Public Finance

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École polytechnique - CREST

Fall 2025

Outline of the class

Introduction

Lecture 2: Tax incidence

Lecture 3: Distortions and welfare losses

Lecture 4-6: Optimal labor income taxation

"Economics is at its best when it offers important insights that contradict initial, casual impressions." (Kotlikoff and Summers (1987) *Handbook of Public Economics*)

$\Rightarrow$ The theory of tax incidence provides a rich assortment of such insights

Tax incidence's basic lesson that real (or statutory) and nominal tax burdens are not necessarily related means that

- taxes on capital may be born by workers,
- investment incentives may be injurious to capitalists
- taxation of foreigners may simply represent indirect domestic taxation

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- taxes on capital may be born by workers,
- investment incentives may be injurious to capitalists
- taxation of foreigners may simply represent indirect domestic taxation
- increasing housing benefits in France helps home owners: Fack (2006) estimate that 1 additional euro of benefits $\Rightarrow$ increase rent by 0.78 euro

Cnews (18/12/2017)

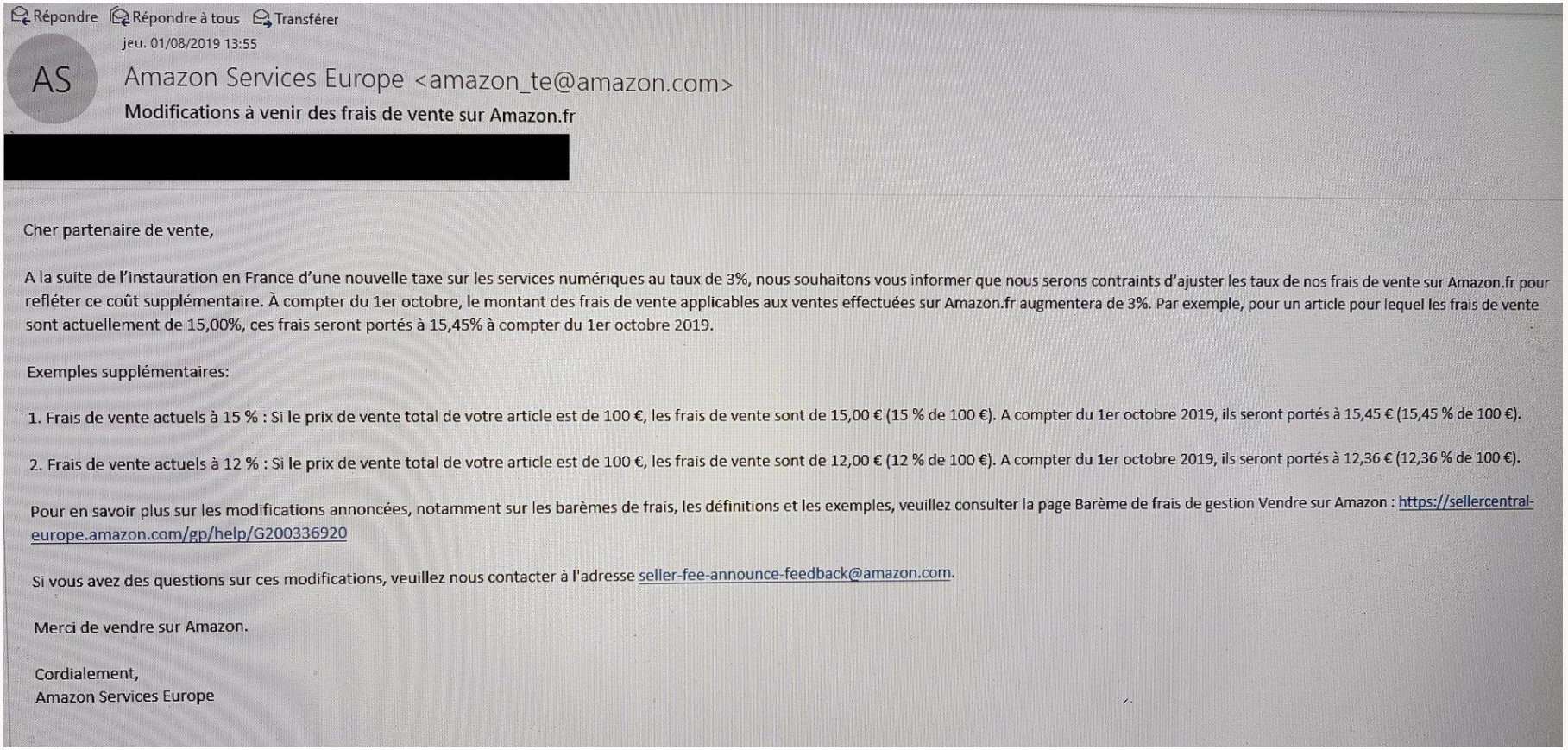
CERTAINES MARQUES S'ADAPTENT AVANT LA FUTURE HAUSSE

UN COURT RÉPIT SUR LE PRIX DU TABAC

© P. POCHARD-CASABIANCA/AFP

En mars, les tarifs augmentent.

