Public Economics
Level 2

2020-2021

Conférence de méthode
Session 2

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SciencesPo

Taxation

parts based on a lecture by Camille Hémet

Definitions

❖ **Marginal tax rate (MTR)**: rate at which the last income unit is taxed

❖ **Average tax rate (ATR)**: share of the total tax amount in total income

❖ Taxes typology:
  ❖ **Progressive**: ATR increasing with income   FR income tax
  ❖ **Proportional**: constant ATR   FR capital gains flat tax
  ❖ **Regressive**: ATR decreasing with income   Rare for a given tax; possibly overall tax schemes

Tax system equity

❖ **Vertical equity**

Fair repartition of the tax burden, i.e. people with more resources contribute more

To be vertically equitable, a tax scheme must be **progressive**.

❖ **Horizontal equity**

Similar individuals but with distinctive life choices should face a similar tax scheme arbitrage.

Hard to implement **in practice**: who is similar?

This principle guides social security and family policies (**universal**).

Not about redistribution but insurance of social risks and (dis)incentivizing specific choices.

Vertical equity in the US?

Animated version here:
https://twitter.com/gabriel_zucman/status/1181061932842770432

or there:

https://www.nytimes.com/interactive/2019/10/06/opinion/income-tax-rate-wealthy.html

Gabriel Zucman @gabriel_zucman · 7 oct.
The US tax system, when taking into account all taxes paid at all levels of government, is now a giant flat tax...

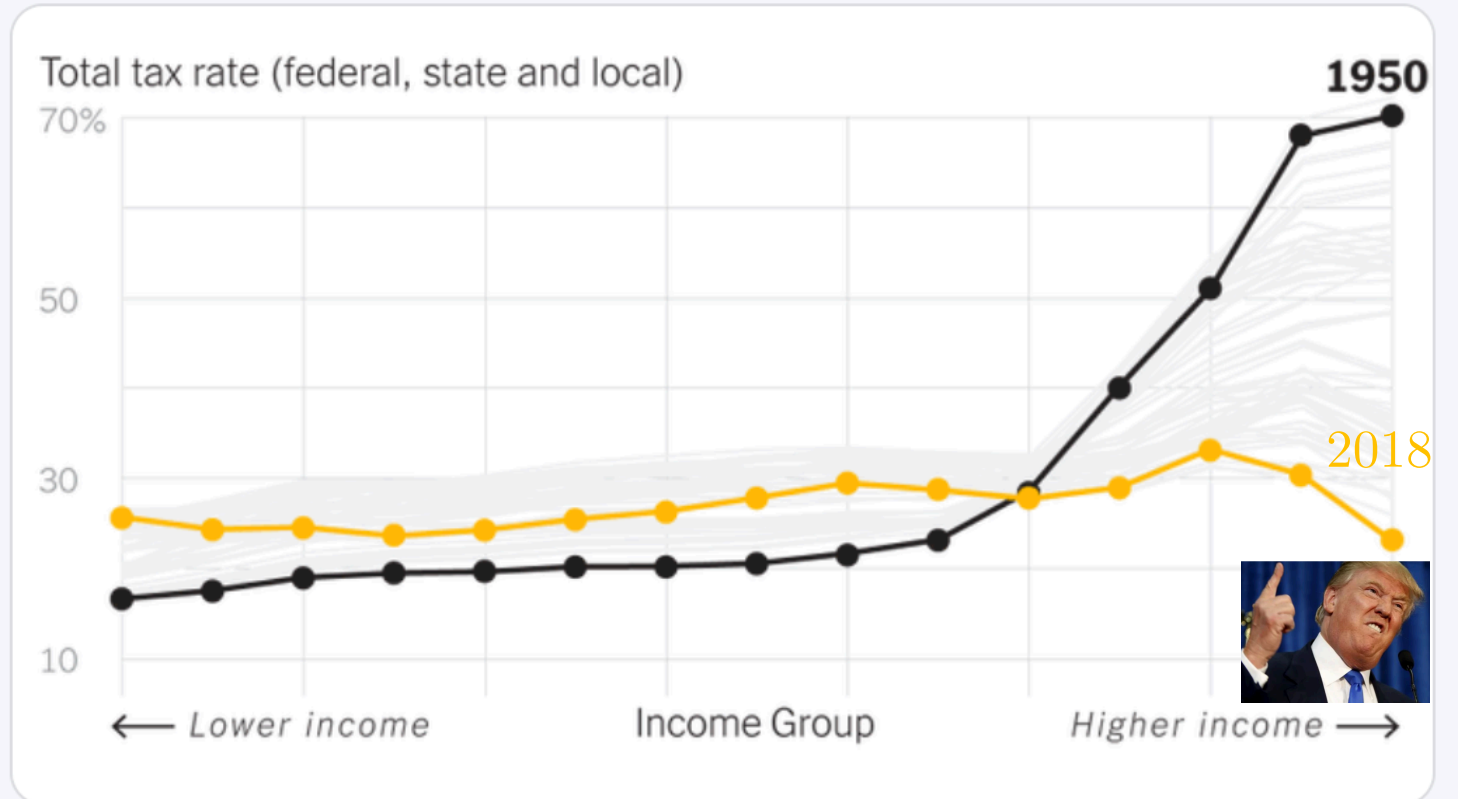... which becomes regressive at the very top, with the super rich paying less than everybody else.

nytimes.com/interactive/20...

Total tax rate (federal, state and local)   **1950**
70%

50

30

10

← Lower income   Income Group   Higher income →

2018

In France?

Un système fiscal faiblement progressif…ou franchement régressif?

1 700€ brut par mois

4 200€ brut par mois

9 400€ brut par mois

63 000€ brut par mois

Système actuel (moyenne générale: 47%)

Classes populaires
Les 50% des revenus les plus bas (revenu brut mensuel individuel compris entre 1 000€ et 2 200€)

Classes moyennes
Les 40% du milieu (revenu brut compris entre 2 300€ et 5 100€)

Classes aisées
Les 10% les plus hauts (revenu brut supérieur à 5 200€)

Très aisées
Les 1% les plus hauts (revenu brut supérieur à 14 000€)

Taux global d'imposition (tous prélèvements)

Percentiles de revenu individuel

Lecture: le graphique montre le taux global d'imposition (incluant tous les prélèvements) par groupe de revenus au sein de la population 18-65 ans travaillant à au moins 80% du plein temps. P0-10 désigne les percentiles 0 à 10, càd les 10% des personnes avec les revenus les plus faibles, P10-20 les 10% suivants, ..., P99.999-100 désigne les .001% les plus riches. La moyenne générale d'imposition est de 47% en moyenne. Les taux d'imposition croissent légèrement avec le revenu jusqu'au 95e percentile puis baissent avec le revenu pour les 5% les plus riches.
Source: C. Landais, T. Piketty & E. Saez, Pour une révolution fiscale, chapitre 1, p.50
Voir www.revolution-fiscale.fr, annexe au chapitre 1 (où nous montrons aussi les chiffres pour la population adulte totale).

Tax incidence   IMPORTANT

Major characteristics of taxation but absent form public debates!

❖ **Three principles :**

1. The **agent to which the tax is affected is not always the one paying it in practice**.

2. The **distribution of the tax burden is independent on the side of the market taxed legally** (be it supply or demand).

3. The tax incidence depends on the **price-elasticities** of demand and supply. The more rigid side is paying more, e.g. cigarettes has quite inelastic demand.

Question:

Imagine there is no VAT and a reusable protective mask
used to sell for 10€/unit

Now, the State implements a VAT of 20%.

What will be the price of the mask?

12€? Still 10€? Less than 10€? 10 to 12€? More than 12€?

Example of a sales tax

Start from a competitive equilibrium
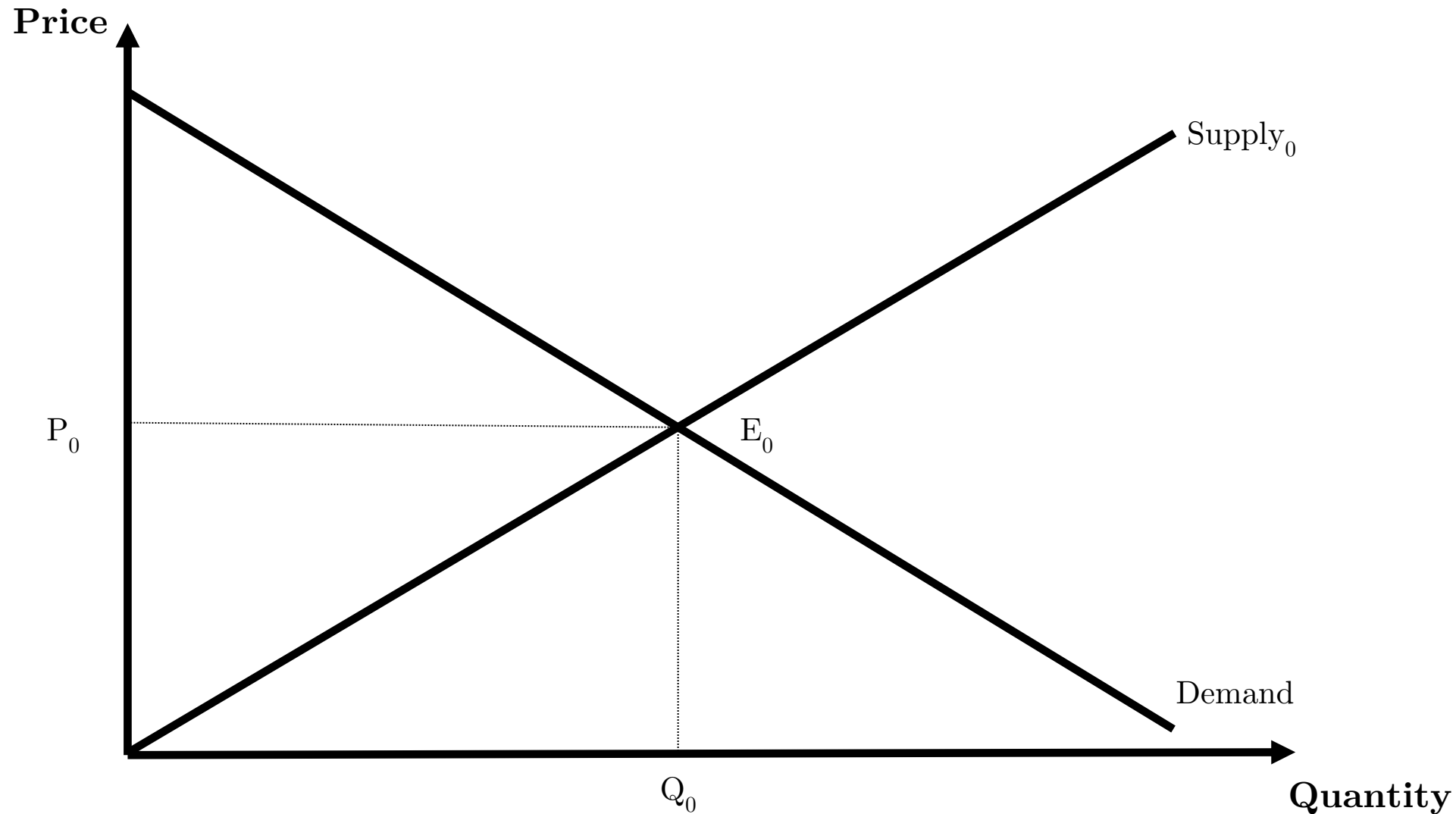
Example of a sales tax

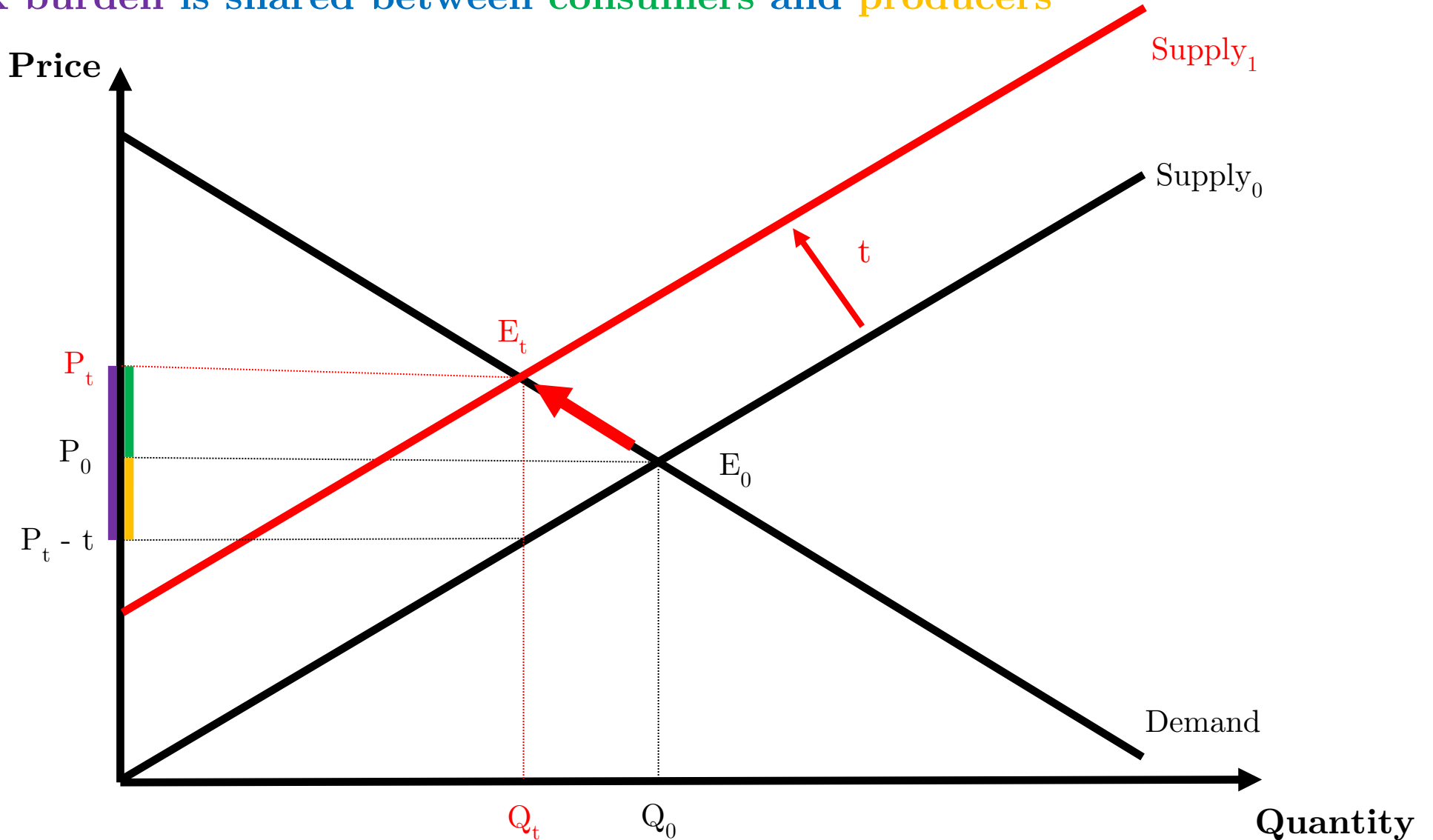**Add a tax t: it increases marginal cost**
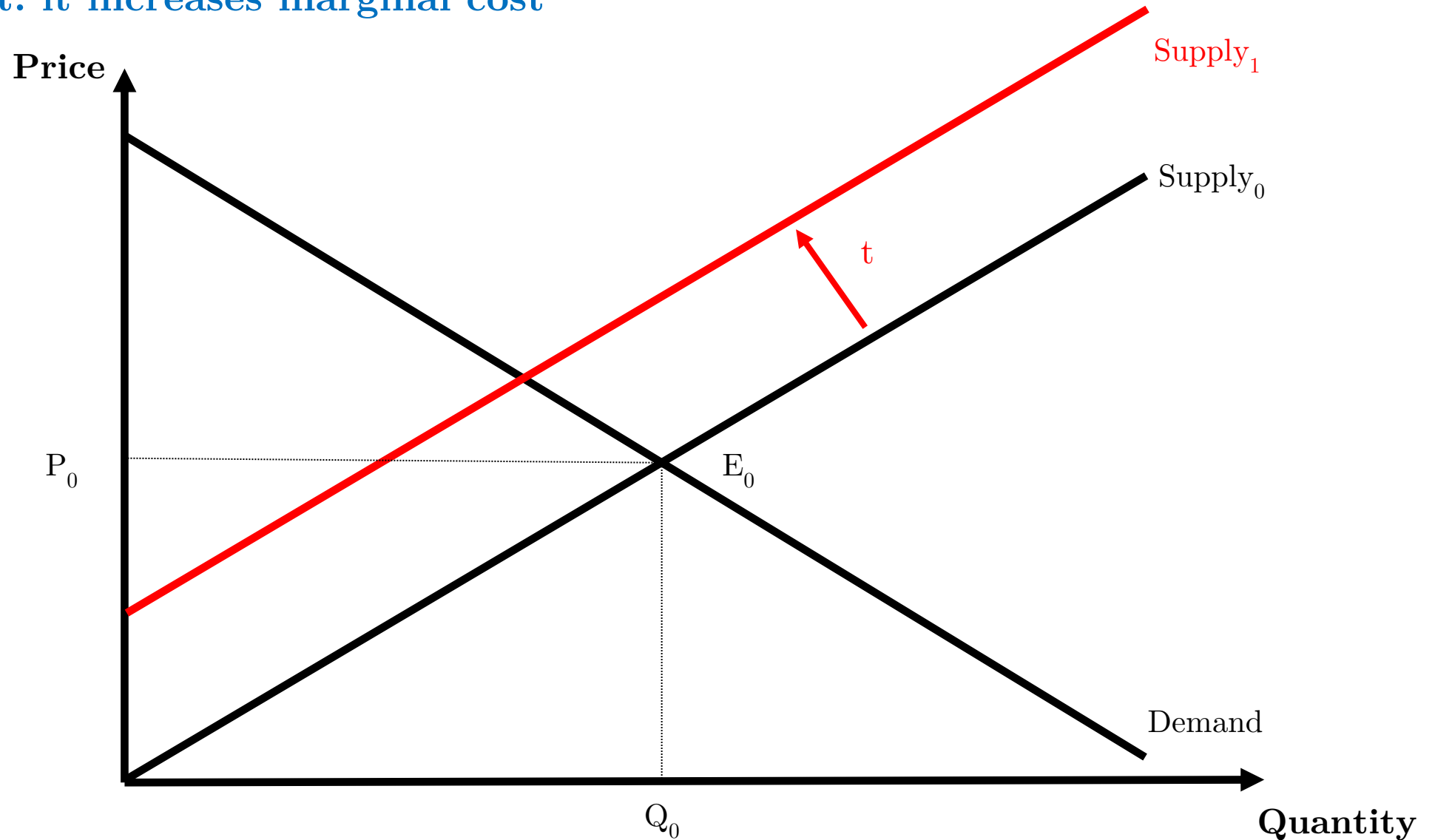
Example of a sales tax

