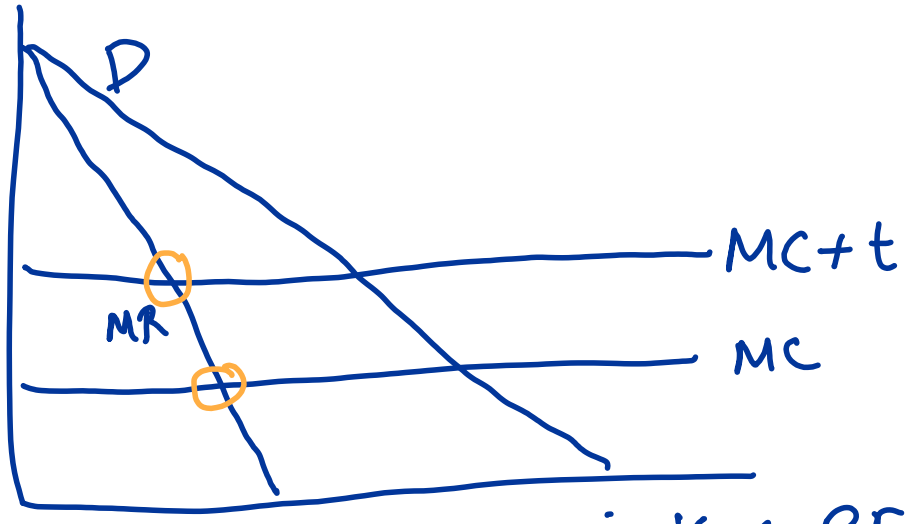
$\Delta q = -\frac{1}{b} \cdot t = -\frac{t}{b}$.

$y = \frac{1}{2}x + 5$

$y' = 1/2$

↳ $\frac{dy}{dx}$

(b)




The monopolist maximises profit at the quantity at which $\underbrace{MR}_{(1)} = MC$.

(1) How to find MR? $MR = TR'$

$TR = Pq = (a - bq)q = \underline{aq - bq^2}$

$MR = TR'(q) = a - 2bq$ //

(2) $MR = MC$

$a - 2bq = MC \iff q^* = \frac{(a - MC)}{2b}$.

(3) We need to find the expression for $P$. We substitute $q$ in the demand function with $q^*$ from $MR = MC$.

$$P = a - bq^*$$

$$= a - b\,\frac{(a - MC)}{2b}$$

$$= \frac{2a}{2} - \left(\frac{a - MC}{2}\right)$$

$$= \frac{2a - a + MC}{2} = \frac{a + MC}{2}$$ //

Break
15:55 – 16:05

(4) To find the effect of taxes, we calculate the derivative of $P$ and $q$ w.r.t. $MC$.

$$q(MC) = \frac{a - MC}{2b} \Longrightarrow q'(MC) = -\frac{1}{2b}.$$ //

$\left(\frac{a}{2b} - \frac{MC}{2b}\right)$ ← constant

$$P(MC) = \frac{a + MC}{2} \Longrightarrow P'(MC) = \frac{1}{2}.$$ //

# Select Exercises

2. Suppose that the demand for cigarettes is given by $q^D = 2000 - 200p$, and supply by $q^S = 200p$, where $q^D$ is the number of packs demanded, $q^S$ is the quantity supplied and $p$ is the price per pack in dollars.

   (a) Find the price and quantity of a pack of cigarettes, assuming the market is competitive. What is the price elasticity of demand (in equilibrium)? Draw the supply and demand function ($p$ on the vertical axis, which goes from 0 to 20, and $q$ on the horizontal axis)

   (b) Show in the graph of point (a) the resulting consequences for the supply curve.

   (c) Compute the quantity after the tax, the price paid by consumers and the (net) price received by producers. How much of the tax can the producer shift to the consumer?

point elasticity

→ Gov't introduces a tax of $2/pack.

↪ calculate the new equilibrium.

2. $q^D = 2000 - 200p$ ; $q^S = 200p$

(a) (i) P and q at equilibrium (market is competitive)

$$q^D = q^S$$

$$2000 - 200p = 200p$$

$$400p = 2000$$

$$p^* = 5.$$

$$q^S = 200\,p^*$$

$$= 200\,(5)$$

$$q^* = 1000.$$

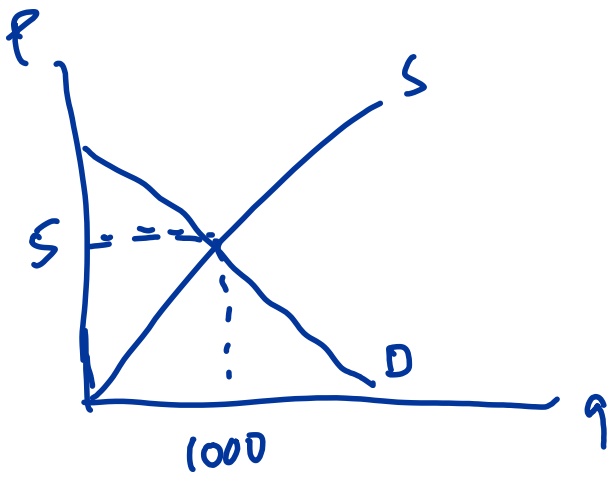
* at equilibrium.