Un étonnant phénomène. Le 2 janvier prochain, les prix de certains paquets de cigarettes baisseront de 20 centimes, selon un arrêté paru ce week-end au *Journal officiel*. En réalité, il s'agit d'ajustements pratiqués par des fabricants, en réaction à la dernière hausse de taxes, décidée en novembre par le gouvernement. Le mois dernier, en effet, certains cigarettiers avaient préféré rogner sur leurs marges, sans augmenter leurs prix, tandis que d'autres avaient répercuté tout ou partie des taxes sur leurs tarifs. Dans la foulée, conformément à la loi, la nouvelle nomenclature des prix du tabac avait été publiée au *Journal officiel*. Certains fabricants ont alors estimé qu'ils avaient trop augmenté leurs prix par rapport à la concurrence, d'où l'ajustement à venir. Cette baisse sera toutefois de courte durée, puisque la prochaine hausse, de 1,10 euro par paquet, est prévue pour mars 2018. L'objectif de l'Etat étant d'arriver à un paquet à 10 euros en 2020. ■



Répondre Répondre à tous Transférer

jeu. 01/08/2019 13:55

AS

Amazon Services Europe <amazon_te@amazon.com>

Modifications à venir des frais de vente sur Amazon.fr

[redacted]

Cher partenaire de vente,

A la suite de l'instauration en France d'une nouvelle taxe sur les services numériques au taux de 3%, nous souhaitons vous informer que nous serons contraints d'ajuster les taux de nos frais de vente sur Amazon.fr pour refléter ce coût supplémentaire. À compter du 1er octobre, le montant des frais de vente applicables aux ventes effectuées sur Amazon.fr augmentera de 3%. Par exemple, pour un article pour lequel les frais de vente sont actuellement de 15,00%, ces frais seront portés à 15,45% à compter du 1er octobre 2019.

Exemples supplémentaires:

1. Frais de vente actuels à 15 % : Si le prix de vente total de votre article est de 100 €, les frais de vente sont de 15,00 € (15 % de 100 €). A compter du 1er octobre 2019, ils seront portés à 15,45 € (15,45 % de 100 €).

2. Frais de vente actuels à 12 % : Si le prix de vente total de votre article est de 100 €, les frais de vente sont de 12,00 € (12 % de 100 €). A compter du 1er octobre 2019, ils seront portés à 12,36 € (12,36 % de 100 €).

Pour en savoir plus sur les modifications annoncées, notamment sur les barèmes de frais, les définitions et les exemples, veuillez consulter la page Barème de frais de gestion Vendre sur Amazon : https://sellercentral-europe.amazon.com/gp/help/G200336920

Si vous avez des questions sur ces modifications, veuillez nous contacter à l'adresse seller-fee-announce-feedback@amazon.com.

Merci de vendre sur Amazon.

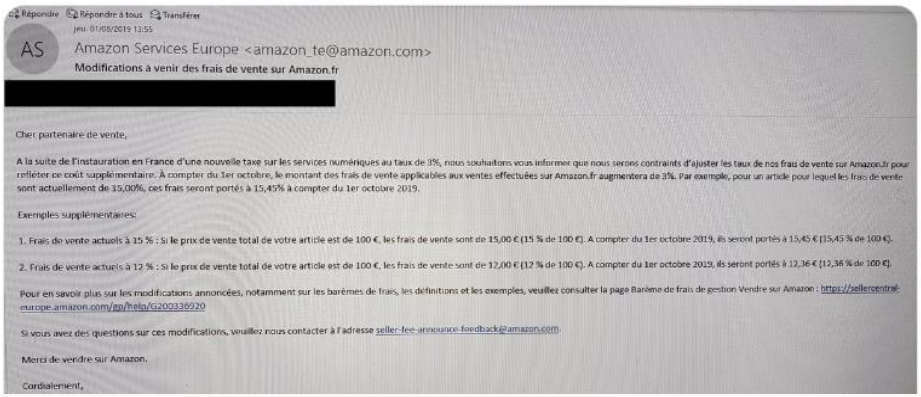
Cordialement,
Amazon Services Europe

Attac France
@attac_fr

Suivre

Attitude minable d'@AmazonNewsFR qui vient d'annoncer à ses partenaires de vente, une augmentation de sa commission d'une valeur de 3% pour compenser la #TaxeGAFA.

En bref, ce n'est pas Amazon qui paiera ce faible mais juste supplément d'impôt. Ce sera ses "partenaires".



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Cordialement,

Objet: Changements à venir dans votre abonnement Spotify Premium

Spotify Premium

A compter de votre date de facturation en juillet, nous augmentons le prix de votre abonnement Spotify Premium à 6,06 €/mois pour couvrir les coûts supplémentaires d'une nouvelle taxe sur les services de streaming musicaux qui nous est imposée par le gouvernement français pour financer le Centre National de la Musique.

Bien que Spotify ait travaillé dur pour trouver des solutions alternatives, le gouvernement français a finalement décidé d'imposer cette taxe de 1,2% à tous les services de streaming musical. Spotify s'engage à défendre les artistes et continuera à reverser près des deux tiers de ses revenus aux ayants droit (soit plusieurs centaines de millions d'euros en France en 2023). A l'avenir, les augmentations supplémentaires de la taxe CNM seront reflétées dans nos plans tarifaires en France et nous continuerons à exhorter le gouvernement à trouver des moyens alternatifs pour ce financement.