New equilibrium E_t at higher price
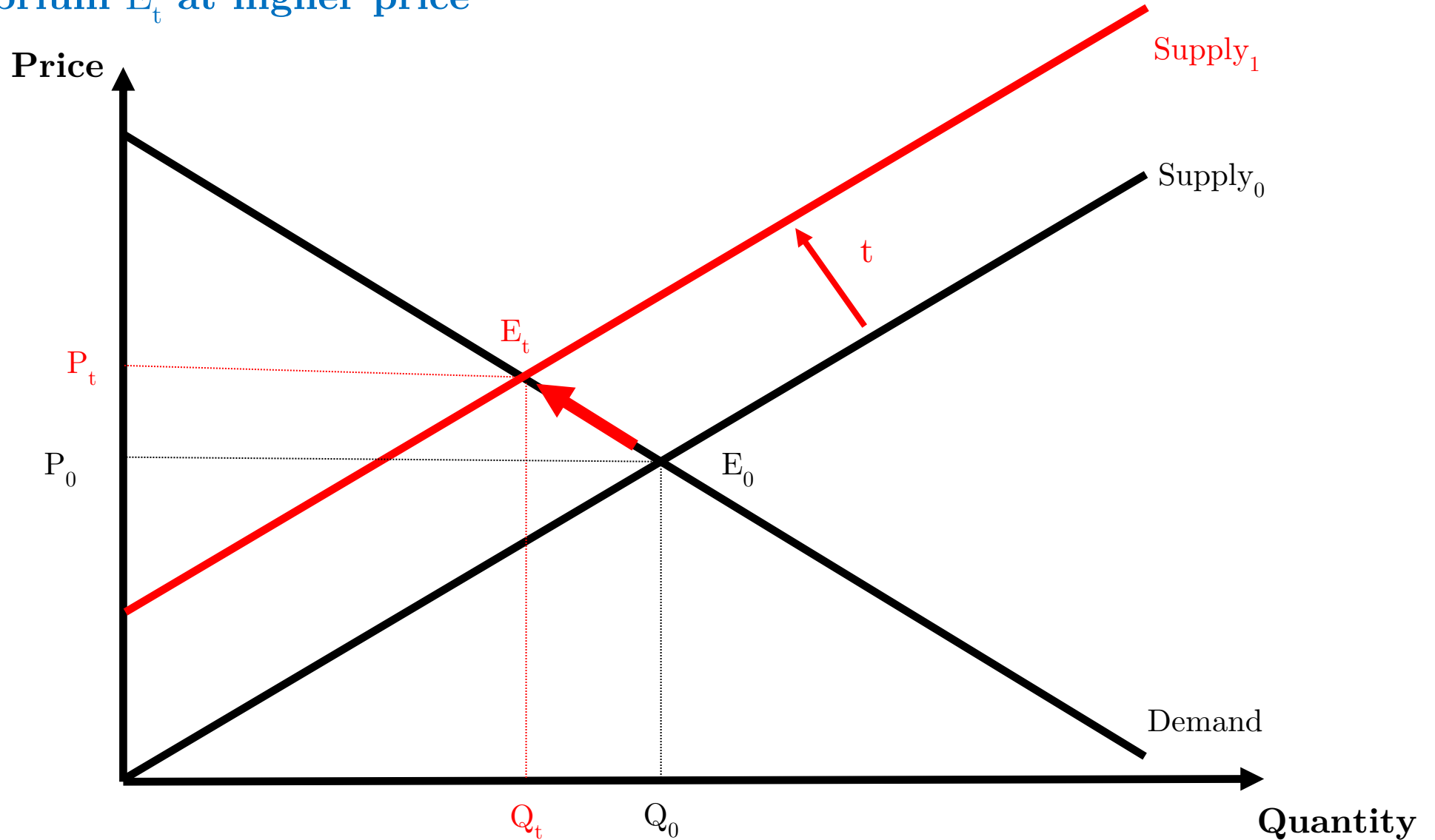
Example of a sales tax

But the tax burden is shared between consumers and producers

Example of a sales tax

The tax burden t is shared between consumers and producers

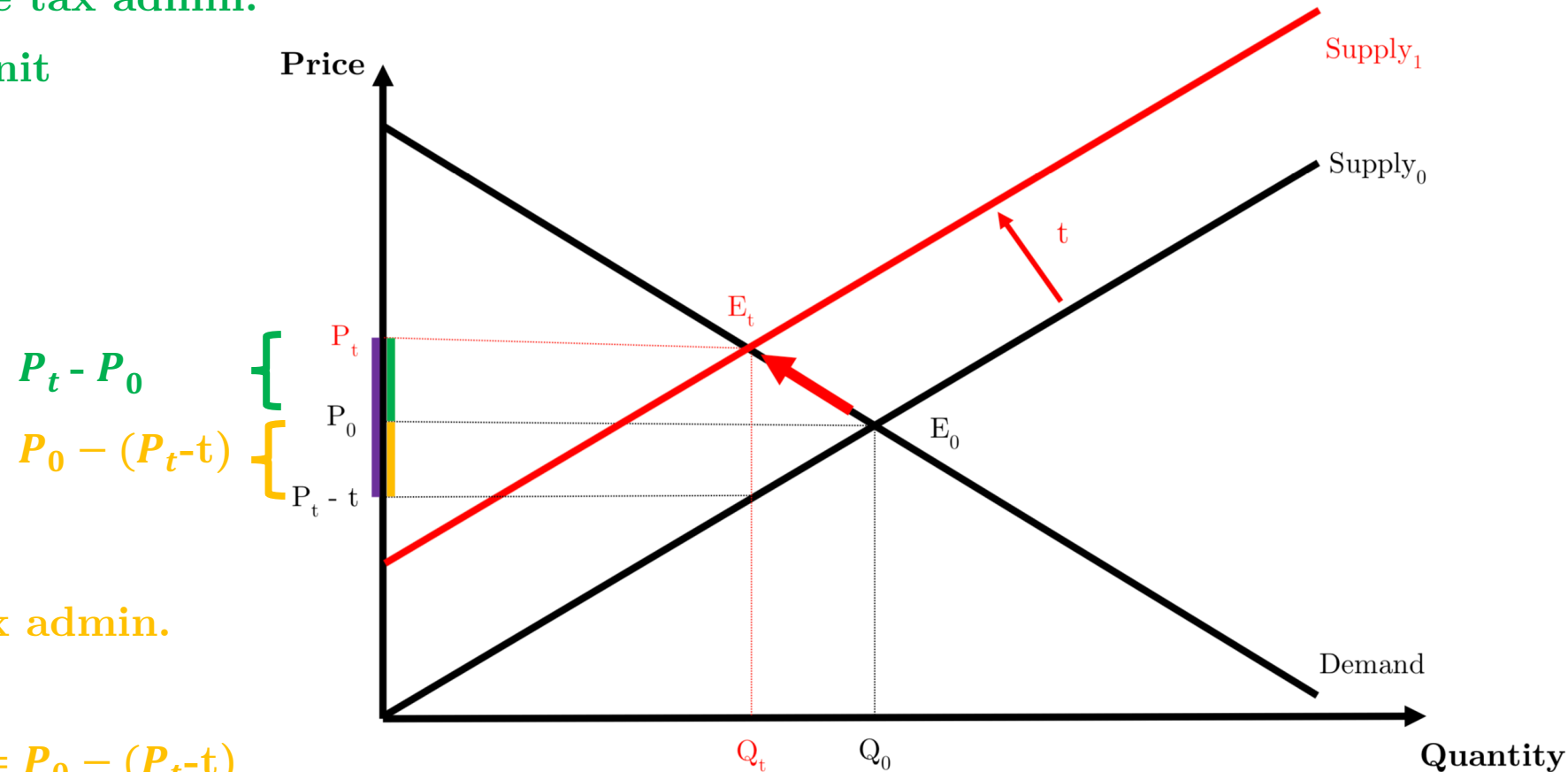Consumer pays nothing to the tax admin.

− but pays $P_t - P_0$ more per unit

Burden per unit: $P_t - P_0$

$P_t - P_0$

$P_0 - (P_t\text{-t})$

Producer:

− Has to pay t per unit to tax admin.
+ but earns $P_t - P_0$ more

Burden per unit: $t - (P_t - P_0) = P_0 - (P_t\text{-t})$

Price

$Supply_1$

$Supply_0$

t

E_t

P_t

P_0

E_0

$P_t - t$

Demand

Q_t Q_0

Quantity

Example of a sales tax

First principle of tax incidence: the agent to which the tax is affected is not always the one paying it in practice (here the burden is shared).
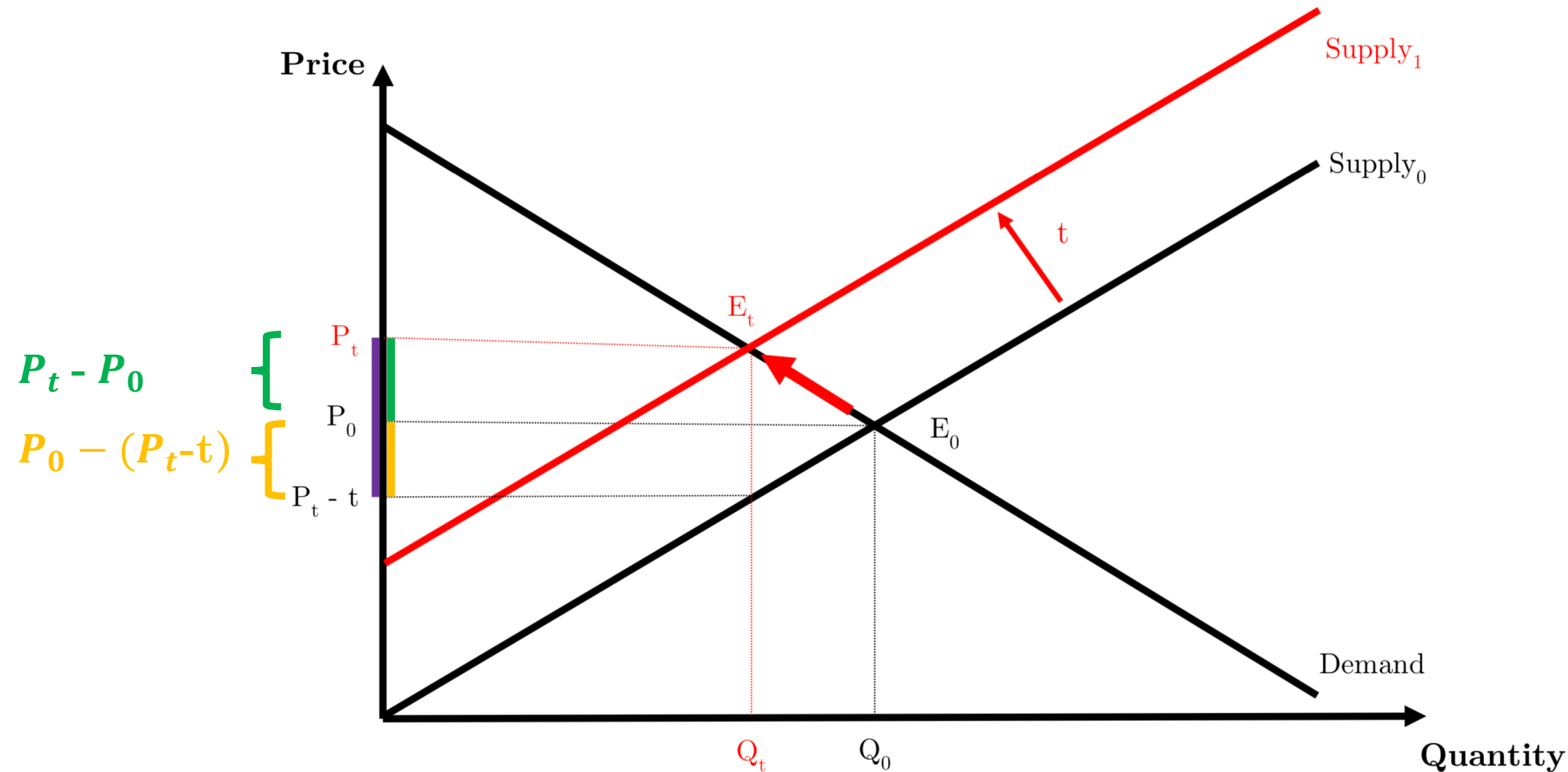
Back to our question:

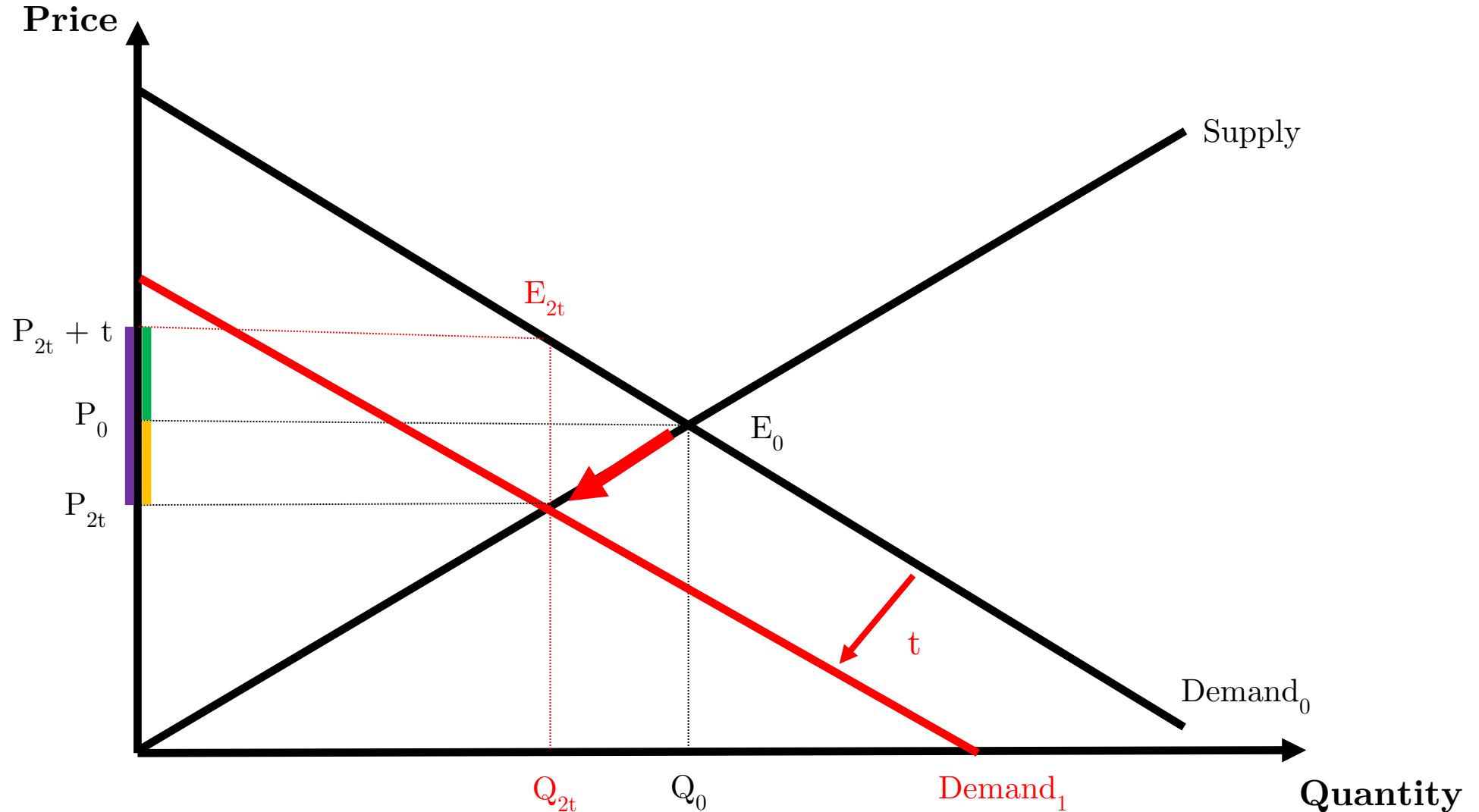Imagine there is no VAT and a reusable protective mask used to sell for 10€/unit

Now, the State implements a VAT of 20%.

What will be the price of the mask?

Somewhere between 10€ and 12€

Example of a consumer tax

The tax burden t is shared between consumers and producers

Consumer pays nothing to the tax admin.

Has to pay t per unit to tax admin.
but pays $P_0 - P_{2t}$ less per unit
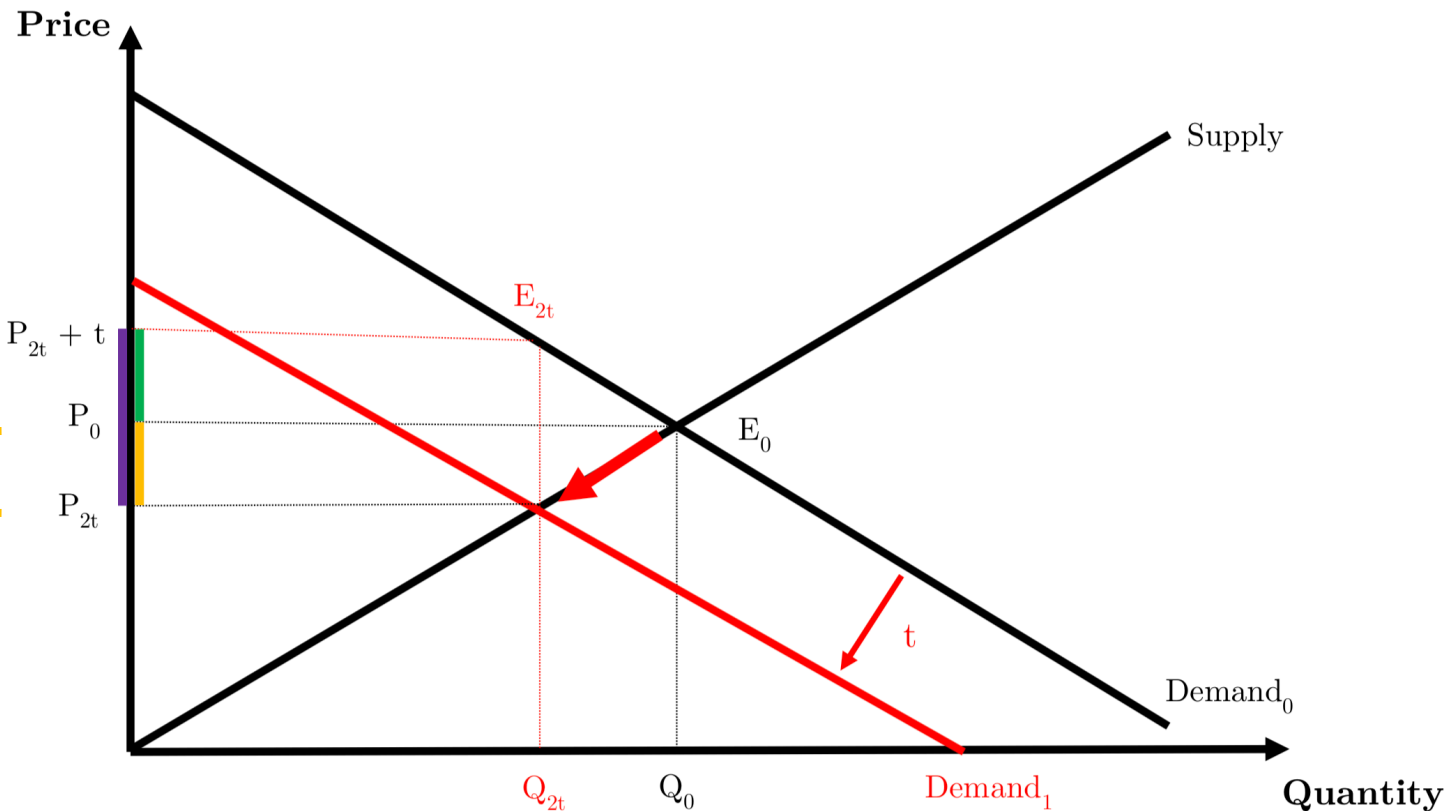
Burden per unit: $t - (P_0 - P_{2t})$
$= (P_{2t}+t) - P_0$