(ii) Price elasticity of demand at equilibrium. point elasticity

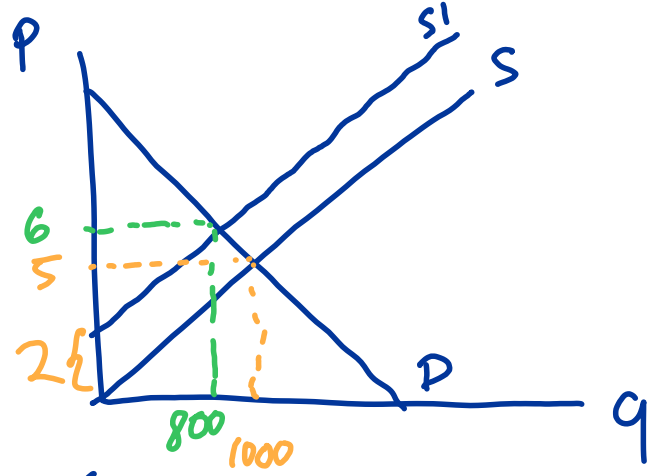
$$\varepsilon_D = \frac{dq^D}{dp} \cdot \frac{p^*}{q^*}$$

$$= -200 \cdot \frac{5}{1000}$$

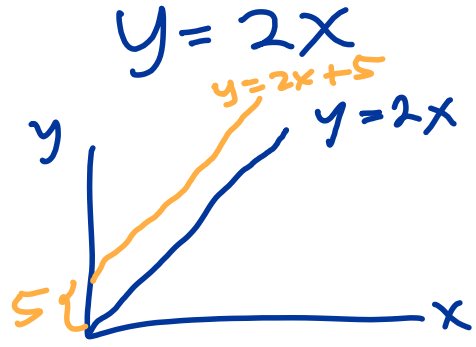
$$= -1.$$ //



2. (b)




After the introduction of cig. tax, the supply curve shifts upward.




(c) $q^s = 200P$

Rearrange

$P^s = \frac{1}{200}q$

$[*MC = \frac{1}{200}q]$

$MC^{new} = P^{s+t} = \frac{1}{200}q + 2$

$[*MB = 10 - \frac{1}{200}q]$

$MB = MC^{new}$

$10 - \frac{1}{200}q = \frac{1}{200}q + 2$

$\frac{2}{200}q = 8$

$q^{*new} = 800$.

$MC = \frac{1}{200}q^{*new} + 2$

$P^* = \frac{1}{200}(800) + 2$

$= 6$.

# Questions for Discussion

# Discussion topics

2. (qn 8, ch. 17, from Stiglitz and Rosengard, 2015) Consider a state debating how to finance emergency road and bridge improvements. Among the possibilities are increased fees on drivers' licenses, a personal property tax on motor vehicles, a tax on automobile parts (including tires), and higher taxes on cigarettes and liquor. Which of these taxes are benefit taxes, which are corrective taxes, which are both? Which of these taxes is least distortionary?
3. (qn 9, ch. 17, from Stiglitz and Rosengard, 2015) Issues of efficiency and fairness often get intertwined in complex ways. Use the perspectives on the principles of taxation provided in the text to discuss the appropriateness of:
   (a) Taxes on gasoline.
   (b) Subsidies to public transportation.

# Multiple-Choice Questions

# MCQ

1. Which of the following is a lump-sum tax?
   (a) A sales tax.
   (b) A payroll tax.
   (c) A head tax.
   (d) An income tax.

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# MCQ

3. The precept that people in a position to pay greater taxes should do so is called
   (a) specific egalitarianism/equalitarianism.
   (b) horizontal equity.
   (c) positional justice.
   (d) vertical equity.

# MCQ

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4. When a competitive market has a horizontal supply curve and a monopolist has a horizontal marginal cost curve, which of the following statements is true of both markets if a specific tax is imposed on each?

   (a) The extent to which price rises depends entirely on the shape of the demand curve.
   (b) The extent to which quantity falls depends entirely on the shape of the demand curve.
   (c) Price will increase, and increase by more in the monopolised market.
   (d) None of the above.

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# MCQ (Past paper)

1. Assuming an economy with two people and two goods, at all points on the contract curve:
   (a) There is equality of opportunity
   (b) The MRS for the two individuals is equal
   (c) There is no poverty
   (d) Utility is being maximized
2. To achieve the efficient amount of use of a public good, the ___should be equal to the ___.
   (a) Average social cost; average marginal benefit
   (b) Marginal social cost; marginal benefit
   (c) Marginal private cost; marginal benefit
   (d) Marginal external cost; marginal benefit

Thank you for your participation!