Merci d'être un abonné Premium. Continuons à écouter ensemble.

L'équipe Spotify

Des réparations d'appareils électriques plus chères depuis la création du bonus étatique, selon un rapport

Par Le Figaro avec AFP
Publié le 04/01/2024 à 07:57, mis à jour le 04/01/2024 à 10:03

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Plusieurs facteurs se conjuguent: l'effet d'aubaine, mais aussi l'augmentation des coûts due à l'inflation, la complexité de certaines réparations, souligne le rapport. *mitand73 / stock.adobe.com*

Après avoir passé au peigne fin plus d'une centaine de milliers de réparations, l'association de consommateurs CLCV constate des augmentations de tarifs allant de 12% à 18% pour de très nombreux appareils électroniques.

Tax incidence

Tax incidence is the study of the effects of tax policies on prices and the distribution of utilities. More precisely the theory of tax incidence aims at characterizing the effect on economic equilibrium of a change in taxes.

- What happens to market prices when a tax is introduced or changed?

  E.g. Increase tax on cigarettes by 1 euro per pack

$\Rightarrow$ Effect on price: distributional effects on smokers, profit of producers, shareholders, farmers, ...

References: Salanié's book; Kotlikoff and Summers (1987) *Handbook of Public Economics*.

- Tax incidence is an example of positive analysis

  Typically the first step in policy evaluation

  An input into thinking about policies that maximize social welfare

- Theory is informative about signs and comparative statics but is inconclusive about magnitudes

  Incidence of cigarette tax: elasticity of demand w.r.t. price is crucial

  Labor vs. capital taxation: mobility of labor, capital are critical

- Ideally, we would characterize the effect of a tax change on utility levels of all agents in the economy

  Criticism of tax incidence theory: unable to answer how is the tax burden shared among the economic agents?

  Useful simplification in practice: aggregate economic agents into a few groups
- Incidence analyzed at a number of levels:
  1. Producer vs. consumer (tax on cigarettes)
  2. Source of income (labor vs. capital)
  3. Income level (rich vs. poor)
  4. Region or country (local property taxes)
  5. Across generations (social security reform)

Partial Equilibrium Incidence: Key Assumptions

1. Two good economy
   - Only one relative price $\rightarrow$ partial and general equilibrium are same
   - Can be viewed as an approx. of incidence in a multi-good model if: (i) the market being taxed is small, (ii) there are no close substitutes/complements in the utility function
2. Tax revenue is not spent on the taxed good
   - Tax revenue is used to buy untaxed good or thrown away
3. Perfect competition among producers
   - Relaxed in some studies of monopolistic or oligopolistic markets

Partial Equilibrium Model: Setup

- Two goods: x and y
- Government levies an excise tax on good x

  Excise or specific tax: levied on a quantity (e.g. gallon, pack, ton)

  Ad-valorem tax: fraction of prices (e.g. sales tax)
- Let p denote the pre-tax price of x and $q = p + t$ denote the tax inclusive price of x
- Good y, the numéraire, is untaxed

Partial Equilibrium Model: Demand

- Consumer has wealth W and has utility $u(x, y)$
- Let $\varepsilon_D = \frac{\partial D}{\partial q} \frac{q}{D(q)}$ denote the price elasticity of demand

  Elasticity: percentage change in quantity when price changes by 1 percent

Partial Equilibrium Model: Supply

- Price-taking firms
- Use $c(S)$ units of the numéraire y to produce S units of x

  Cost of production increasing and convex: $c'(S) > 0$ and $c''(S) \geq 0$
- Profit at pre-tax price p and level of supply S is $pS - c(S)$
- With perfect optimization, the supply function for good x is implicitly defined by the marginal condition $p = c'(S(p))$
- Let $\varepsilon_S = \frac{\partial S}{\partial p} \frac{p}{S(p)}$ denote the price elasticity of supply