Producer:

pays nothing to the tax admin.
but loses $P_0 - P_{2t}$ per unit

Burden per unit: $P_0 - P_{2t}$

$(P_{2t}+t) - P_0$

$P_0 - P_{2t}$

Price

Supply

E_{2t}

$P_{2t} + t$

P_0

E_0

P_{2t}

t

Demand$_0$

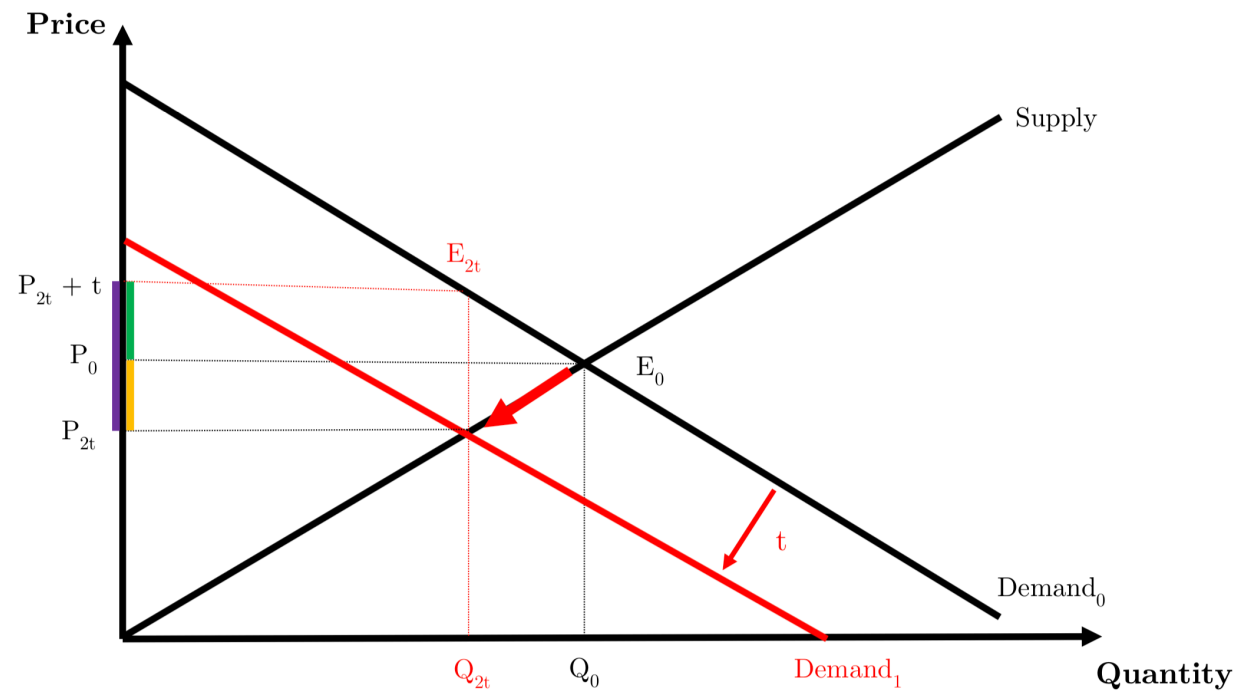Q_{2t} Q_0 Demand$_1$ Quantity

Sales & consumer taxes

Second principle of tax incidence: the distribution of the tax burden is **independent on the side of the market taxed legally** (be it supply or demand)
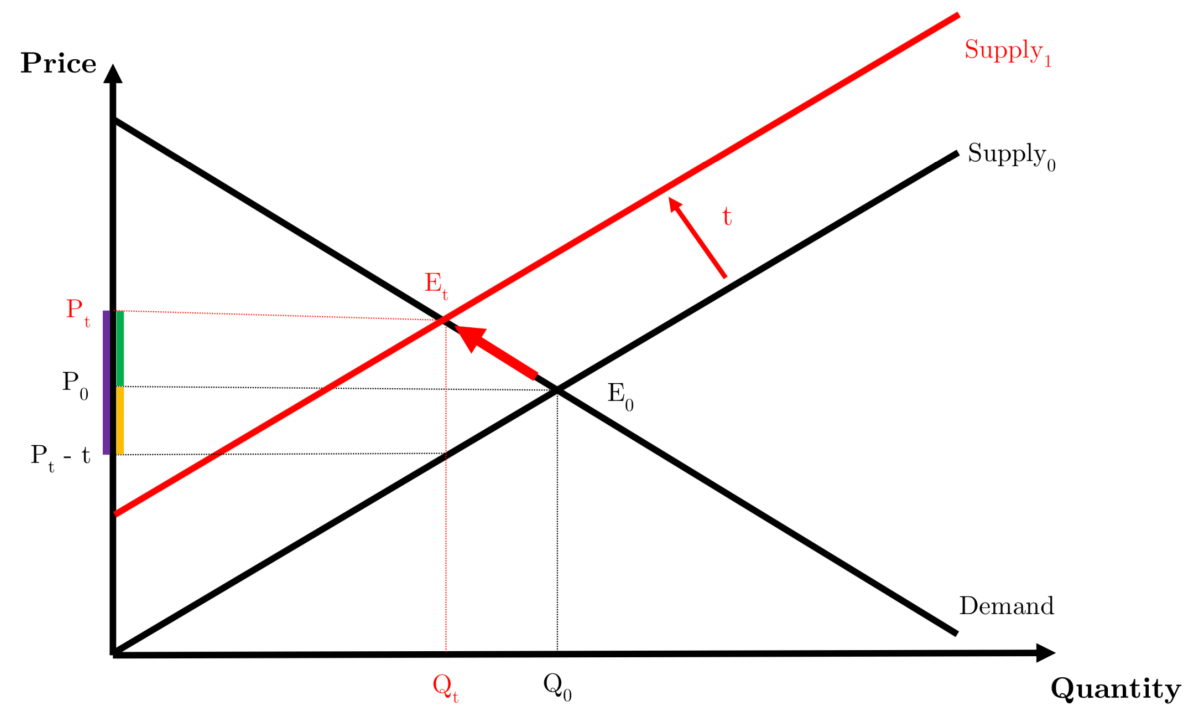
sales tax

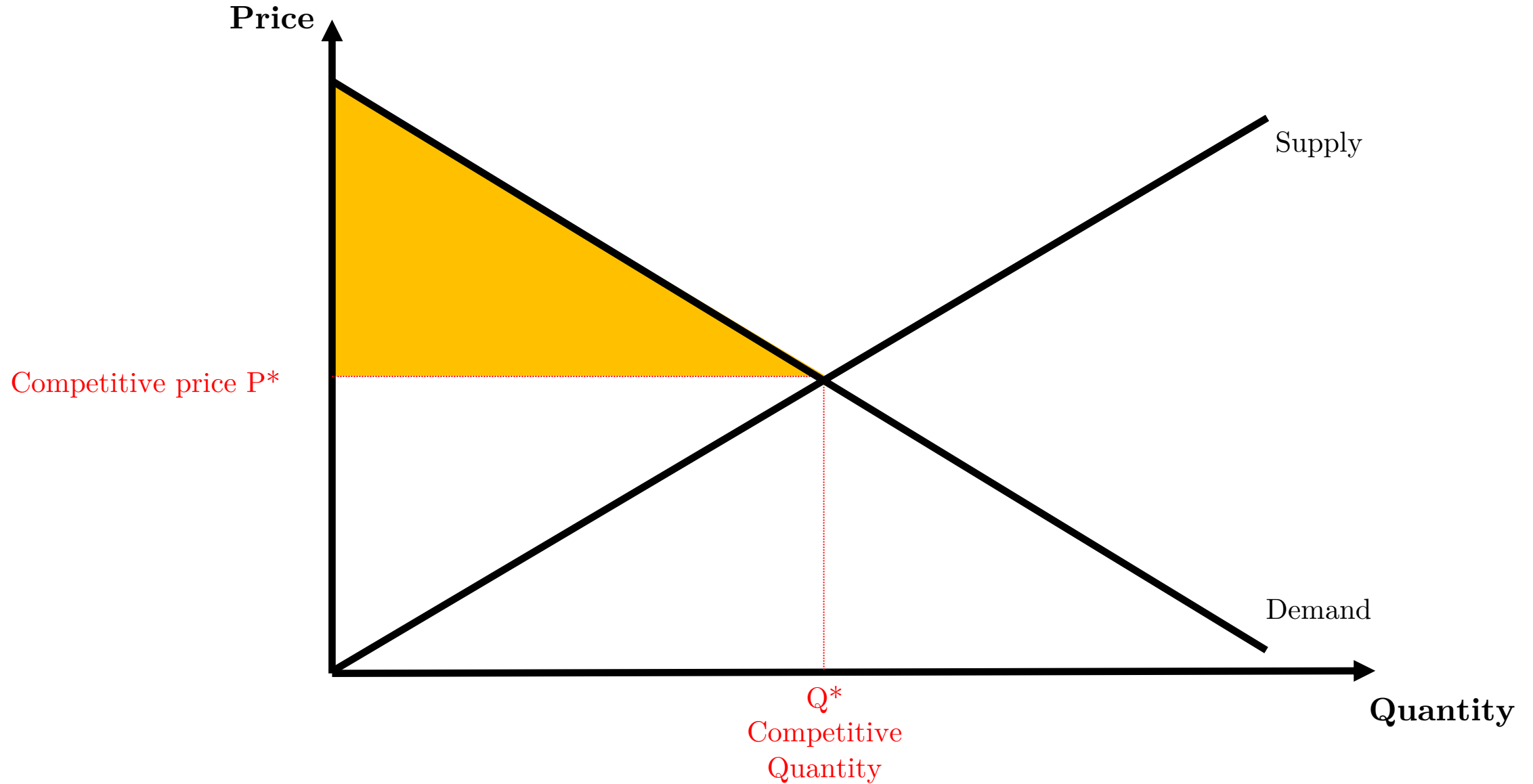consumer tax

Taxation & Welfare analysis

Small parenthesis about what you studied/review with Emeric Henry.

Did you understand (or already remembered) the concepts of consumer surplus, producer surplus, deadweight loss?

Surplus

❖ **Consumer Surplus** (measures satisfaction) :
sum for all consumed units of the spread between the price paid by the consumer and the price the consumer was ready to pay

❖ **Producer Surplus** (measures profit) :
sum for all sold units of the spread between the selling price and the reservation price (the marginal cost)

❖ At the optimal choice, both the consumer and the producer marginal surpluses are null

❖ The collective/**social surplus** is the sum of consumer and producer surpluses

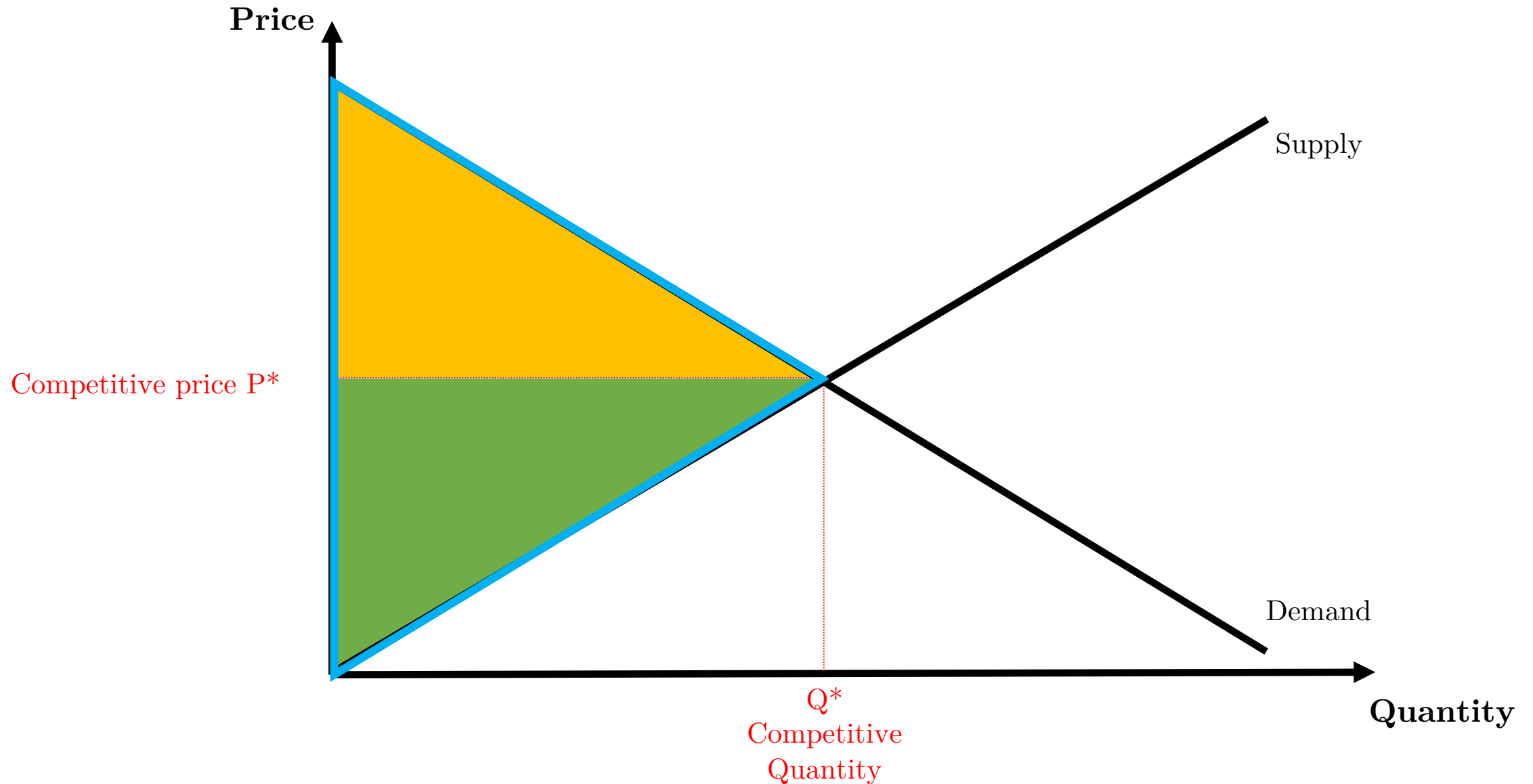# Consumer Surplus

Price

Supply

Competitive price P*

Demand

Q*
Competitive
Quantity

Quantity

Producer Surplus

Legend:
- Consumer surplus
- Producer surplus
- Social surplus

Price

Supply

Competitive price P*

Demand

Q*
Competitive
Quantity

Quantity

Taxation and welfare

❖ Social surplus is maximum at competitive price and quantities (**First welfare theorem**)

❖ The introduction of a tax implies a loss of consumer surplus and producer surplus
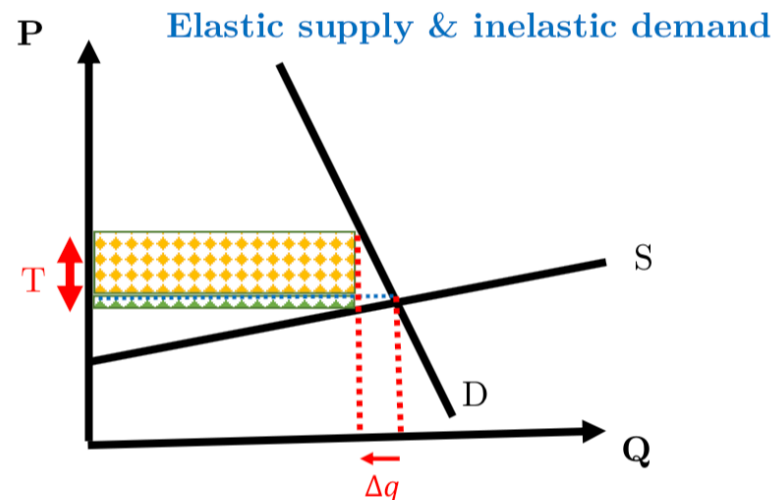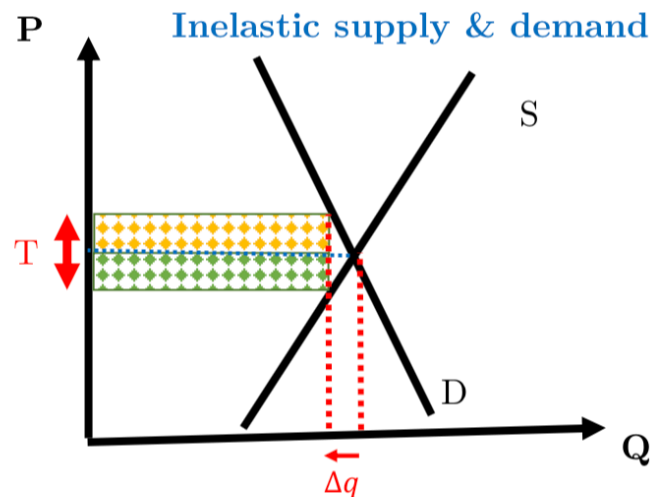
Taxation and welfare, graphically

Legend:
- Consumer surplus
- Consumer surplus loss
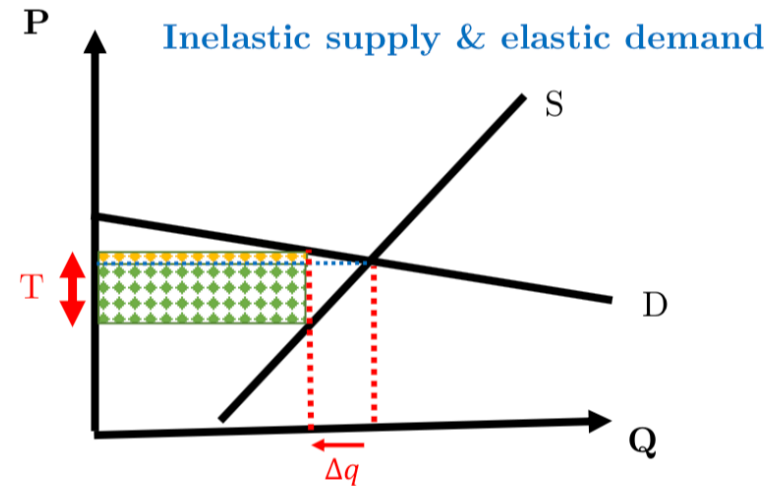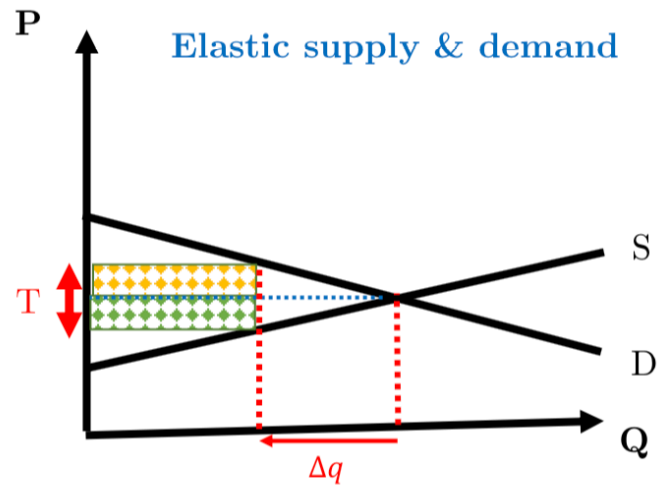- Producer surplus loss
- Producer surplus

Supply

Demand

Price

Quantity

T

Δq
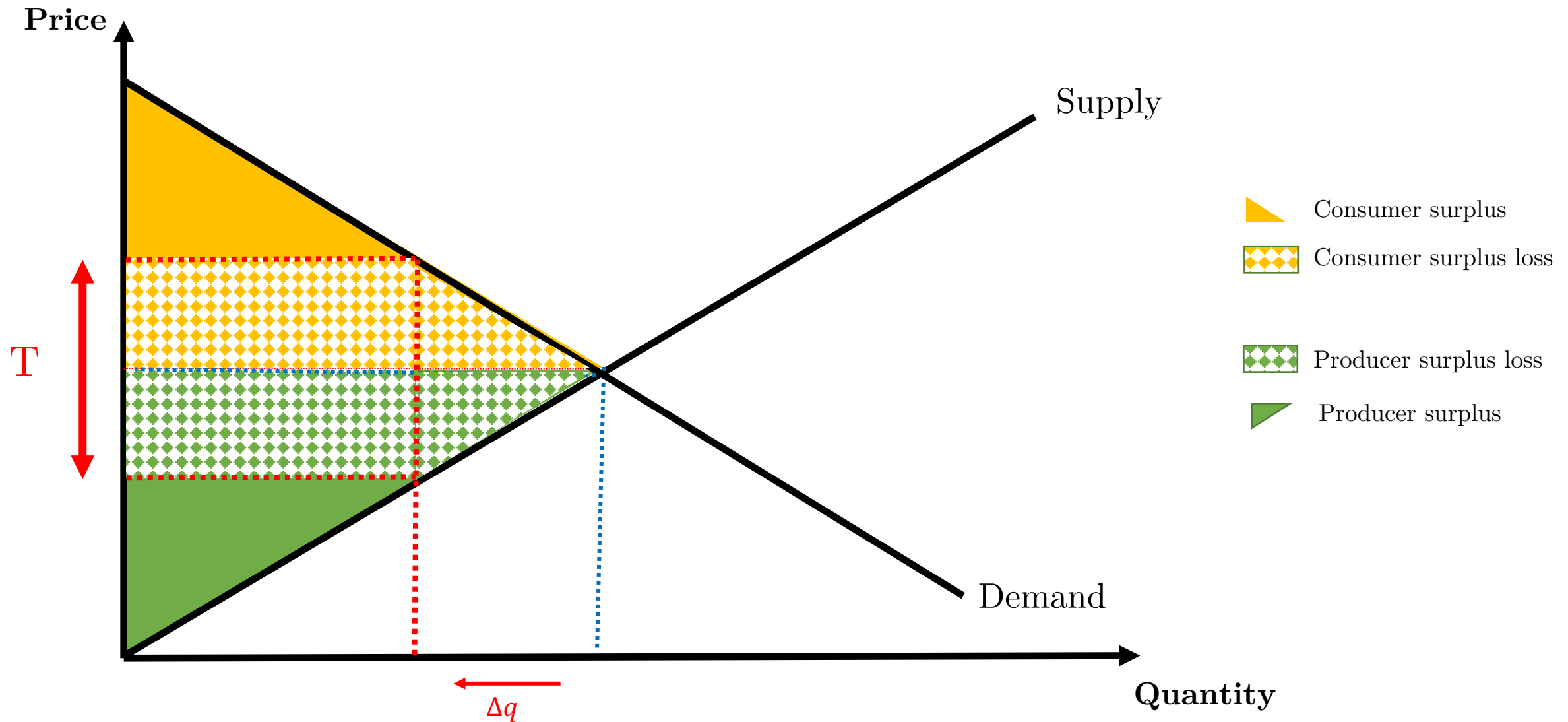
Tax incidence – graphics

Third principle of tax incidence: the tax incidence depends on the **price-elasticities** of **demand** and **supply**. The more rigid side is paying more.