Partial Equilibrium Model: Equilibrium

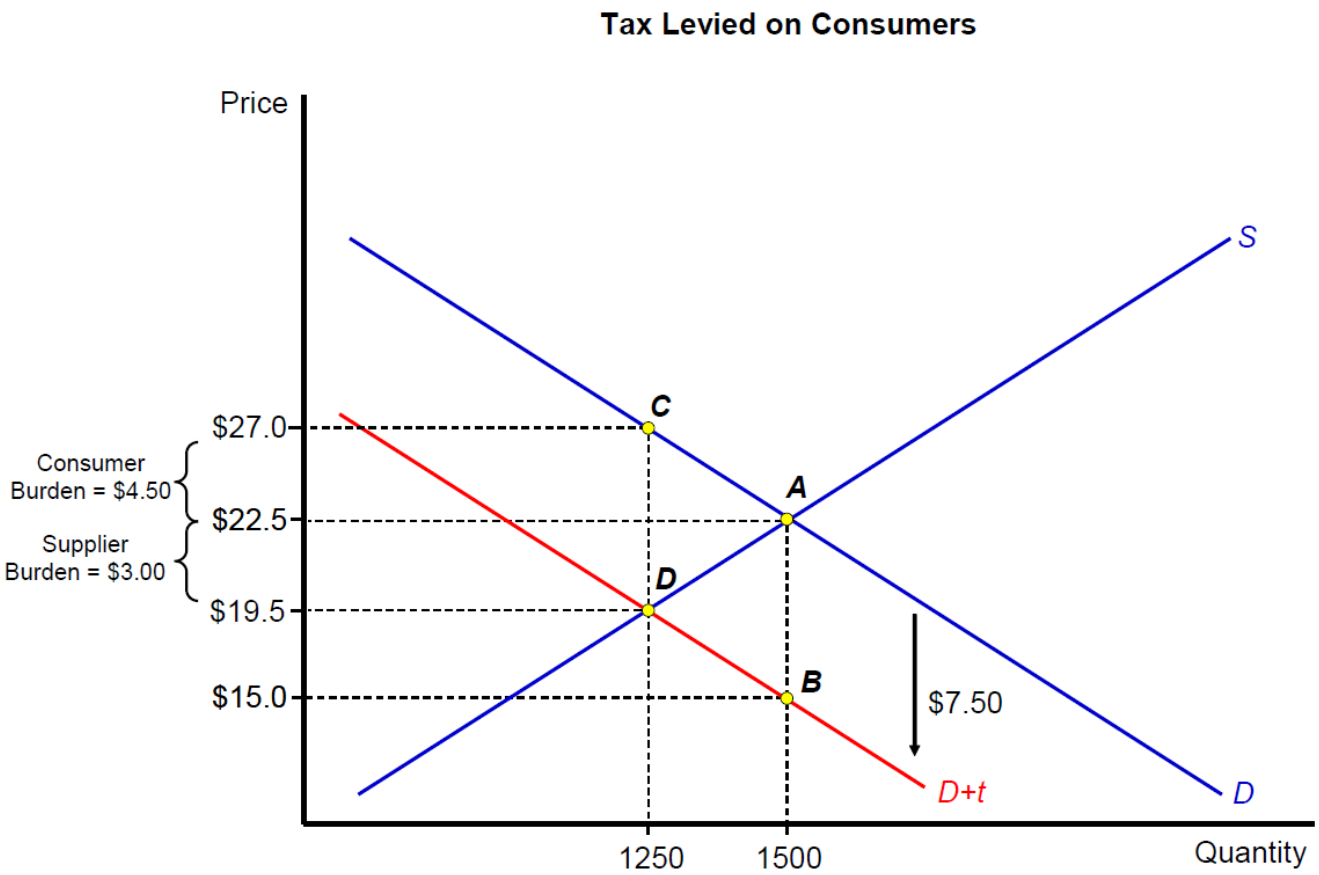
- Equilibrium condition

$$Q = S(p) = D(p + t)$$

  defines (implicitly) an equation $p(t)$

- Goal: characterize $\frac{dp}{dt}$, the effect of a tax increase on price

$\Rightarrow$ Let's get some intuition first.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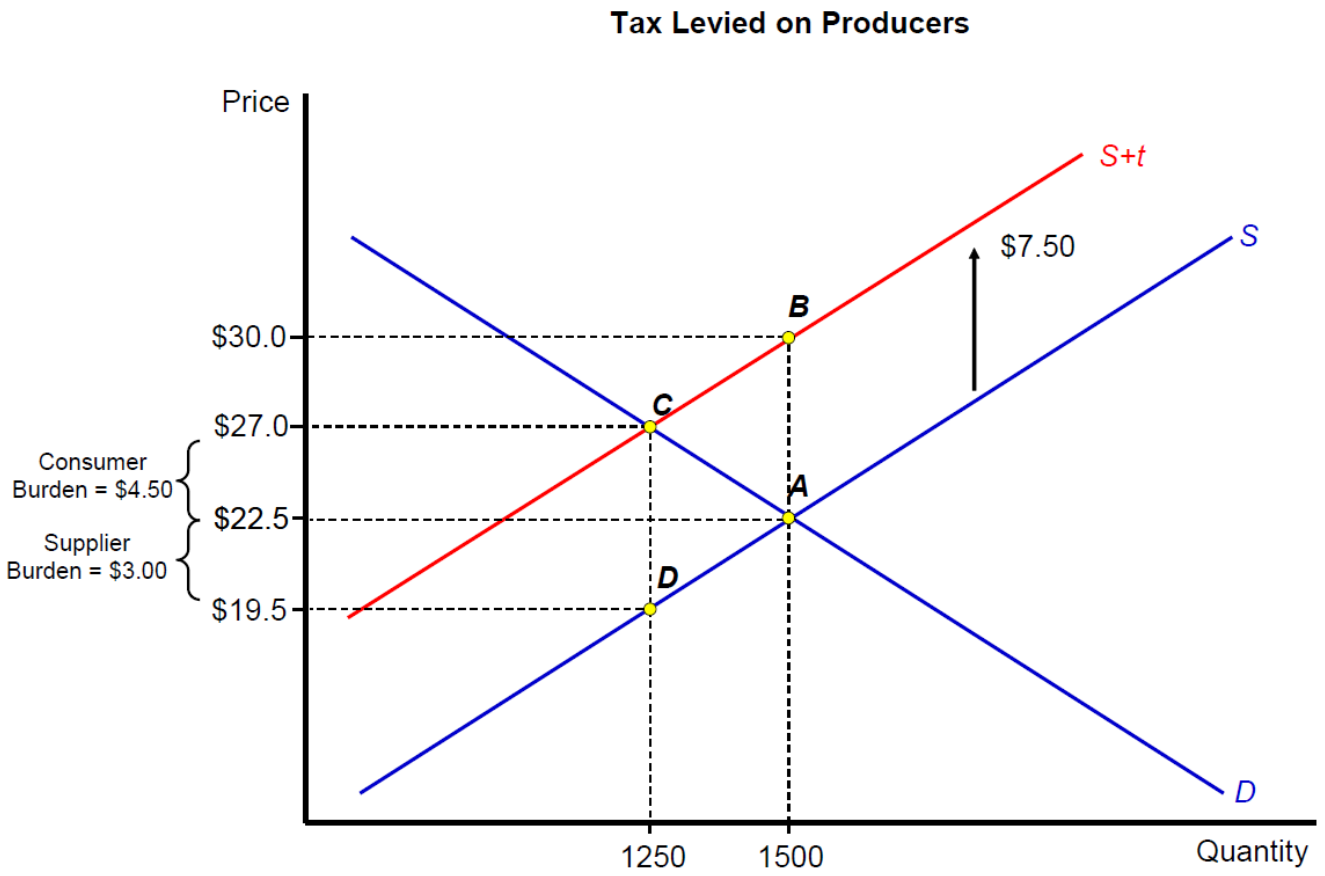
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