Back to our question:

Imagine there is no VAT and a reusable protective mask
used to sell for 10€/unit

Now, the State implements a VAT of 20%.

What will be the price of the mask?

Somewhere between 10€ and 12€
It depends on relative **price-elasticities** of **supply** and **demand**.

Elastic supply & demand
Moderate price increase

Inelastic supply & elastic demand
Low price increase

Inelastic supply & demand
Moderate price increase

Elastic supply & inelastic demand
Large price increase
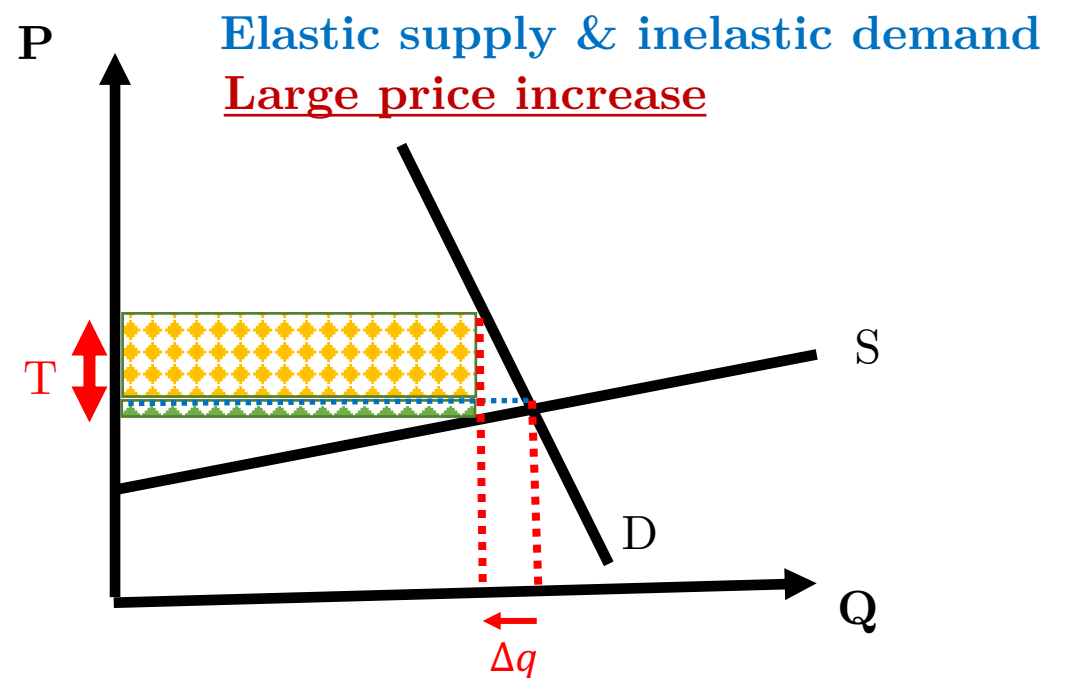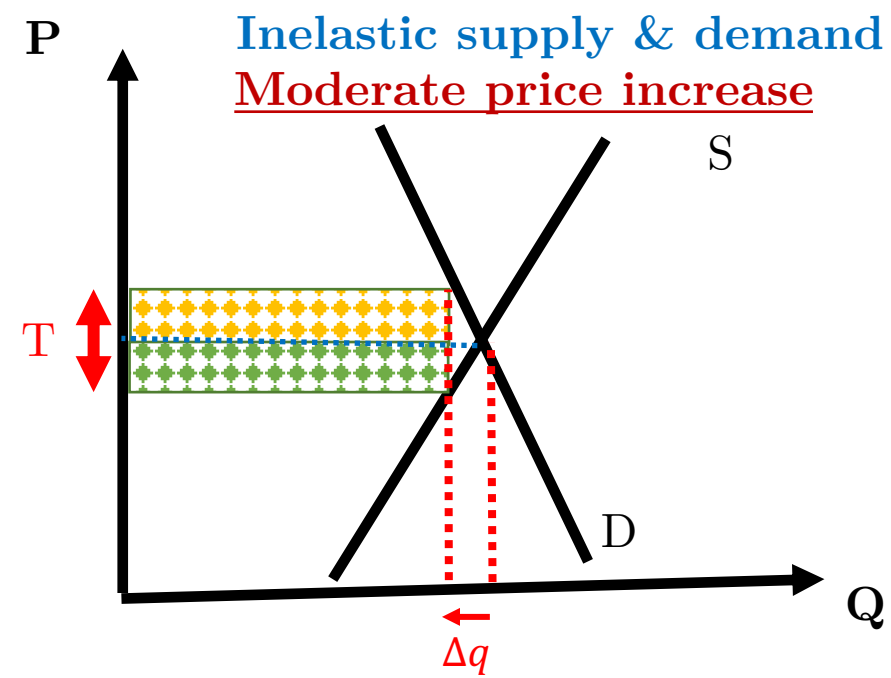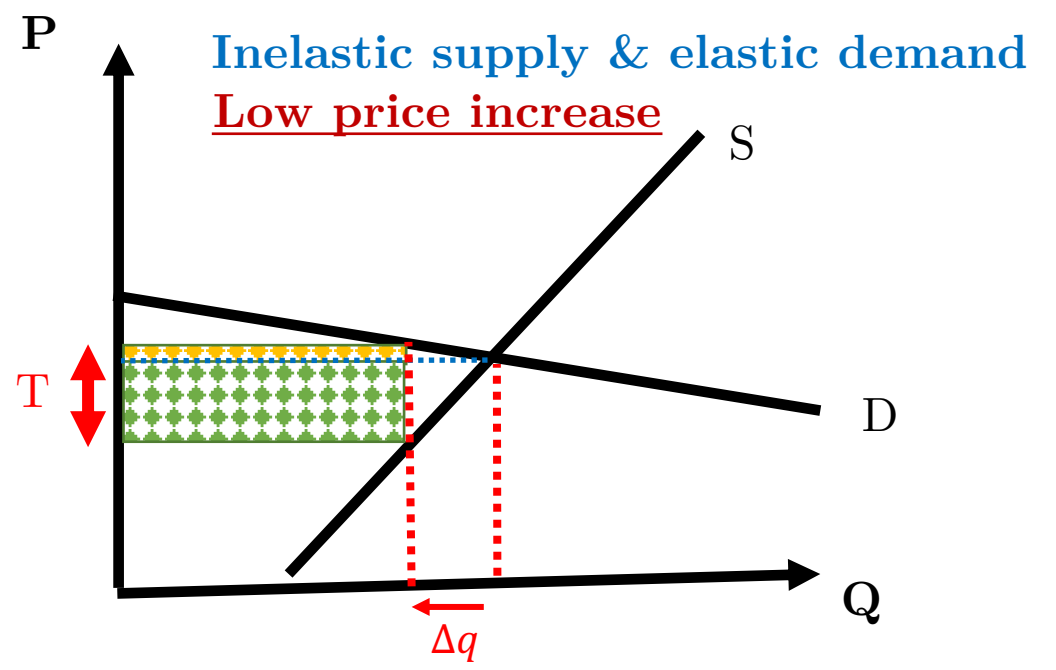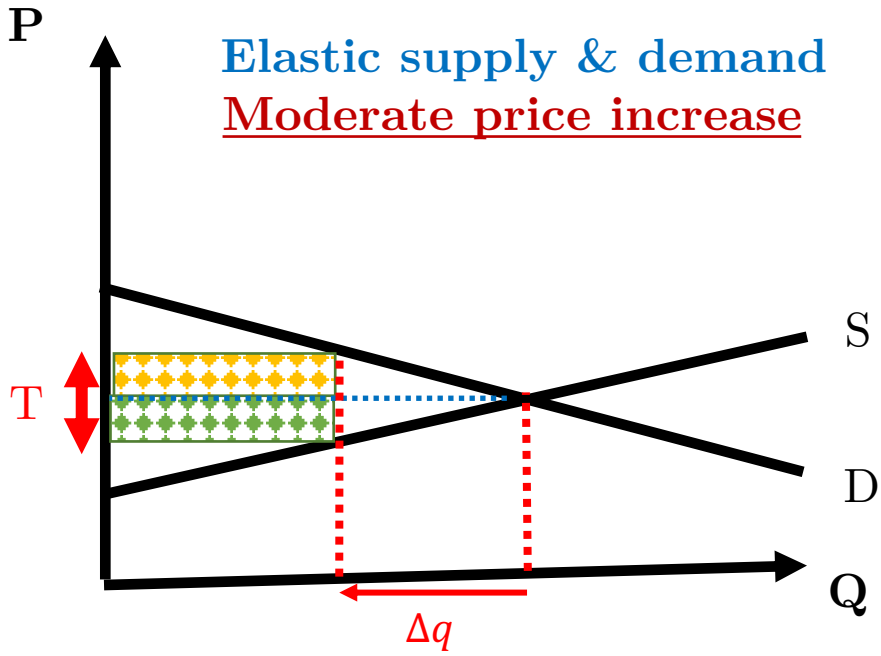
Limits of tax incidence analysis

❖ **Price adjustments:**

Tax incidence is based on price adjustments. In the presence of a minimum wage, price floors or price ceilings, or other similar rules limiting the adjustment, the side legally taxed matters.

❖ **Tax revenue usage:**

Tax incidence studies the share of the tax burden without consideration for beneficiaries of the public spending linked to this tax.

In practice, taxes are rarely targeted to a given destination

❖ **General equilibrium:**

Those analysis are partial equilibria (on a given market). But markets are interdependent. A tax on sodas will have effects on other markets. Not taken into account here.

Empirical evidence of tax incidence

Doyle & Samphanthara (2008)

❖ About tax incidence for **gasoline**

❖ Sudden price increase in Spring 2000

❖ **Temporary tax suspension** from July 1 to October 30 in Indiana and Illinois

❖ Difference-in-differences with neighboring States as control group

❖ RESULTS:
  ❖ **70% of the decrease is only progressively transmitted to consumers**
  ❖ **80 to 100% of the re-increase is supported** by consumers

Taxation

parts based on a lecture by Camille Hémet

Optimal taxation

❖ **Tax incidence** relates to:
  ❖ **equity**;
  ❖ the share of **price variations** between producers and consumers.

❖ Whereas **optimal taxation** relates to:
  ❖ **efficiency**;
  ❖ the change in **quantities exchanged**.

=> Recall the **first welfare theorem**: the competitive equilibrium is optimal.

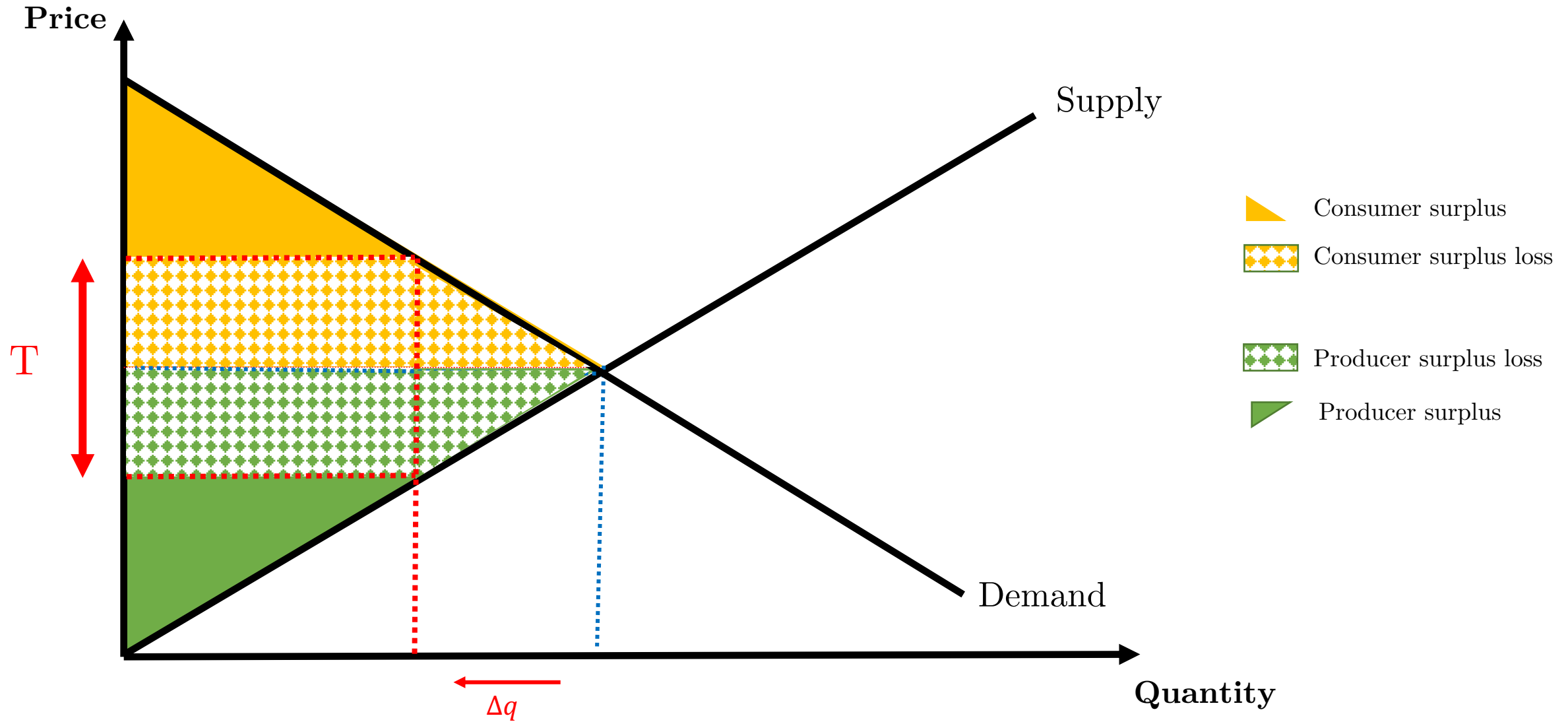Therefore, a tax induces an efficiency loss.

Taxation and welfare

❖ **Social surplus is maximum at competitive price and quantities (First welfare theorem)**

❖ **The introduction of a tax implies** a loss of consumer surplus and producer surplus... including **a social deadweight loss**
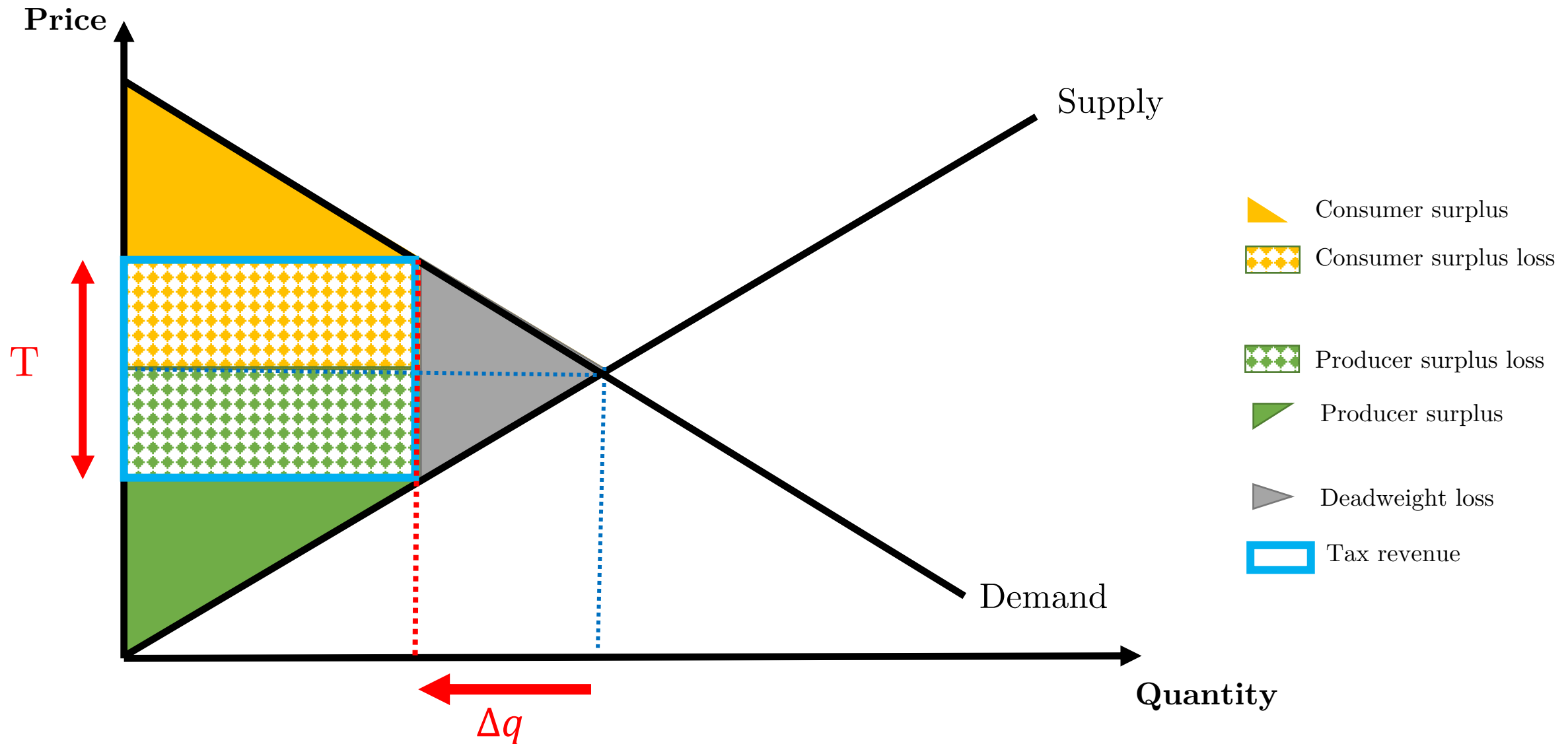
Indeed, part of the exchanges will no longer take place

Back to this graph...