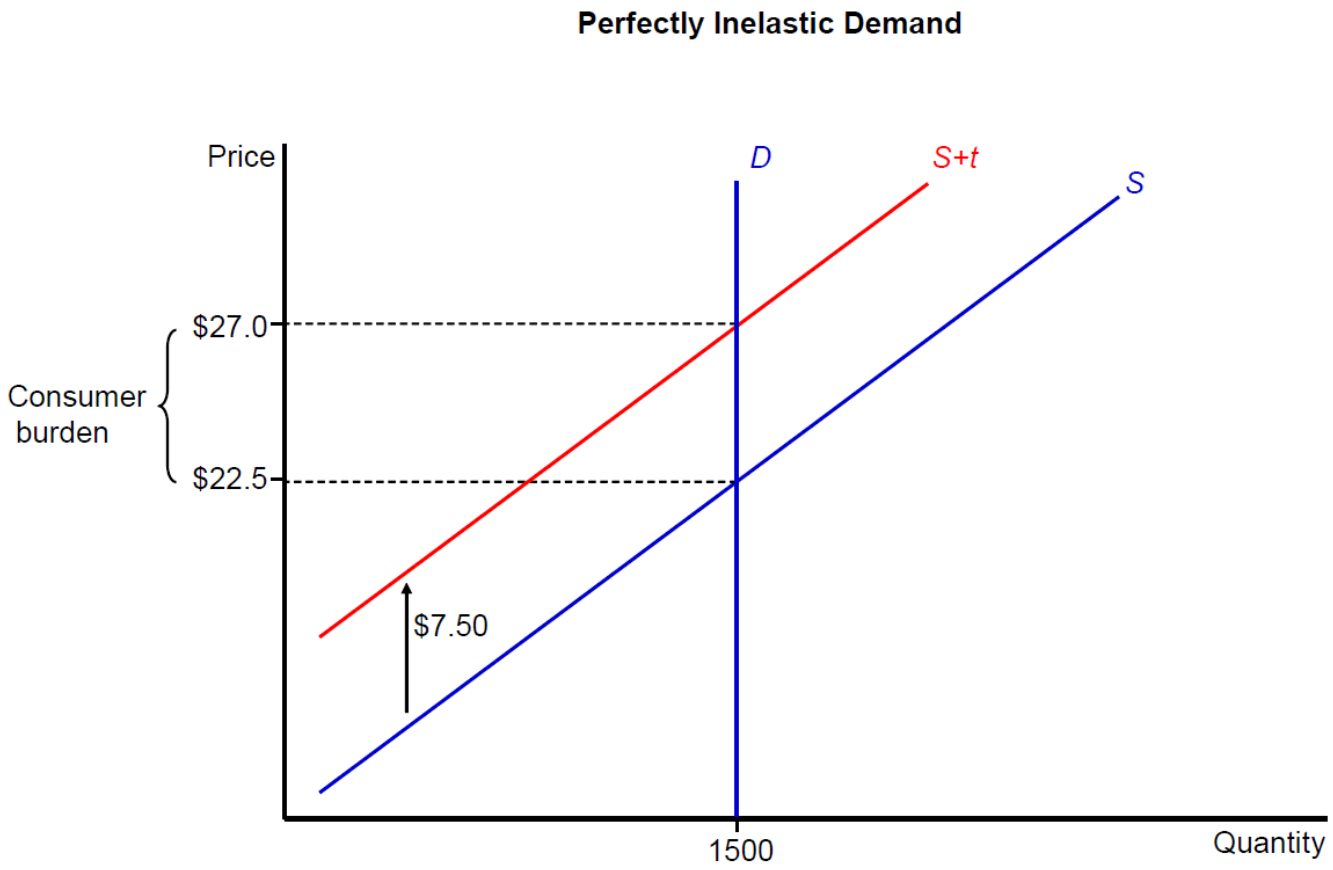
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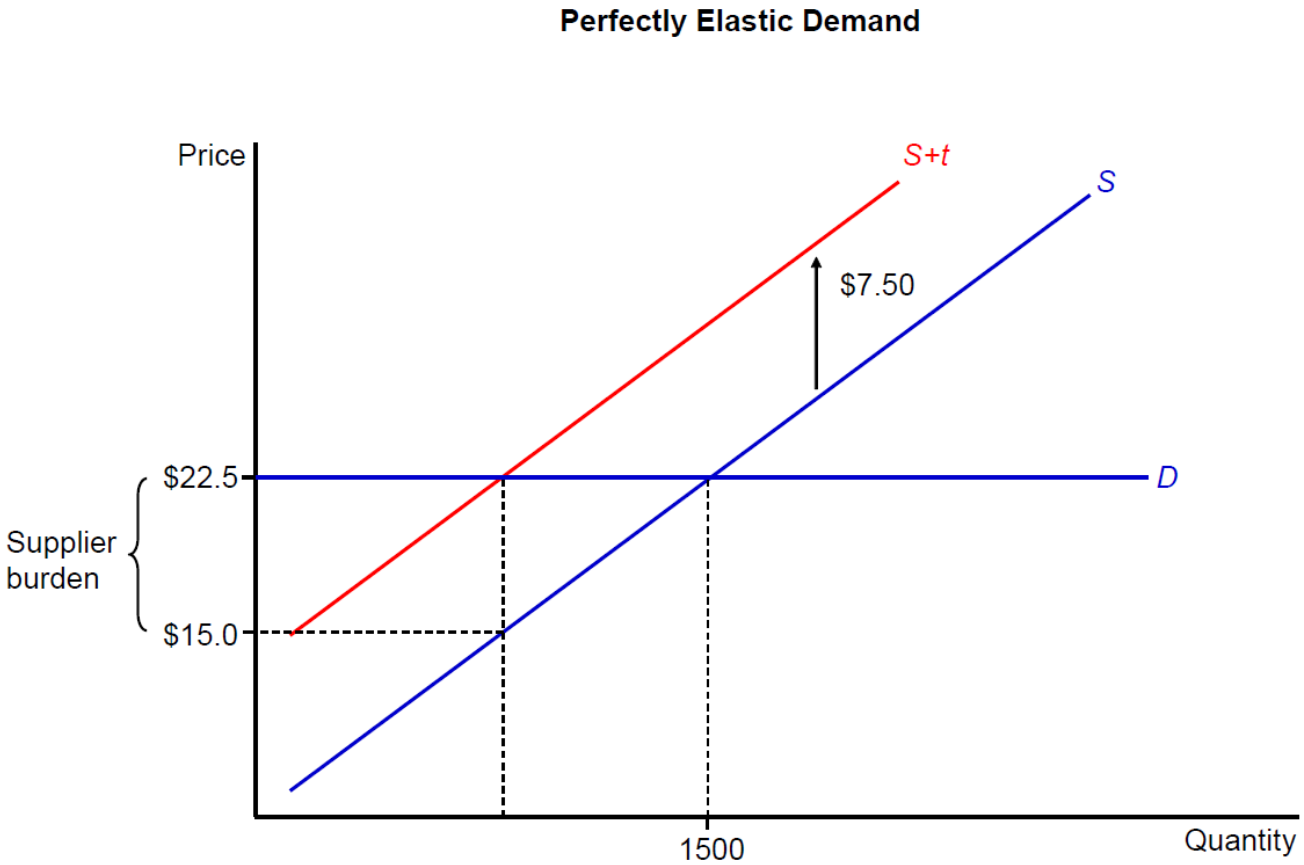
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Formula for Tax Incidence