Part of the social surplus is transferred to the State, but part is simply lost (the DWL = Harberger triangle)

Price

T

Supply

Demand

Quantity

Δq

Consumer surplus

Consumer surplus loss

Producer surplus loss

Producer surplus

Deadweight loss

Tax revenue

Efficiency loss

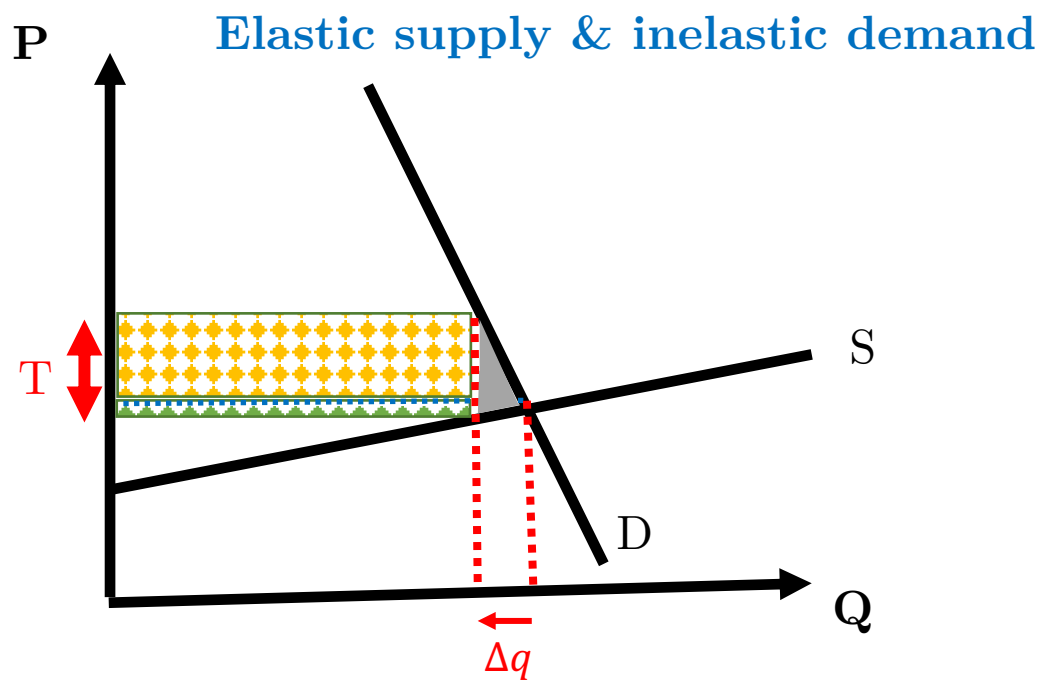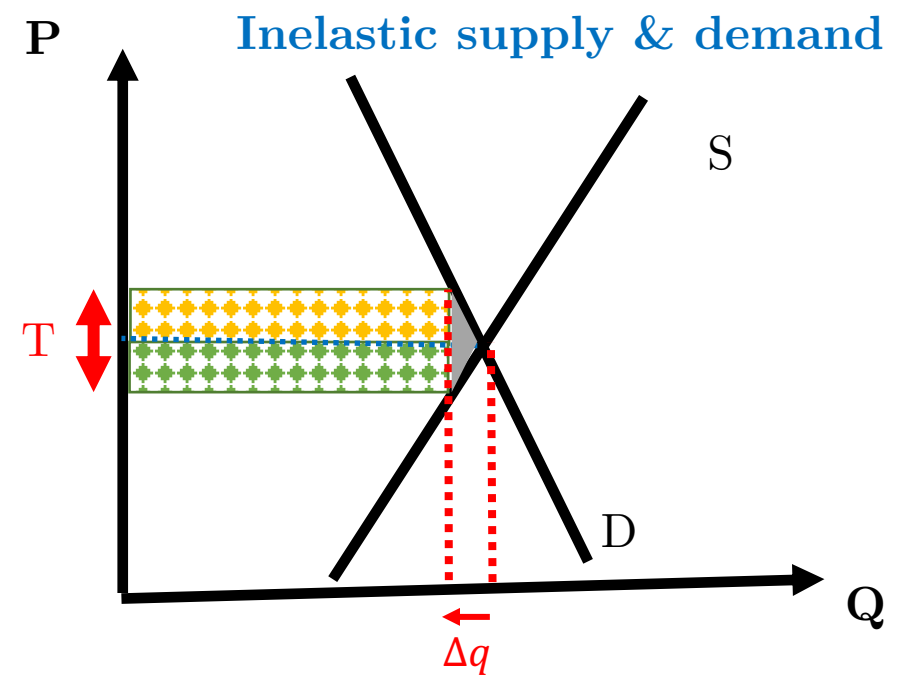❖ The deadweight loss constitutes unrealized mutually beneficial transactions.

❖ Why?

1. Some producers go below their break-even point.

2. The price is now above the willingness to pay of some consumers.

NB: Agents excluded from the market may keep consuming producing on **distinctive markets**, but those choices are **less efficient** (otherwise they would have been chosen first)

NB 2: The magnitude of the inefficiency depends on supply and demand **elasticities** (see again graphs) **The more elastic the higher the inefficiency**.

NB 3: The tax revenue will be used and should have a positive impact on welfare (even though it is not what individuals would have chosen to do).

Elastic supply & demand

P

T

S

D

Q

Δq

Inelastic supply & elastic demand

P

T

S

D

Q

Δq

Inelastic supply & demand

P

T

S

D

Q

Δq

Elastic supply & inelastic demand

P

T

S

D

Q

Δq
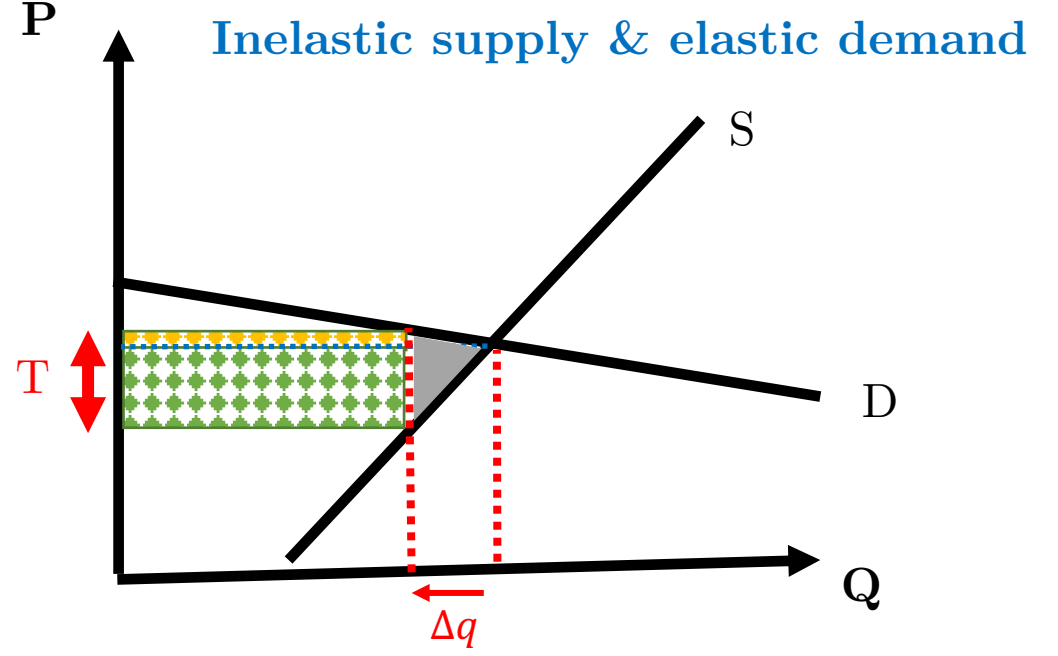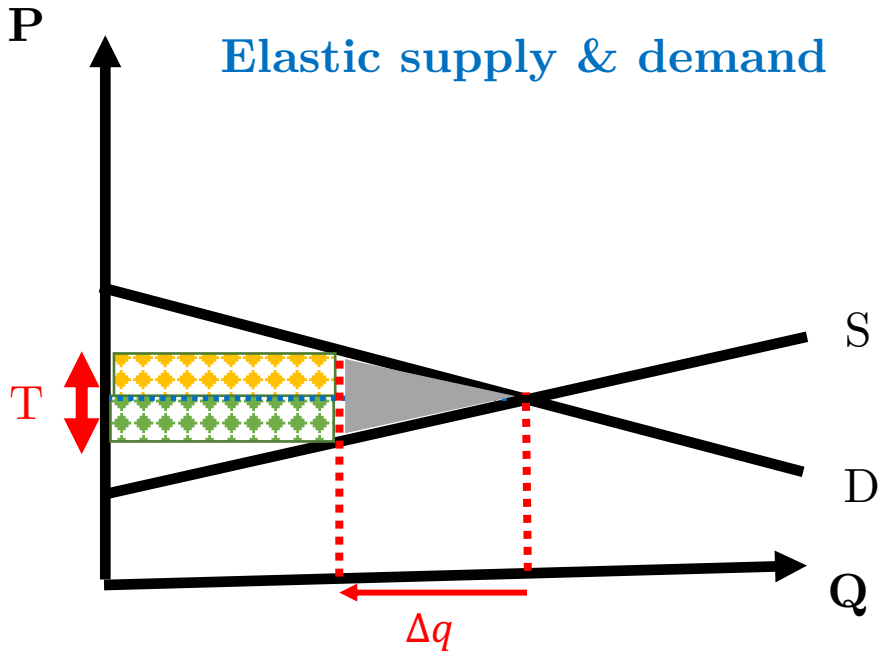
Marginal deadweight loss

❖ Additional DWL generated by a marginal increase of the tax

❖ It increases with the tax rate.

❖ Indeed, the further away from competitive equilibrium, the bigger the area of the additional DWL

Marginal deadweight loss

Price

Supply₁

Supply₀

Initial tax t

t

E_t

P_t

P_0

P_t - t

E_0

Demand

Q_t   Q_0

Quantity

Marginal deadweight loss

Initial tax t

and additional tax t'

Price

$Supply_2$

$Supply_1$

$Supply_0$

t'

t

E_t

P_t

P_0

$P_t - t$

E_0

Demand

$Q_{t'}$

Q_t

Q_0

Quantity
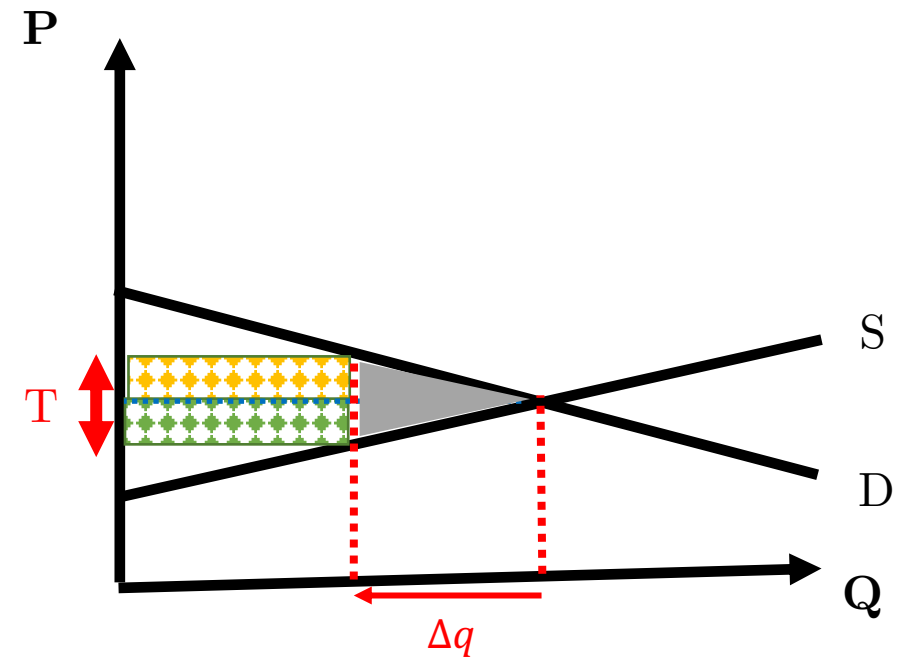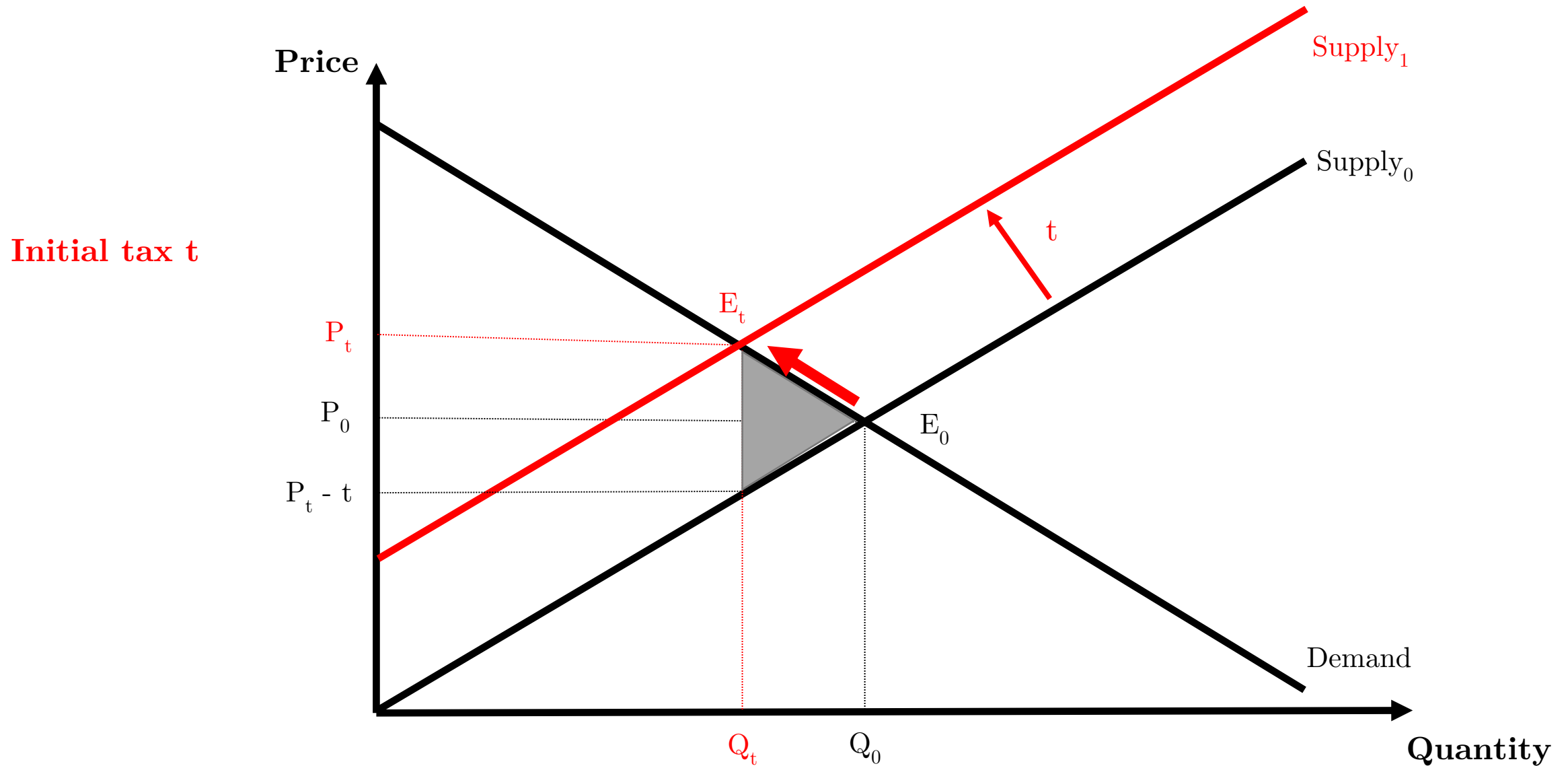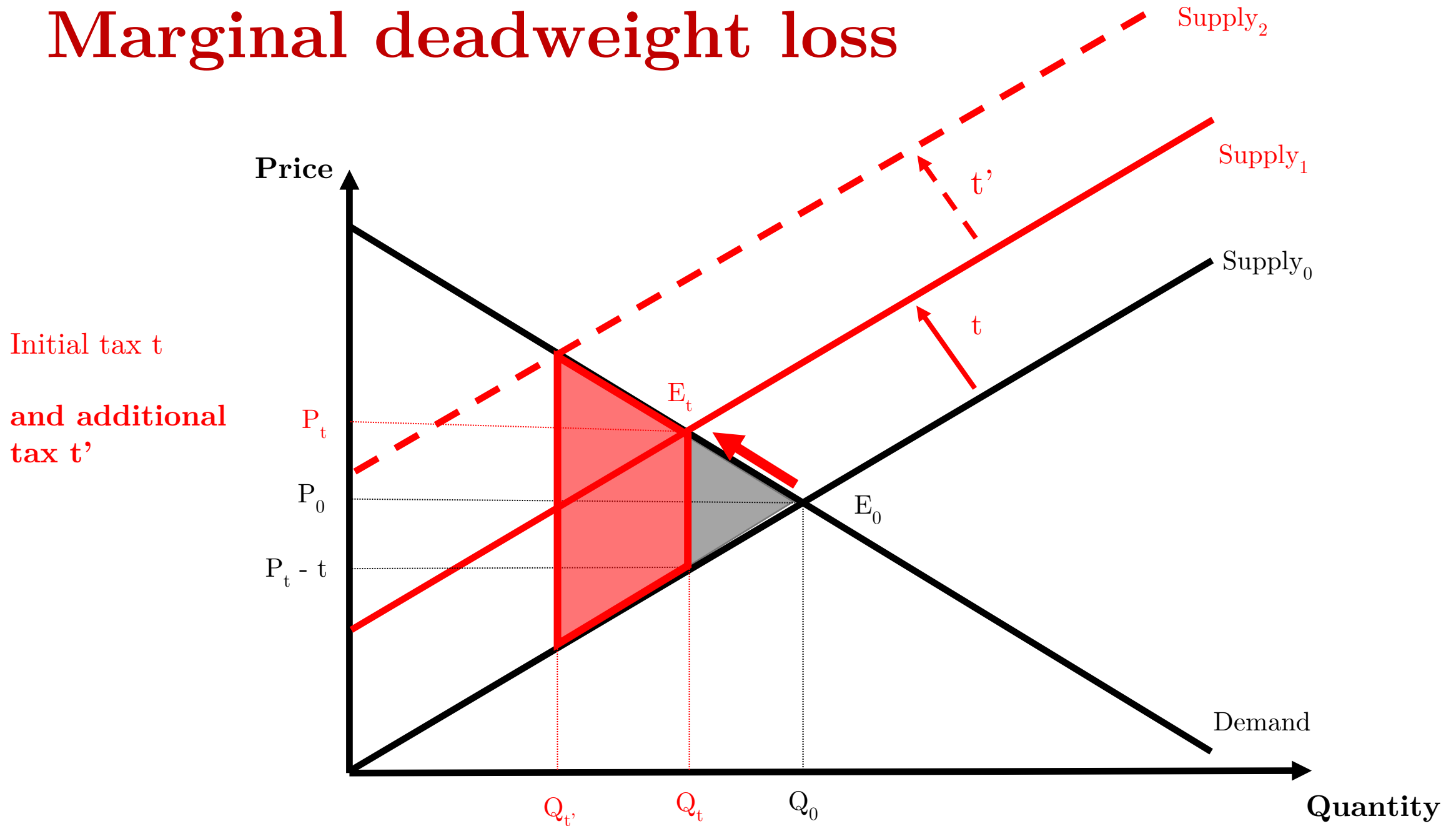
Optimal taxation: Ramsey

❖ Governments may split efficiently taxes between markets to limit inefficiencies

❖ **Formalization**: minimize sum of DWL on all markets under the constraint of a given tax revenue

❖ **Ramsey rule**: the government must set the tax rate for different goods such that it **equalizes on every market the ratio of the marginal deadweight loss and the marginal tax revenue**.

❖ **Consequence**: it is preferable to tax many goods at a moderate rate than a few goods at a high rate because the marginal DWL increases with the tax rate.

Optimal taxation: Ramsey, conclusions

1. **Consequence**: it is preferable to tax many goods at a moderate rate than a few goods at a high rate because the marginal DWL increases with the tax rate.

2. Tax rates should be high when price-elasticities are low
   Tax rates should be low when price-elasticities are large
   (otherwise, large drop in exchanged quantities)

Optimal taxation: Lafer curve

❖ Each marginal increase of a tax rate on labor or income has theoretically two opposite effects:
1. It yields **more revenue per taxed unit** ↗ tax revenue
2. It implies **less hours worked** and diminishes the tax base ↘ tax revenue

❖ Arthur Laffer: the higher the tax rate, the more the second effect dominates
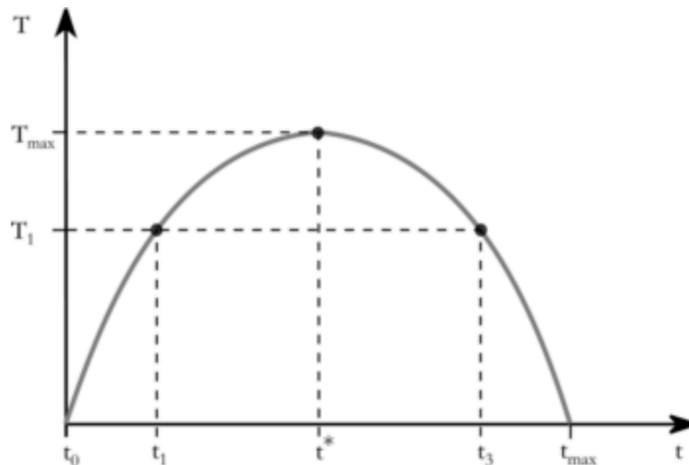
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ADDITIONAL VIDEO

Taxation

2 papers for application

1. **Tax & equity: subsidy incidence**
   Fack (2006) on housing benefits

2. **Tax & price elasticity of work**
   Kleven et al. (2015) on top income taxation

Tax incidence

Fack (2006)

"Are housing benefit an effective way to redistribute income? Evidence from a natural experiment in France"

Labour Economics

Housing benefits in France (APL)

❖ Rent subsidy

❖ 18 billions € (almost 1% of GDP)

❖ Objective (as stated in law):
  ❖ reduce the burden of rent for tenants (first reason for budget spending)
  ❖ paternalistic = incentivize households to have better housing (+ externalities)

Subsidy incidence

❖ Recall that tax incidence:
    ❖ studies **who** pays the tax –or receive the subsidy– in practice
    ❖ is mostly **absent** from public debates

❖ Who is going to benefit from the housing benefits?
    ❖ tenants?
    ❖ lessors?

$\Rightarrow$ This will **depend on supply & demand elasticities**
    Housing supply is quite inelastic

Graphically

Inelastic supply

Consumer surplus
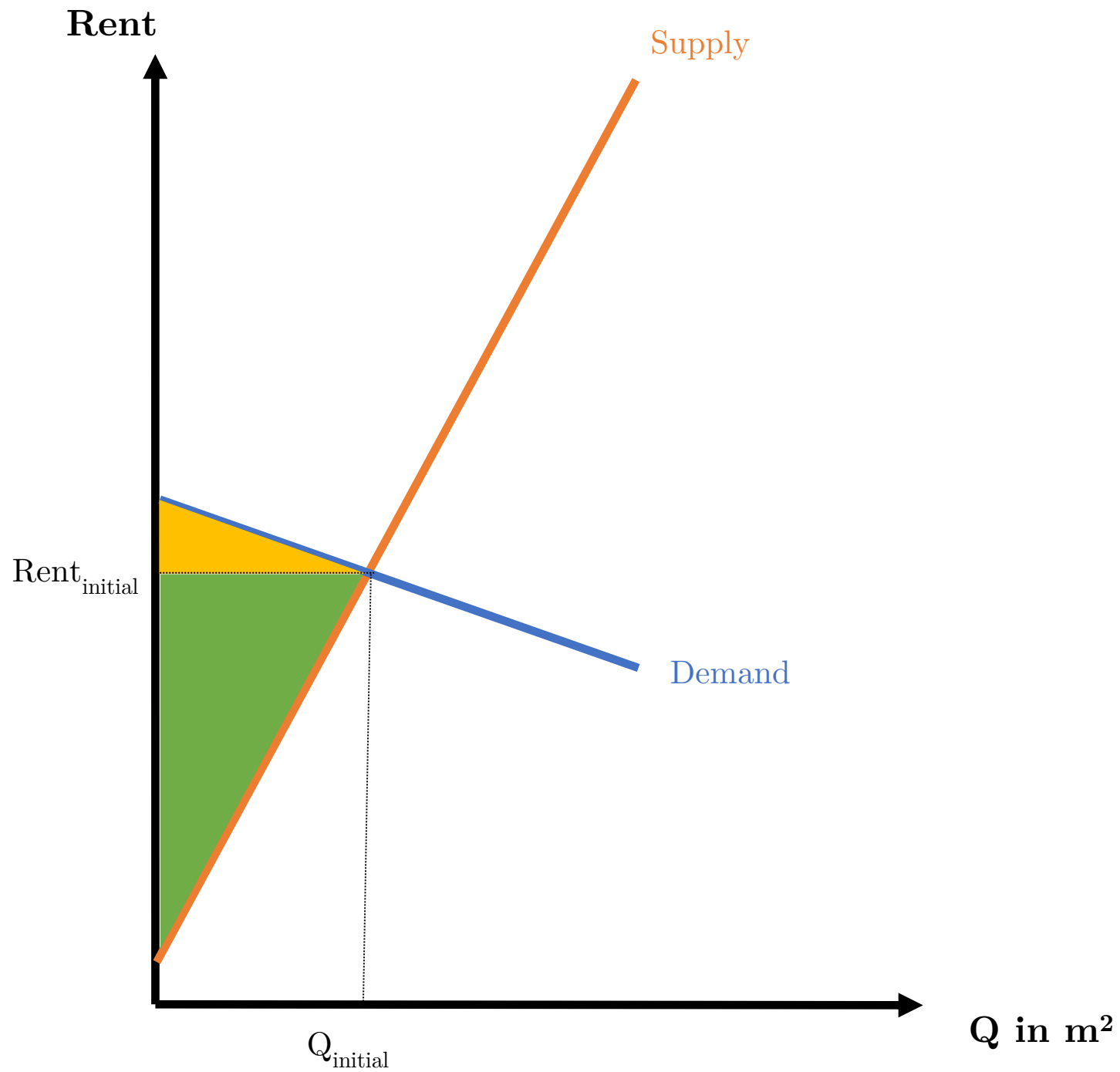
Producer surplus

Graphically

Inelastic supply

Tenants and lessors will face different rents

Supply

Rent

$Rent_{received}$

Subsidy
(housing benefits)

$Rent_{initial}$

$Rent_{paid}$

Demand

Consumer surplus

Producer surplus
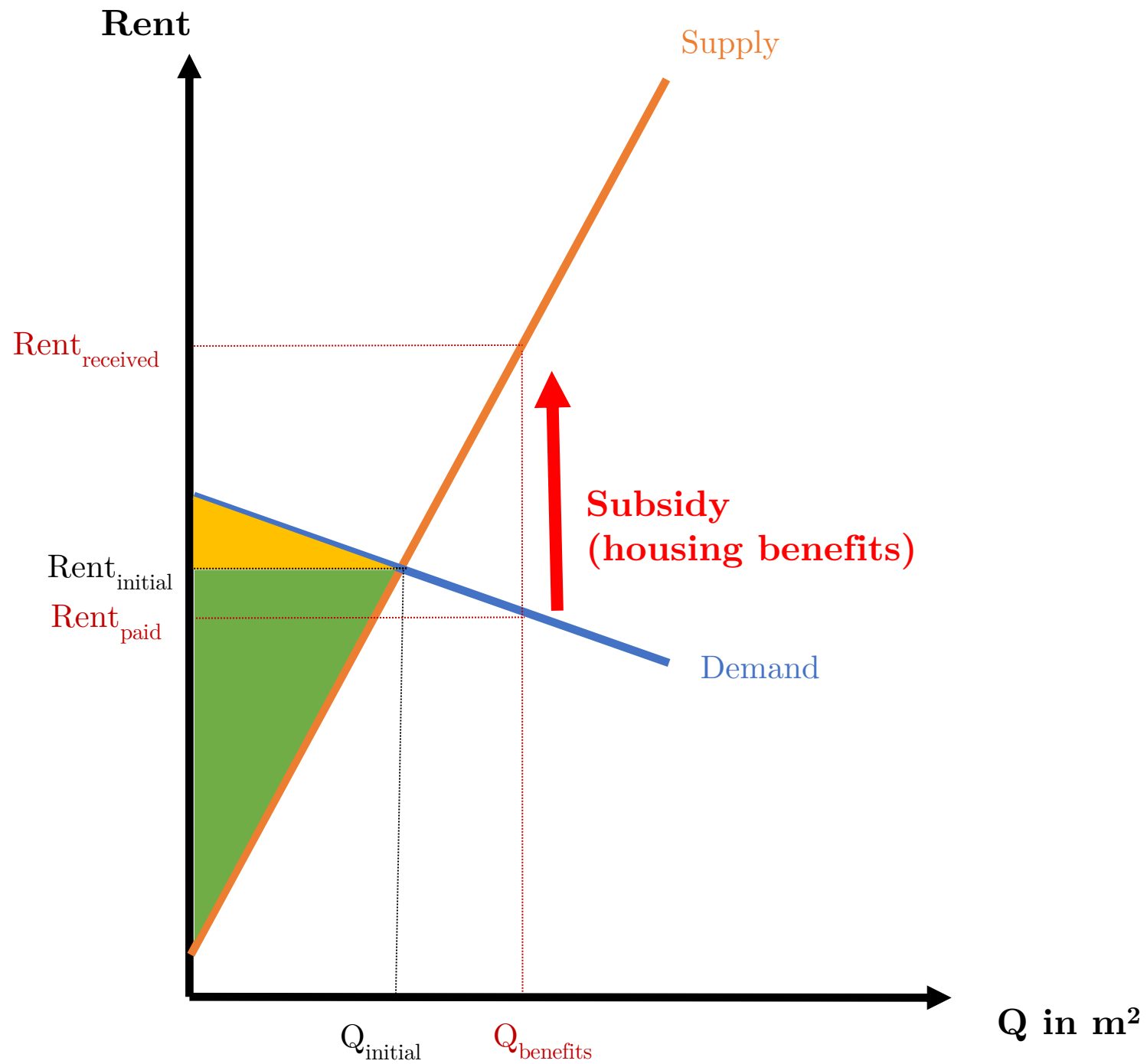
$Q_{initial}$ $Q_{benefits}$

Q in m²

Graphically

Inelastic supply

Tenants and lessors will face different rents...

... due to the public spending

EXPANDING CS AND PS WITH A DWL

Consumer surplus

Producer surplus

Subsidy spending by the State

Deadweight loss

Additional consumer surplus

Additional producer surplus
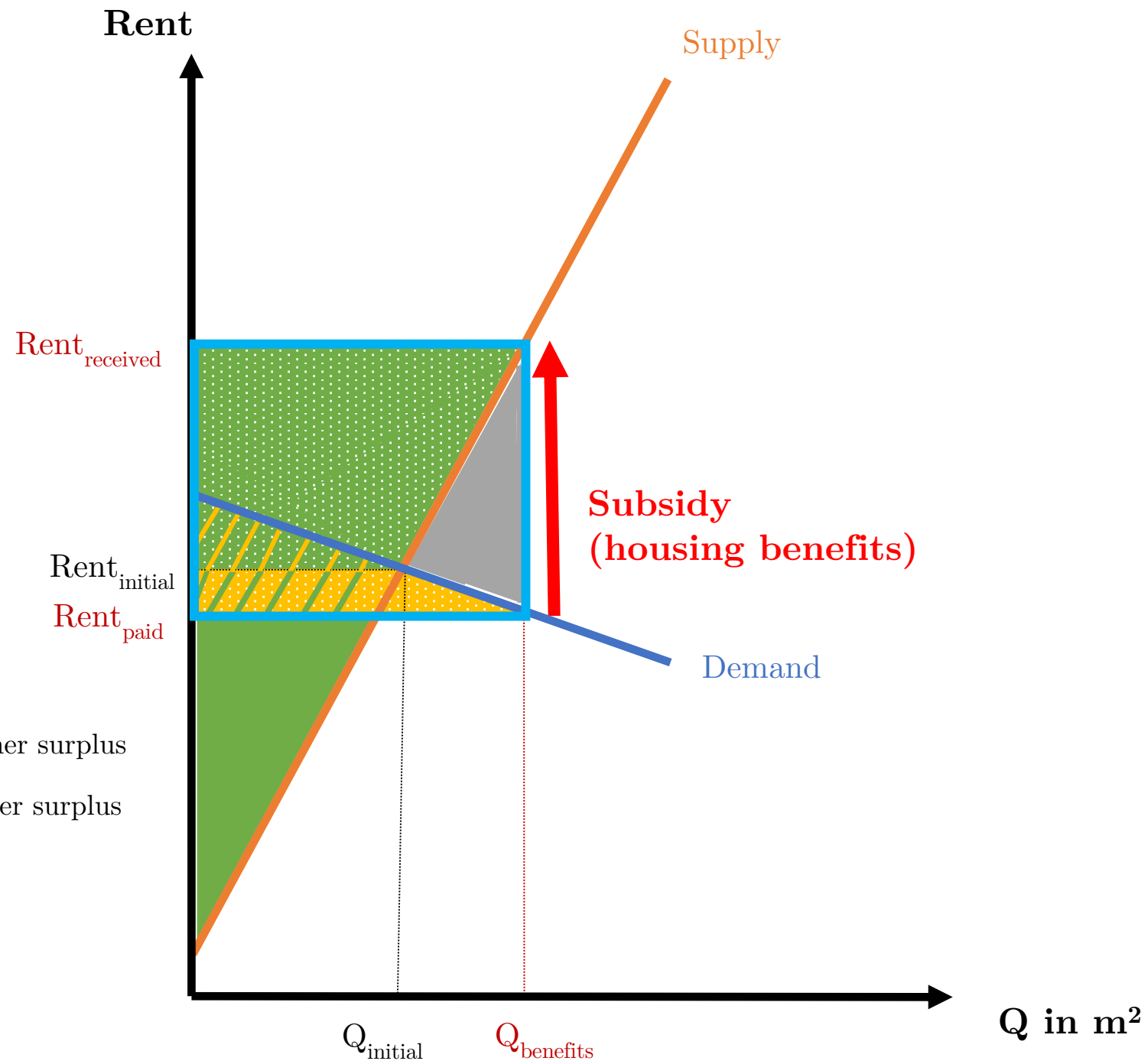
Fack (2006) study

❖ Simple OLS regression of rents on subsidy level would be biased
  unobservables could influence rents and eligibility to subsidies

❖ Uses a **diff-in-diff** with the **extension of access** in 1991
  Now only **income** as a criteria

  Treatment group: 1st quartile of income distrib.
  Control group: 2nd quartile (benefited much less)

❖ Differences bw 2 groups:

  Controls to account for household composition,
  geographical location, age of household head

Sources : author's computation from Enquêtes Logement Insee

Notes : in 1984, 43 % of the tenants (private sector only) of the 1st quartile receive housing benefit.

1984 1988 1996 2002
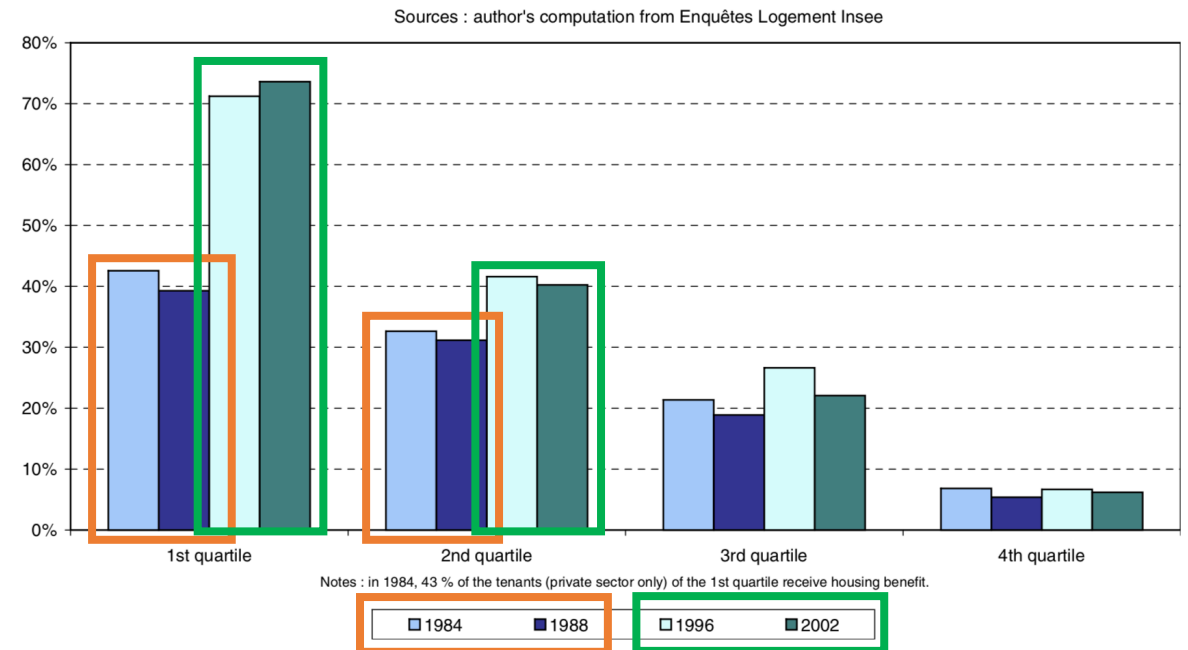
Fig. 5. Percentage of tenants receiving housing benefit by quartile, before and after the reform (private sector only).

Difference rents & benefits 1ˢᵗ vs 2ⁿᵈ quartile

Sources : author's computation from Enquêtes Logement Insee

Before the reform:
1ˢᵗ quartile receives slightly more benefits
and pays slightly less per m²

Reform in 1991

After the reform:
1ˢᵗ quartile receives much more benefits
but **also pays more** per m²
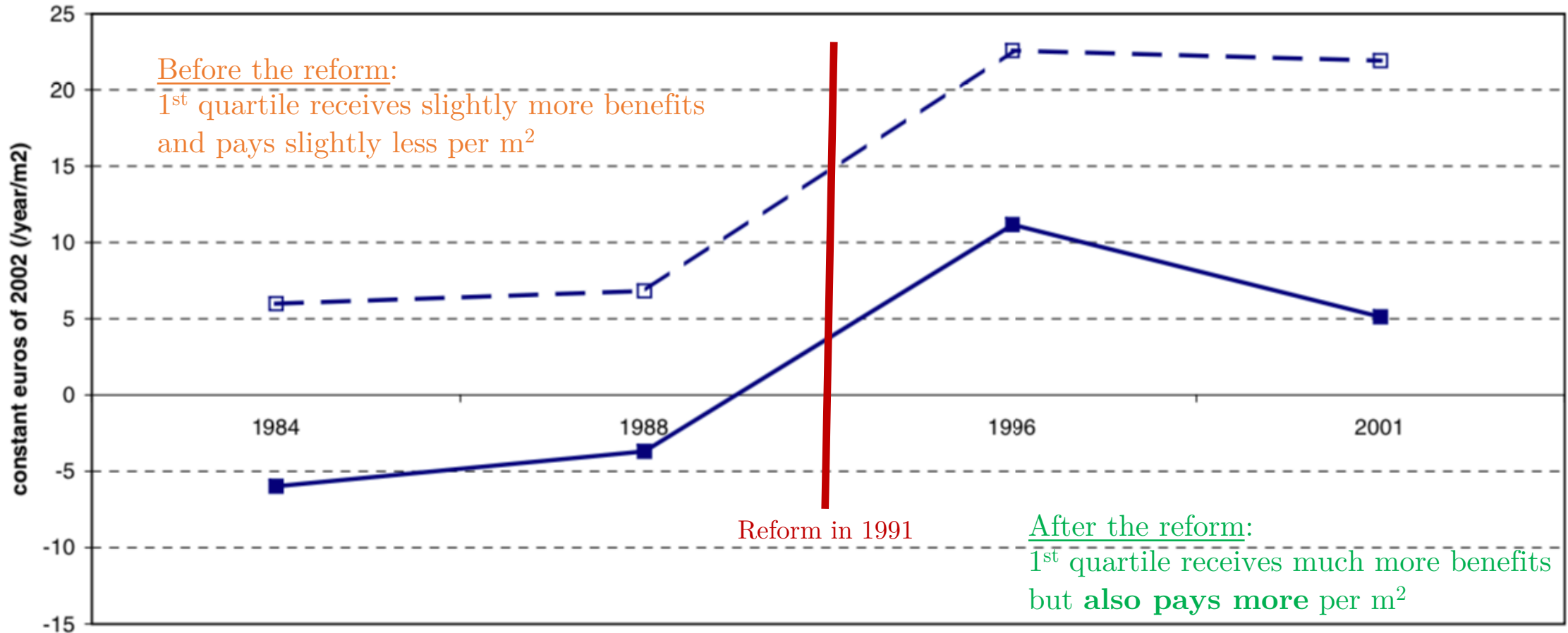
Notes : In 1996, there is a difference of 11 euros in housing benefit received by the first quartile compared with the 2nd quartile of tenants and a difference of 23 euros in the rent paid.