- Implicitly differentiate equilibrium condition

$$D(p+t) = S(p)$$

to obtain:

$$\frac{dp}{dt} = \frac{\partial D}{\partial p} \frac{1}{(\frac{\partial S}{\partial p} - \frac{\partial D}{\partial p})}$$

$$\Rightarrow \frac{dp}{dt} = \frac{\varepsilon_D}{\varepsilon_S - \varepsilon_D}$$

- Incidence on consumers:

$$\frac{dq}{dt} = 1 + \frac{dp}{dt} = \frac{\varepsilon_S}{\varepsilon_S - \varepsilon_D}$$

Formula for Tax Incidence

Two special cases:

- If demand much more elastic than supply (i.e. $|\varepsilon_D| >> \varepsilon_S$): producers bear the whole burden of the tax

- If supply much more elastic than demand (i.e. $|\varepsilon_D| << \varepsilon_S$): consumers bear the whole burden of the tax

Applications: Tax Incidence with Salience Effects

- Chetty, Looney, and Kroft (2009): test whether taxes are equivalent to prices ($\frac{dx}{dt} = \frac{dx}{dp}$).

  Find that consumers underreact to taxes that are not salient: field experiment in a grocery store, they find that posting tax-inclusive price tags reduces demand by 8 percent.
- Bradley and Feldman (2020): 2012 regulation by US Department of Transportation required air carriers/online travel agents to incorporate all ticket taxes in up-front, advertised fares.

  Airlines passed through nearly the entire tax onto consumers in the form of higher base and total fares, while in the post-reform period, only about 25 cents of every dollar of unit taxes is passed onto consumers.

Cigarette Tax Incidence:

- Evans, Ringel, and Stech (1999): Cigarette excise taxes. How do cigarette tax increases affect prices?

  Taxes levied on cigarette companies lead to poor paying more for same goods, with no impact on companies

- Adda and Cornaglia (2006): Intensive vs. extensive margin.

  Use data on cotinine (biomarker) levels in lungs to measure inhalation.

  Higher taxes lead to fewer cigarettes smoked but no effect on cotinine in lungs, implying longer inhalation of each cigarette

- Hastings and Washington (2010): Food stamps

  How does food stamps subsidy affect grocery store pricing?

  Store raises prices by 2-3 % in week 1 in high poverty areas

  Policy implication: subsidies in markets where low-income recipients are pooled with others have better distributional effects

- Leung and Seo (2023): Effect of the Supplemental Nutrition Assistance Program (SNAP) on retail prices nationwide.

  Marginal benefit dollar raises a recipient's consumer surplus from groceries by \$0.7, producer surplus by \$0.5, and lowers each non-SNAP consumer's surplus by \$0.05.

  Because: large marginal-propensity-to-consume-food out of SNAP, low elasticities of demand, and moderate market power.

Incidence theory treats increase and decrease the same way

- Benzarti et al (2020): Study all VAT reforms from 1996 to 2015 across all European countries

  Show that prices respond 3 to 4 times more to VAT increases than decreases.

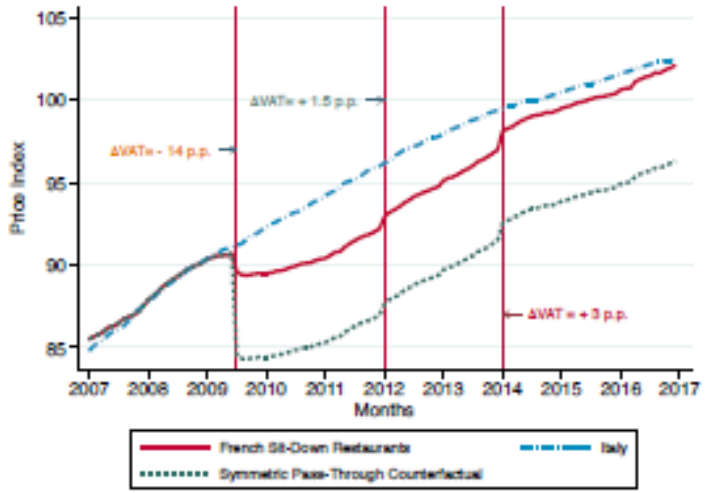
- Benzarti and Carloni (2019): cut in value-added taxes (VAT) for French sit-down restaurants in 2009 from 19.6 to 5.5

  Cost 3 billion euros in 2010

  Estimate its effect on four groups (workers, firm owners, consumers and suppliers of material goods): (1) the effect on consumers was limited, (2) employees and sellers of material goods shared 25 and 16 percent of the total benefit, and (3) the reform mostly benefited owners of sit-down restaurants, who pocketed 41 percent of the tax cut.

Benzarti et Carloni (2019)

(b) French Restaurants



Debate was held in the French Parliament (October 2012), regarding increasing the VAT rate on sit-down restaurants from 7 % to 19.6 % in January 2012 after it was decreased from 19.6 % to 5.5 % in July 2009.

After analyzing the response of prices to each reform: " Given the strong price elasticity for increases, which is surprisingly much higher than the price elasticity for decreases, we cannot consider going back to [a VAT rate of] 19.6 %."

- Rothstein (2010): Earned Income Tax Credit

  EITC payments subsidize work and transfer money to low income working individuals

  How does EITC affect wages? This subsidy could be taken by employers by shifting wage

  Policy question: are we actually transferring money to low incomes through this program or are we just helping business owners?

  Results (Many caveats): EITC-eligible workers gain \$0,70 per \$1 EITC expansion

  Employers gain about \$0.70

  EITC-ineligible low-skilled workers lose about \$0.40

- Fuest et al. (2018): Incidence of corporate taxes on wages using a 20-year panel of German municipalities exploiting 6800 tax changes for identification.

  Workers bear about half of the total tax burden.

  Show that low-skilled, young and female employees bear a larger share of the tax burden.

General Equilibrium Analysis

- Now move beyond two-good partial equilibrium model to analyze impacts on all prices
- Typical goal: trace out full incidence of taxes back to original owners of factors
  - Partial equilibrium: "producer" vs. consumer
  - General equilibrium: capital owners vs. labor vs. landlords, etc.