Difference in rent per square meter — Difference in benefit per square meter

Results

Table 3
The incidence of housing benefit on rents in the private sector

Method	Variable	(1) Tenants, private sector	(2) Private sector students excluded	(3) Strongest student concentration	(4) Lowest student concentration	(5) Correction for quality changes
DD (88 and 96)	Housing benefit instrumented	0,45* (0,18)	0,39**(0,24)	0,58** (0,32)	0,10 (0,37)	0,29 (0,25)
DDD (84, 88, 96, 02)	Housing benefit instrumented	0,78* (0,31)	1,02* (0,52)	1,34 (0,86)	0,71 (0,47)	0,76** (0,40)
Sample size		4476 (DD) 9635 (DDD)	4248 (DD) 9180 (DDD)	2043 (DD) 4521 (DDD)	1486 (DD) 3196 (DDD)	4476 (DD) 9635 (DDD)

Controls

Type of area (rural, small, medium, large cities or Paris) × region
Type and size of the household (11 types)
Age of the head of the household (5 age groups)

Results

❖ Inflationary: for 1€ of subsidy, 0.78€ rents increase

❖ Quality is very marginally increased (and not due to benefits)

❖ The major demand effect: **incentivized demand from students** who would otherwise rather share flats or stay in the family's house
Probably not the paternalistic goal

❖ Explained by a quite inelastic supply
Not many vacancies in demanded areas; constructions is a slow process

Public policy implication

❖ The subsidy is mostly inflationary and beneficial to lessors

Results confirmed by more recent studies, e.g. Grislain-Lertemy & Trevien (2014)

❖ Seems much more sensible to target supply than to subsidize demand

Social housing, etc.

❖ Or to offer untargeted transfers to poor households (here in-kind)

❖ Or remember a limit of tax incidence... when prices cannot adjust

Could be combined with **rents control** (*encadrement des loyers*)

Should we prefer/combine rent control? (not linked to taxation)

The Effects of Rent Control Expansion on Tenants, Landlords, and Inequality: Evidence from San Francisco[†]

By Rebecca Diamond, Tim McQuade, and Franklin Qian*

Using a 1994 law change, we exploit quasi-experimental variation in the assignment of rent control in San Francisco to study its impacts on tenants and landlords. Leveraging new data tracking individuals' migration, we find rent control limits renters' mobility by 20 percent and lowers displacement from San Francisco. Landlords treated by rent control reduce rental housing supplies by 15 percent by selling to owner-occupants and redeveloping buildings. Thus, while rent control prevents displacement of incumbent renters in the short run, the lost rental housing supply likely drove up market rents in the long run, ultimately undermining the goals of the law. (JEL R23, R31, R38)

Blog article in French: https://www.ofce.sciences-po.fr/blog/qui-profite-du-controle-des-loyers-chronique-de-san-francisco/

Blog article in English: https://www.bloomberg.com/opinion/articles/2018-01-18/yup-rent-control-does-more-harm-than-good

Tax & price elasticity of work

Kleven, Landais, Saez, Schultz (2014)

"Migration and Wage Effects of Taxing Top Earners:
 Evidence from the Foreigners' Tax Scheme in Denmark"

Topics

❖ Brain drain

❖ Tax competition

❖ Fiscal nomadism

Context

❖ Reform of income tax for top earners
   contracts signed after June 1ˢᵗ 1991 (quasi-experiment):
   ❖ <u>Before</u>: marginal TR 62% (average: ~55%)
   ❖ <u>After</u>: 30% for 3 years

❖ Conditions
   ❖ Over 100k€ (z^*)
   ❖ No taxes paid in DK in the past 3 years (foreigners or repatriates)
   ❖ At least 2/3 of working time in DK

Research questions
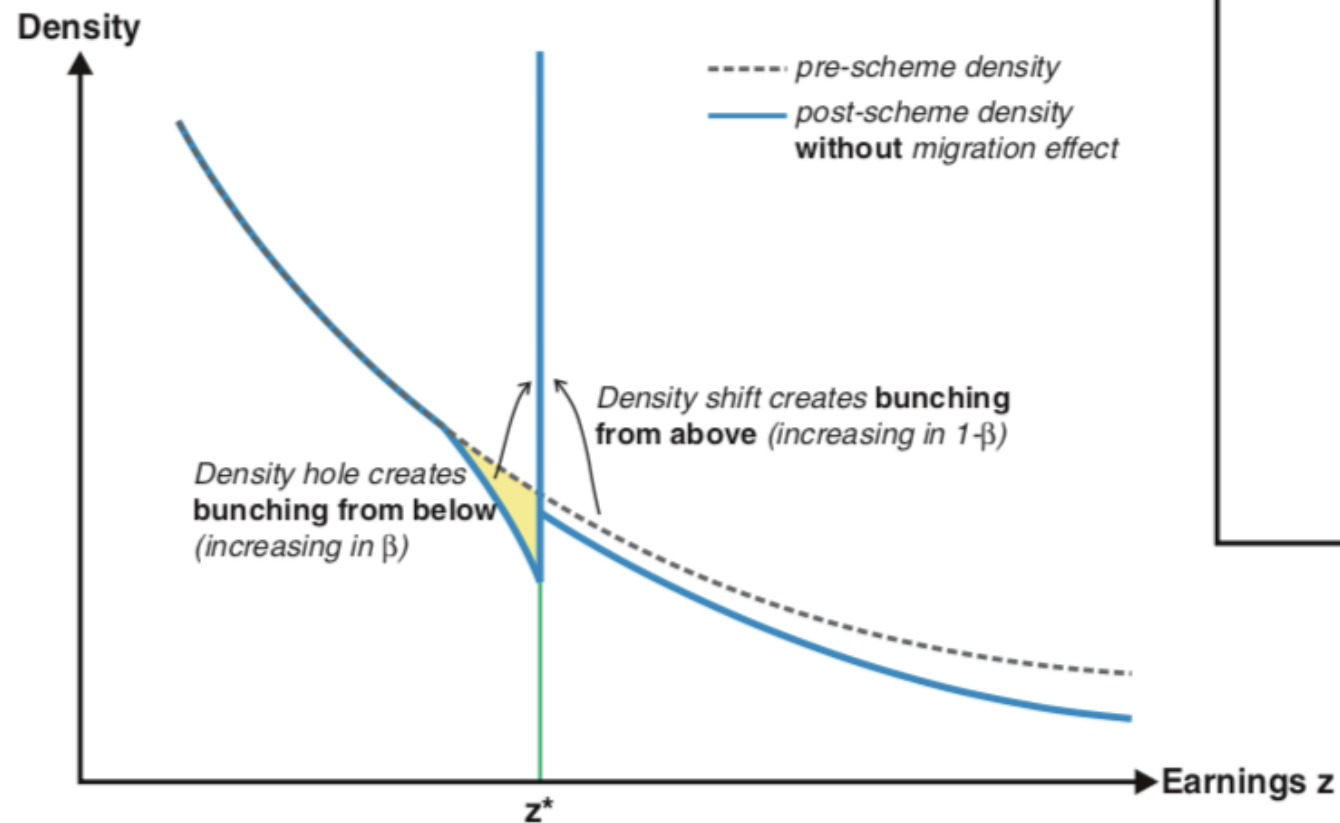
❖ How does it affect **migration decisions**?
  ❖ What is the **elasticity**?
  ❖ What about **length of stay**?

❖ What is the effect on **wages**?
  ❖ Who benefits from the reform?

Method

❖ Use matched **employer-employee data** on full population in DK
  - ❖ Immigration history
  - ❖ Income and tax
  - ❖ Labor market information
  - ❖ Sociodemographic characteristics

❖ Use the **discontinuity** with a **difference-in-differences**
  - ❖ Treated: above the threshold
  - ❖ Control 1: earn 80 to 90% of the threshold
  - ❖ Control 2: earn 90 to 99.5% of the threshold
  - ❖ Other control: 96 to 99 percentile of income distribution

Theoretical prediction

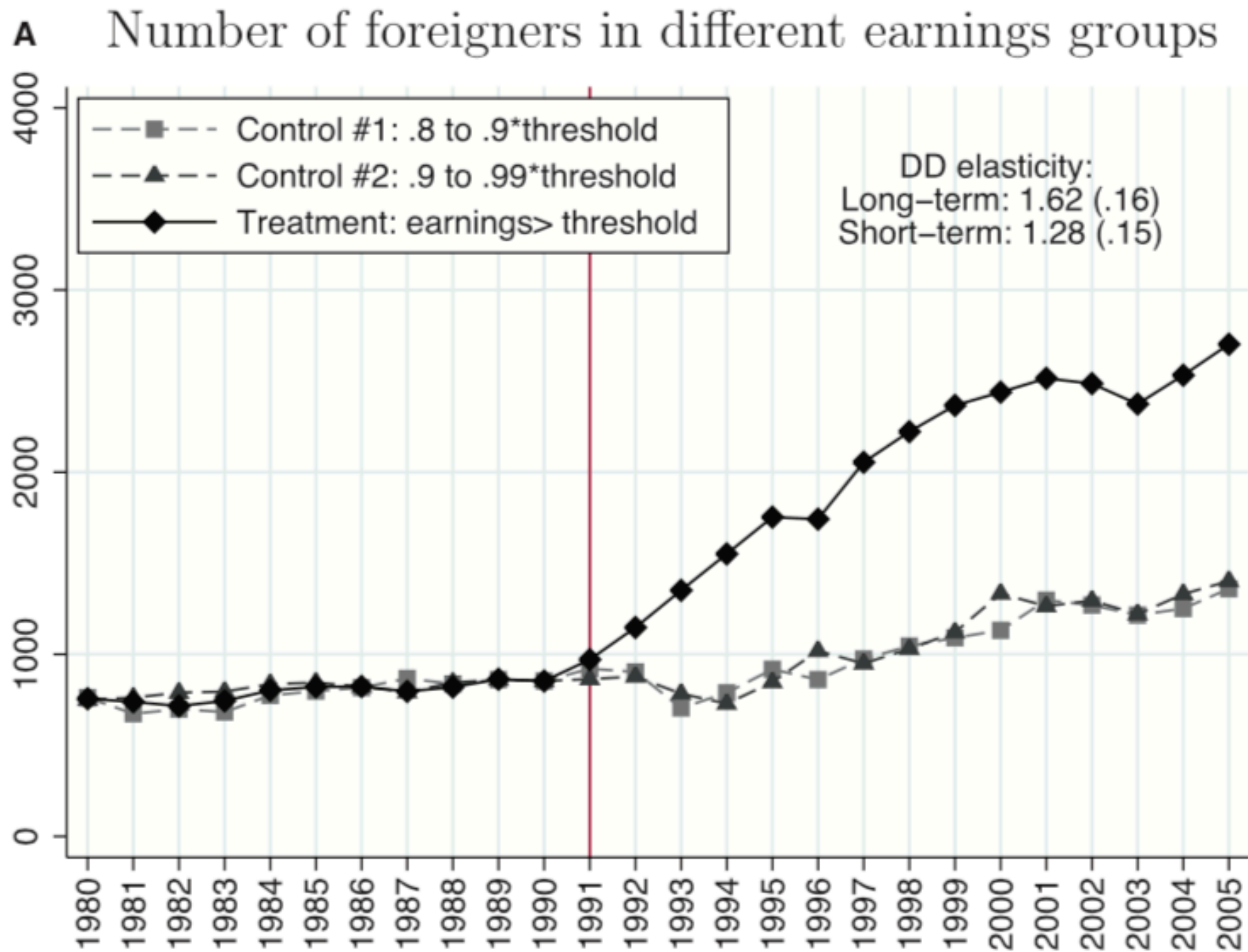**Panel A: Intensive Earnings Responses Conditional on Migration**

Density

- - - - - pre-scheme density
——— post-scheme density **without** *migration effect*

Density shift creates **bunching from above** *(increasing in 1-β)*

Density hole creates **bunching from below** *(increasing in β)*

z*   Earnings z

Panel B: Intensive and Migration Responses

Density

- - - - - pre-scheme density
— — post-scheme density **without** *migration effect*
——— post-scheme density **with** *migration effect*

new migrants add to bunching

migration response

z*   Earnings z

Results (i)

A Number of foreigners in different earnings groups

- Control #1: .8 to .9*threshold
- Control #2: .9 to .99*threshold
- Treatment: earnings> threshold

DD elasticity:
Long–term: 1.62 (.16)
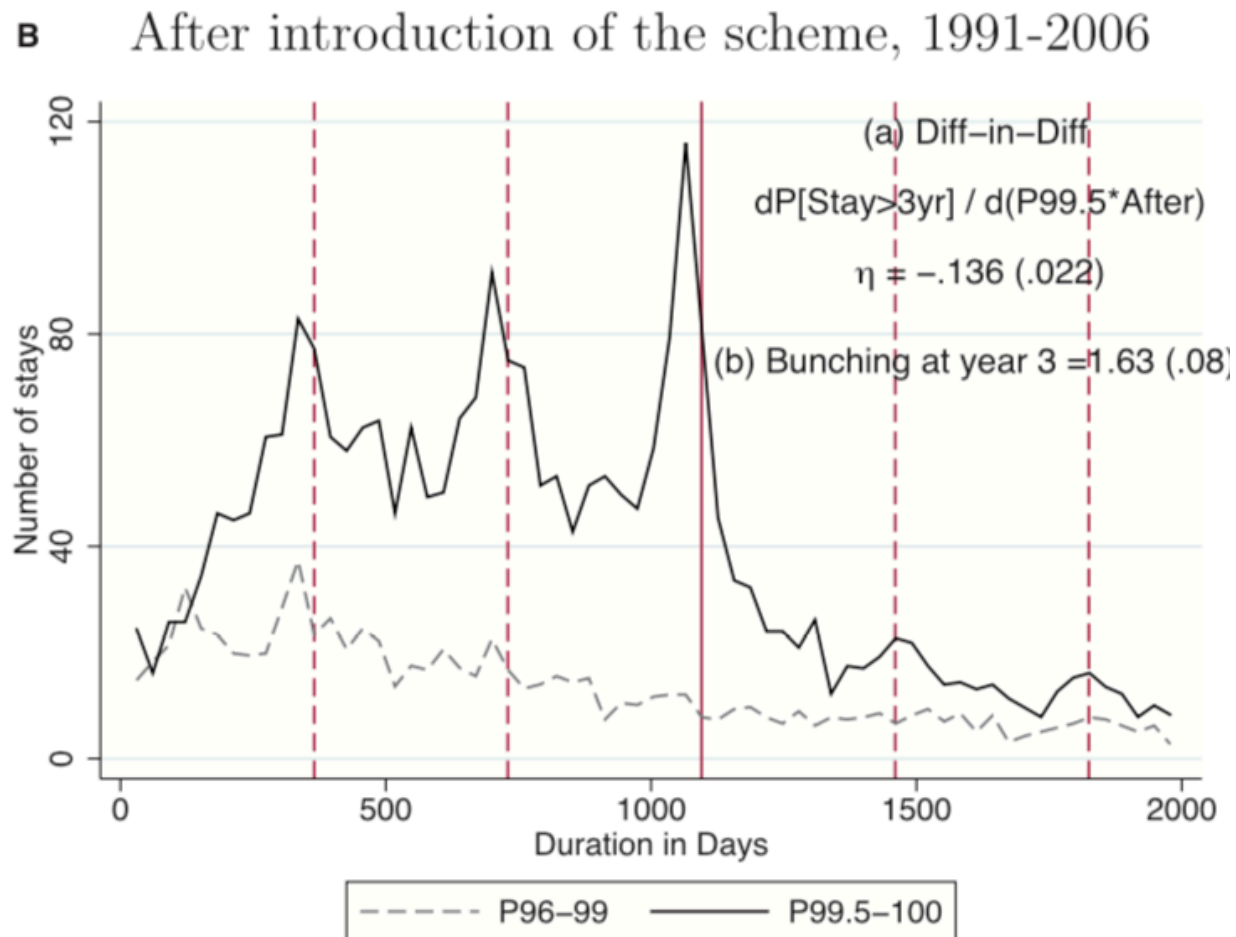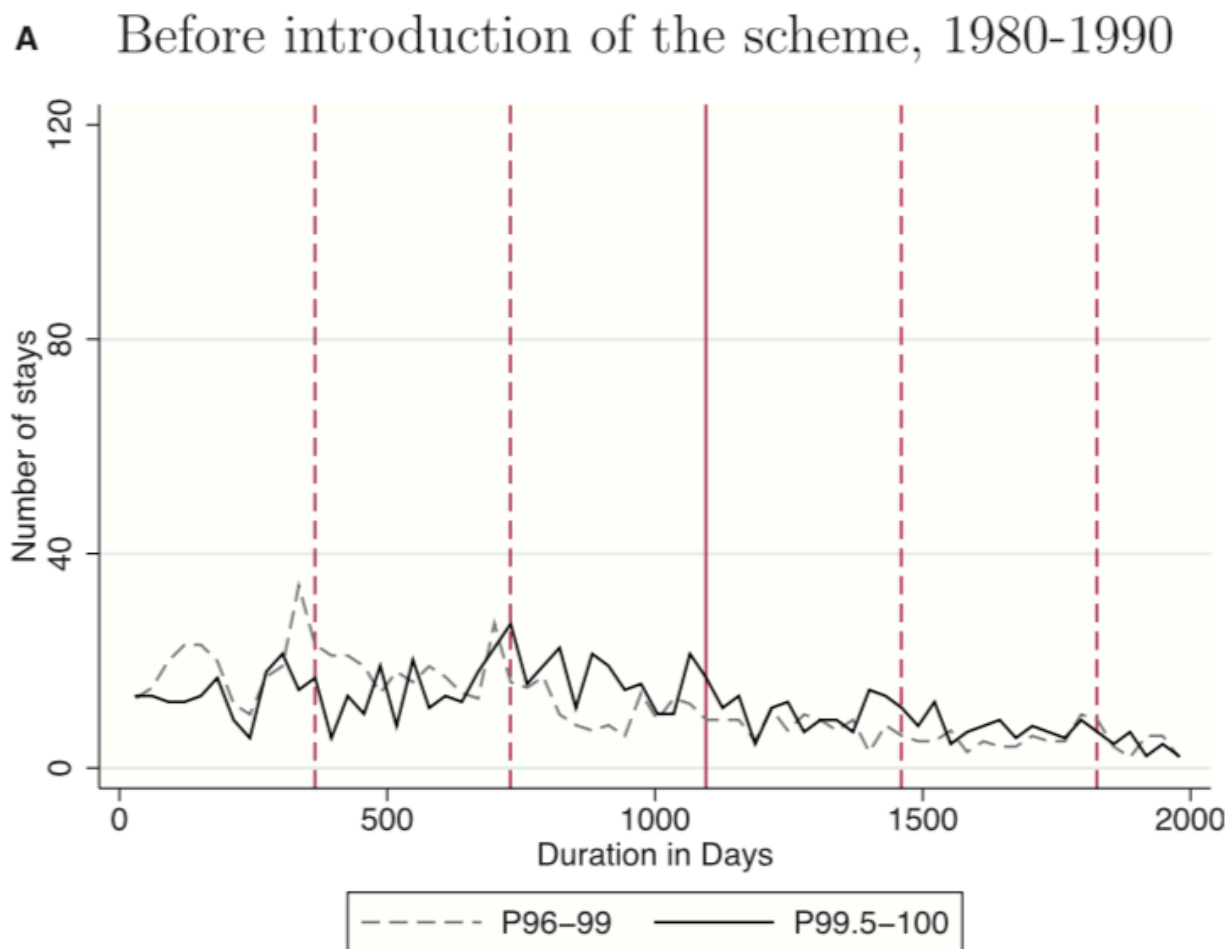Short–term: 1.28 (.15)
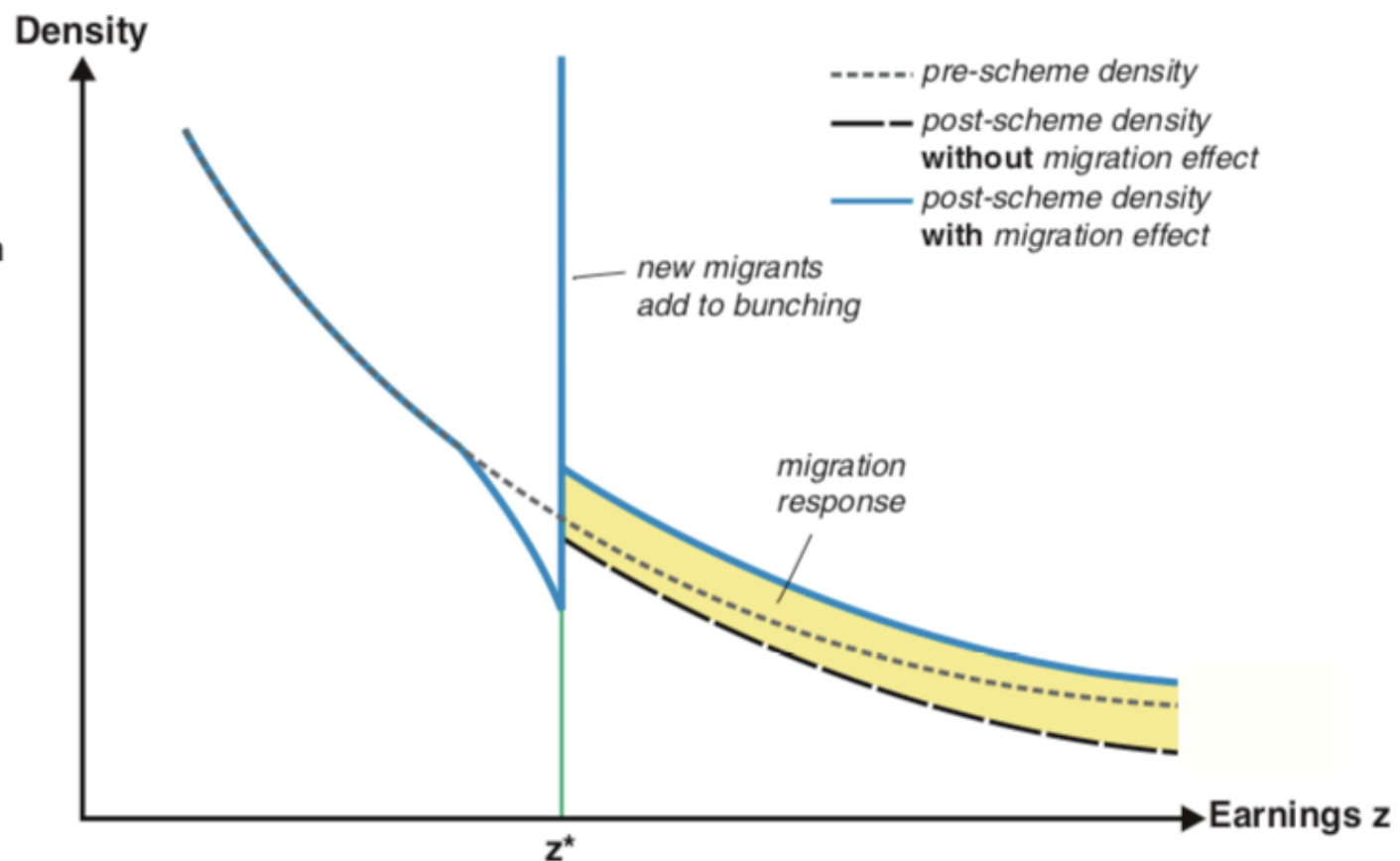
Many **more foreigners** with income above threshold (~twice more).

Results (ii)

Concentration of length of stay over the 3 first years (avrg: 2.35 years; only ¼ stay more)

Percentiles 96-99 and top 0.5%

A Before introduction of the scheme, 1980-1990

B After introduction of the scheme, 1991-2006

(a) Diff–in–Diff

dP[Stay>3yr] / d(P99.5*After)

η = −.136 (.022)

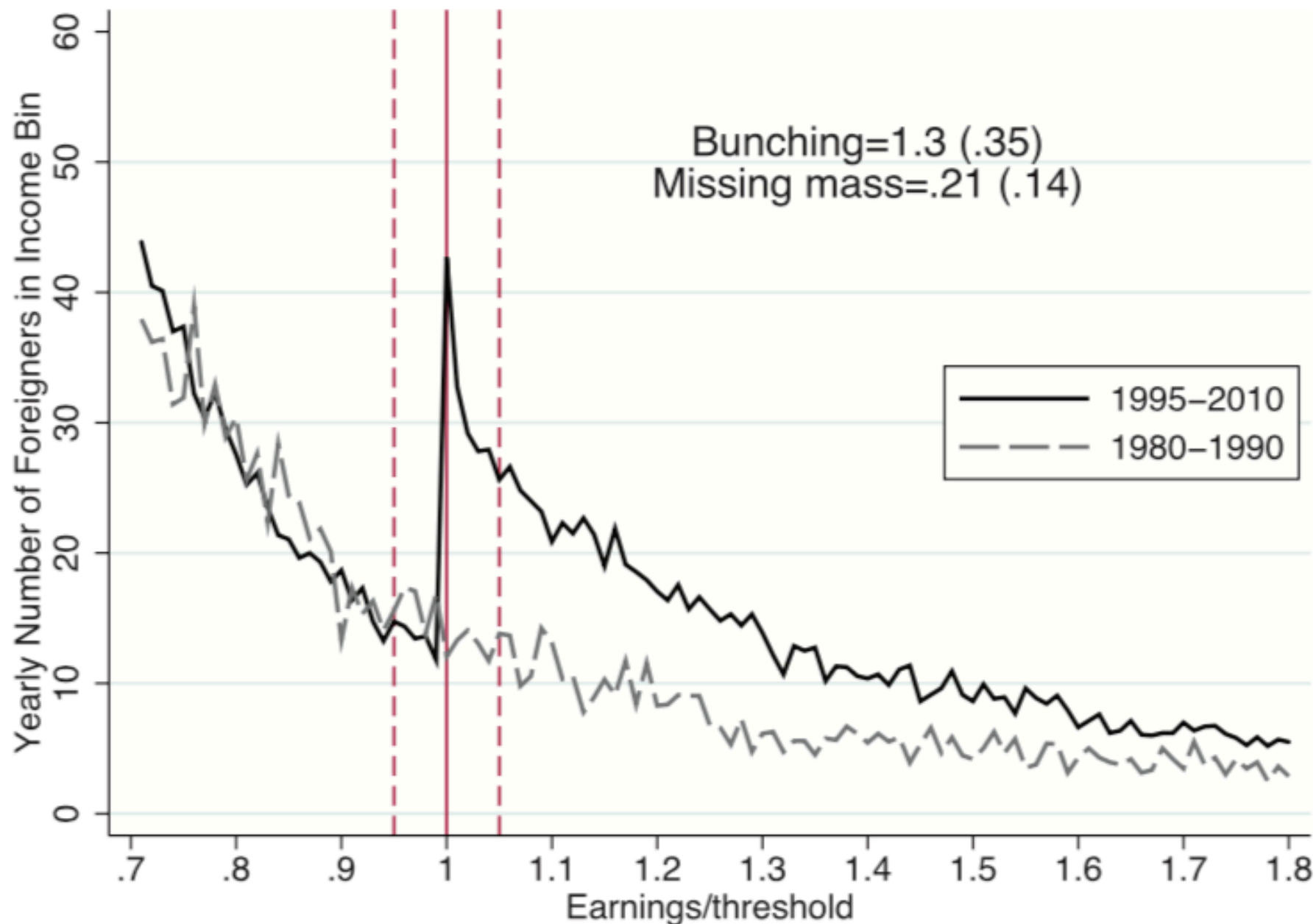(b) Bunching at year 3 =1.63 (.08)

P96–99   P99.5–100

Results (iii)

No hole before the threshold

(low bargaining power of employees, who cannot benefit from reform)

but a **large bunching** at the threshold and an **excess mass** above

(larger bargaining power of firms)

Bunching=1.3 (.35)
Missing mass=.21 (.14)

1995–2010
1980–1990

Results (iv)

So more people just above the threshold...

... and a **gross wage reduction by 5 to 10pp**
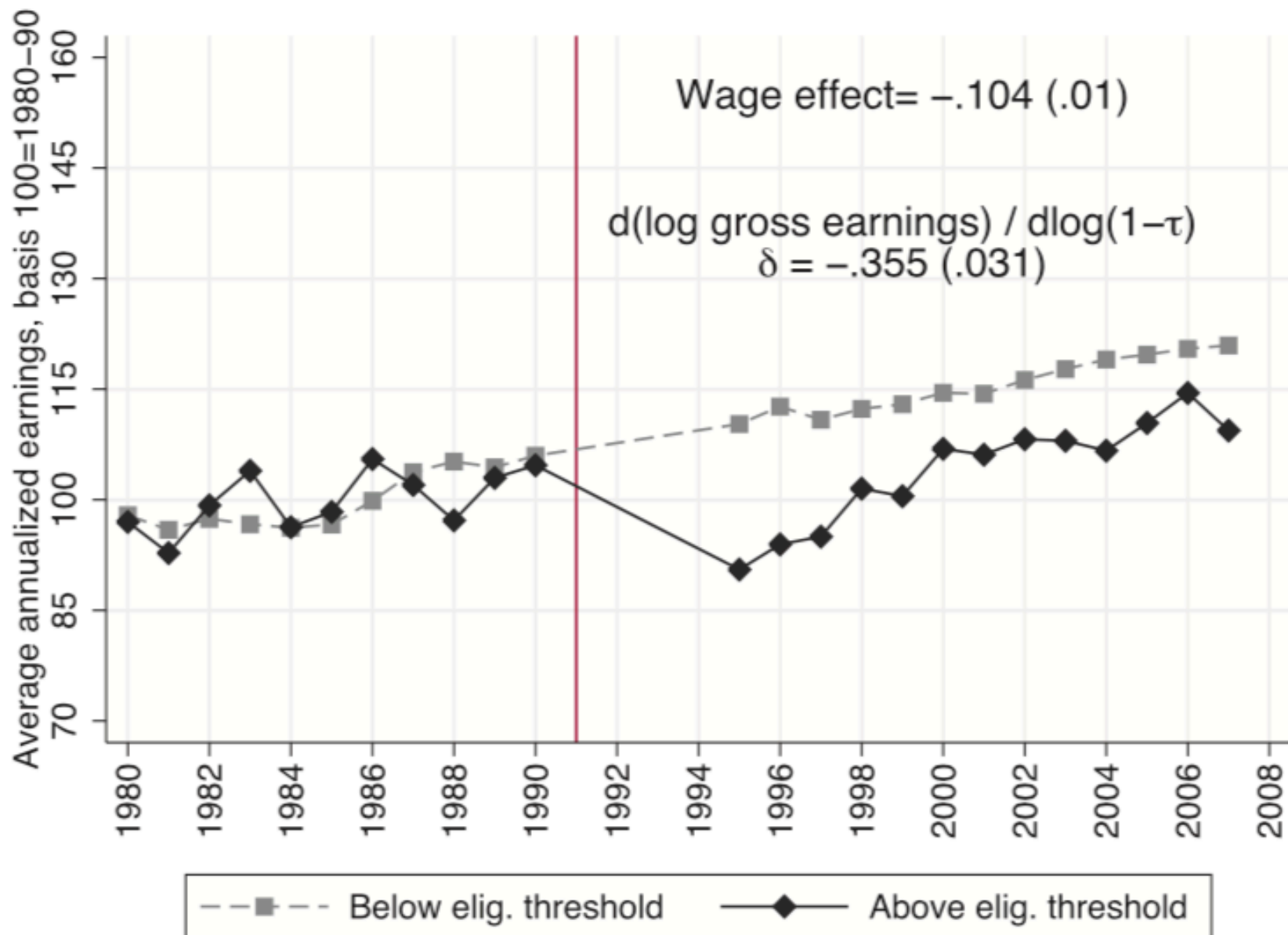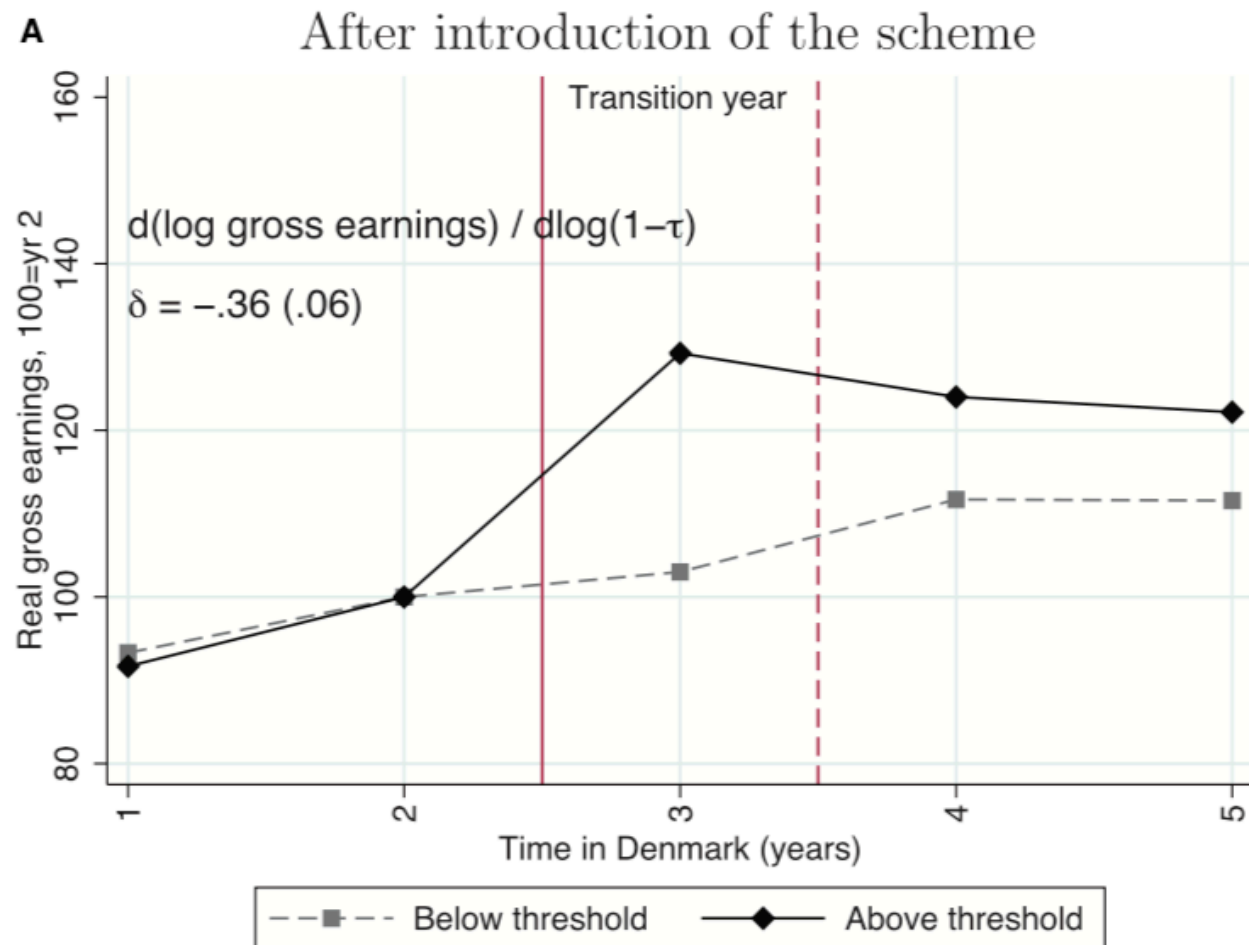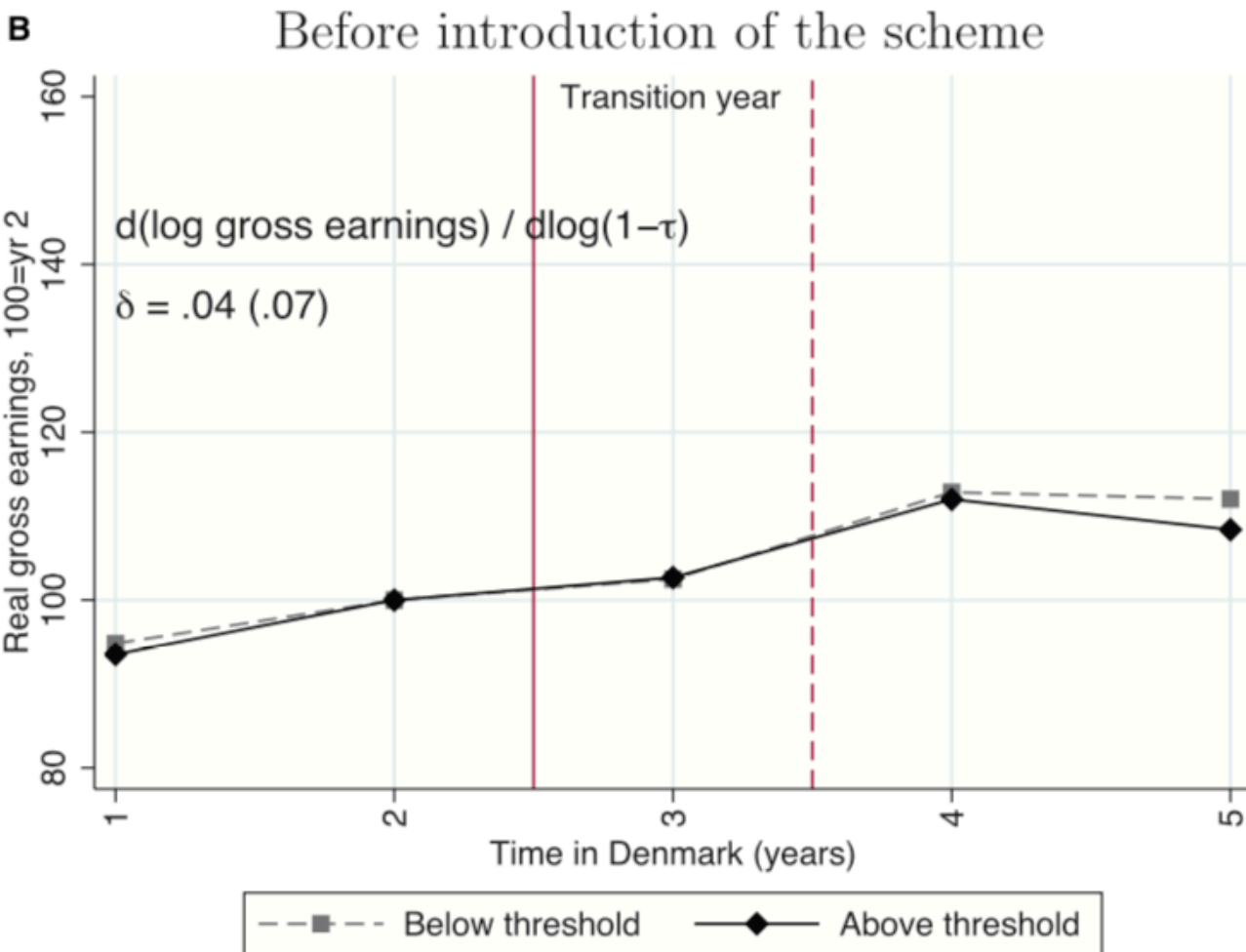
firms capture part of the tax decrease

Wage effect= −.104 (.01)

d(log gross earnings) / dlog(1−τ)
δ = −.355 (.031)

Below elig. threshold   Above elig. threshold

FIGURE VI

Effects of the Tax Scheme on Pretax Earnings: Repeated Cross-Section Evidence

Results (v)

Wage rise after 3 years

Meaning the previously mentioned decrease is temporary (bargaining firm/employee)

Public policy implication

❖ The winners are Danish firms

❖ With such a temporary measure, "brains" do not stay

❖ External validity limited because country with a small tax base

❖ Tax competition is a dangerous infinite non cooperative game

Public Economics
Level 2

2020-2021

Conférence de méthode
Session 2

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