- Two types of GE models:

1. **Static**: many sectors or many factors of production
   - ⋆ Workhorse analytical model: Harberger (1962): 2-sector and 2-factor of production
   - ⋆ Computational General Equilibrium: many sectors, many factors of production model
2. **Dynamic** (not covered in class, see Kotlikoff and Summers)
   - ⋆ Characterize impacts over time or across generations
   - ⋆ Asset price effects: capitalization

Harberger (1962) Two Sector Model

1. Fixed total supply of labor L and capital K (short-run, closed economy)
2. Constant returns to scale in both production sectors
3. Full employment of L and K
4. Firms are perfectly competitive

   Implicit assumption: no adjustment costs for capital and labor $\Rightarrow$ labor and capital perfectly mobile

- Production in sectors 1 (bikes) and 2 (cars):

$$X_1 = F_1(K_1, L_1)$$

$$X_2 = F_2(K_2, L_2)$$

  with full employment conditions $K_1 + K_2 = K$ and $L_1 + L_2 = L$

- Factors w and L fully mobile $\rightarrow$ in eq., returns must be equal:

$$w = p_1 F_{1L} = p_2 F_{2L}$$

$$r = p_1 F_{1K} = p_2 F_{2K}$$

- Demand functions for goods 1 and 2:

$$X_1 = X_1(p_1/p_2) \text{ and } X_2 = X_2(p_1/p_2)$$

- Note: all consumers identical so redistribution of incomes via tax system does not affect demand via a feedback effect
- System of ten equations and 10 unknowns: $K_i, L_i, p_i, X_i, w, r, \forall i$

Harberger Model: Effect of Tax Increase

- Introduce small tax $d\tau$ on rental of capital in sector 2 (K_2)
- All equations the same as above except $r = (1 - d\tau)p_2 F_{2K}$
- Linearize the 10 equations around initial equilibrium to compute the effect of $d\tau$ on all 10 variables (dw, dr, dL_1, ...)
- Labor income = wL with L fixed, rK = capital income with K fixed
- Therefore change in prices $dw/d\tau$ and $dr/d\tau$ describes how tax is shifted from capital to labor
- Changes in prices $dp_1/d\tau$, $dp_2/d\tau$ describe how tax is shifted from sector 2 to sector 1

Harberger Model: Main Effects

1. **Substitution effects**: capital bears incidence
   - Tax on K_2 shifts production in Sector 2 away from K so aggregate demand for K goes down
   - Because total K is fixed, r falls $\rightarrow$ K bears some of the burden

2. **Output effects**: capital may not bear incidence

- Tax on K_2 implies that sector 2 output becomes more expensive relative to sector one
- Therefore demand shifts toward sector 1
- *Case 1:* $K_1/L_1 < K_2/L_2$ (1: bikes, 2: cars)
  - Sector 1 is less capital intensive so aggregate demand for K goes down
  - Output effect reinforces substitution effect: K bears the burden of the tax
- *Case 2:* $K_1/L_1 > K_2/L_2$ (1: cars, 2: bikes)
  - Sector 1 is more capital intensive, aggregate demand for K increases
  - Subst. and output effects have opposite signs; labor may bear some or all the tax

3. **Substitution + Output = Overshifting effects**

- *Case 1:* $K_1/L_1 < K_2/L_2$
  - Can get overshifting of tax, $dr < -d\tau$ and $dw > 0$
  - Capital bears more than 100 % of the burden if output effect sufficiently strong
  - Taxing capital in sector 2 raises prices of cars $\rightarrow$ more demand for bikes, less demand for cars
  - With very elastic demand (two goods are highly substitutable), demand for labor rises sharply and demand for capital falls sharply
  - Capital loses more than direct tax effect and labor suppliers gain

- *Case 2*: $K_1/L_1 > K_2/L_2$
  - Possible that capital is made better off by capital tax
  - Labor forced to bear more than 100 % of incidence of capital tax in sector 2
  - Ex. Consider tax on capital in bike sector: demand for bikes falls, demand for cars rises
  - Capital in greater demand than it was before $\rightarrow$ price of labor falls substantially, capital owners actually gain
- Bottom line: taxed factor may bear less than 0 or more than 100 % of tax.

- Harberger Two Sector Model not very informative: model mainly used to illustrate negative result that "anything goes"
- More interest now in developing methods to identify what actually happens
- Original application by Harberger: sectors = housing and corporations
- Can be extended to open economies: analyze capital taxation in open economies where capital is more likely to be mobile than labor (see Kotlikoff and Summers)

Computable General Equilibrium Models

- Harberger analyzed two sectors; subsequent literature expanded analysis to multiple sectors
- Analytical methods infeasible in multi-sector models
- Instead, use numerical simulations to investigate tax incidence effects after specifying full model

CGE Models: General Structure

- N intermediate production sectors
- M final consumption goods
- J groups of consumers who consume products and supply labor
- Each industry has different substitution elasticities for capital and labor
- Each consumer group has Cobb-Douglas utility over M consumption goods with different parameters
- Specify all these parameters (calibrated to match some elasticities) and then simulate effects of tax changes

Criticism of CGE Models

- Findings very sensitive to structural assumptions
  - Ex: assumption of perfect competition
  - Key behavioral elasticities and functional form assumptions
- Modern econometric methods conceptually not suitable for GE problems
  - The whole point is "spillover effects" (contamination)
- Need a new empirical paradigm to deal with these problems

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