1VF466 FISCAL POLICY (MODERN TRENDS AND CASE STUDIES)

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INCOME DISTRIBUTION AND TAXATION

VOCABULARY

- Statutory Incidence
- Economic Incidence
- Tax Shifting (Q:, Ex. Direct/indirect taxes)
- Partial Equilibrium Models

- Example: VAT in Czech R. (or CIT example (hand))
  - VAT agent – who runs the shop and sells goods (seller, producer)
  - Consumer - me, you if buying something in shop of VAT agent
  - Who is worse off? Me or seller?

TAX INCIDENCE: GENERAL REMARKS

- Only people can bear taxes
  - Functional distribution of income (capitalists, labourer) (Q (CIT))
  - Size distribution of income (rich or poor)
- Both sources (PRODUCERS) and uses (CONSUMERS) of income should be considered
- Incidence depends on how prices are determined (see later MONOPOL, or time aspects – long or shor run)
- Incidence depends on the disposition of tax revenues (what for the taxes are collected)
  - Balanced-budget tax incidence (Net tax+transfer incidence)
  - Differential tax incidence (One tax is replaced by another tax)
  - Lump-sum tax incidence (One tax is replaced by head tax, means nominally equal to all)
  - Absolute tax incidence (only one tax is changing, ceteris paribus – the simplest analyses)

TAX PROGRESSIVENESS (YES OR NO) CAN BE MEASURED IN SEVERAL WAYS…

- Average tax rate versus marginal tax rate
- Proportional tax system
- Progressive tax system
- Regressive tax system

Tax Liabilities under a hypothetical tax system

Income	Tax Liability	**Average Tax Rate**	Marginal Tax Rate
$2,000	-$200	**-0.10**	0.2
3,000	0	**0**	0.2
5,000	400	**0.08**	0.2
10,000	1,400	**0.14**	0.2
30,000	5,400	**0.18**	0.2

Source: Rosen, 2005

... AND UNFORTUNATELY SOMETIMES WITH DIFFERENT RESULTS. HOW PROGRESSIVE A TAX SYSTEM IS CAN BE MEASURED BY:
1/CHANGE IN ATR IF I GOES UP FOR 1 OR
2/LEVEL OF ELASTICITY

$$\nu_1 = \frac{\frac{T_1}{I_1} - \frac{T_0}{I_0}}{I_1 - I_0} \qquad \nu_2 = \frac{\frac{T_1 - T_0}{T_0}}{\frac{I_1 - I_0}{I_0}}$$

Q: THE TAX PROPOSAL - EVERYONE´S TAX LIABILITY WILL INCREASE BY 20 %

- T = t*TaxBase
- T´ = 1,2*T
- calculate v1/v1´
- calculate v2/v2´
- discuss the impact on progressivity

MEASURING HOW PROGRESSIVE A TAX SYSTEM IS – A NUMERICAL EXAMPLE (2 PAYERS, POOR 0 AND RICH 1)

T1=300, T2=1,2*300=360

$$v_1 = \frac{\frac{T_1}{I_1} - \frac{T_0}{I_0}}{I_1 - I_0} \qquad v_2 = \frac{\frac{T_1 - T_0}{T_0}}{\frac{I_1 - I_0}{I_0}}$$

$$.00025 = \frac{\frac{300}{1000} - \frac{200}{800}}{1000 - 800} \qquad 2.0 = \frac{\frac{300-200}{200}}{\frac{1000-800}{800}}$$

$$.0003 = \frac{\frac{360}{1000} - \frac{240}{800}}{1000 - 800} \qquad 2.0 = \frac{\frac{360-240}{240}}{\frac{1000-800}{800}}$$

MEASURING OF GLOBAL PROGRESSIVITY – GINI - *PROPERTIES OF INEQUALITY METRICS*

The Gini coefficient satisfies four important principles (Rosen, 2005):

- *Anonymity*: it does not matter who the high and low earners are (man, woman, children, maried…).
- *Scale independence*: the Gini coefficient does not consider the size of the economy (in dollars or in CZK), the way it is measured, or **whether it is a rich or poor country on average (v1 does not meet)**.
- *Population independence*: it does not matter how large the population of the country is (CR vs USA, still coparable).
- *Transfer principle*: if income (less than the difference), is transferred from a rich person to a poor person the resulting distribution is more equal.

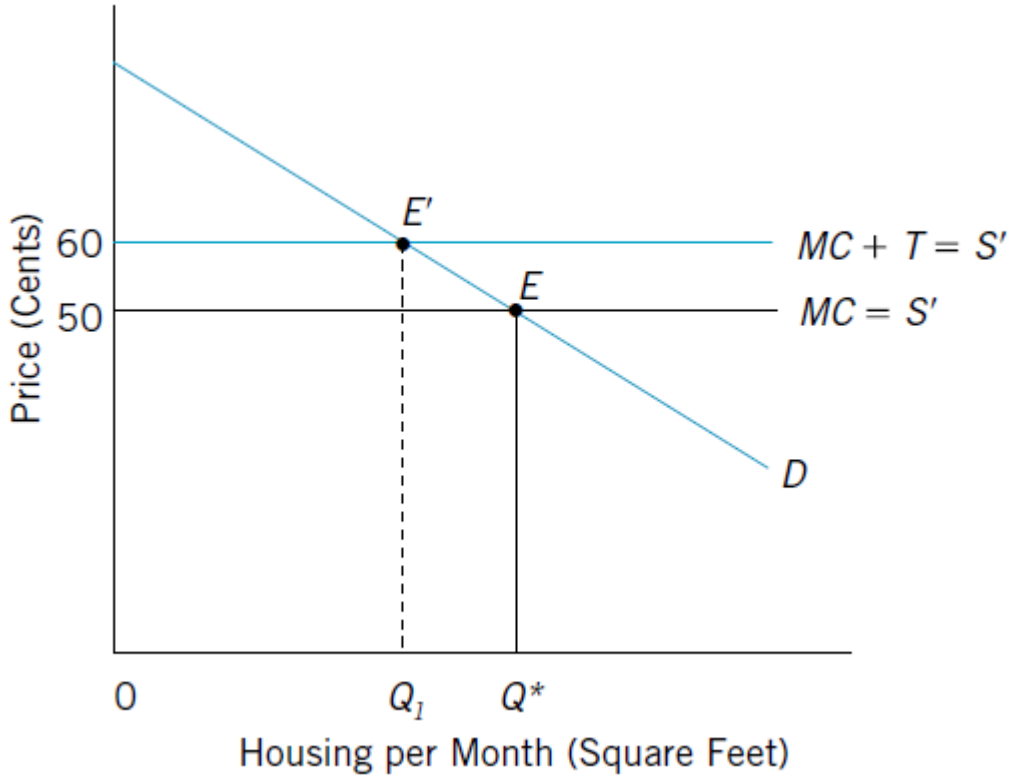
GINI – HOW TO SIMPLE…:

$$G = 1 + \frac{1}{n} - \frac{2}{n^2 * \bar{y}} * [y_1 * n + y_2 * (n-1) + \ldots y_n]$$

- n is number of units
- y is income (ascending manner)

PARTIAL EQ APPROACH

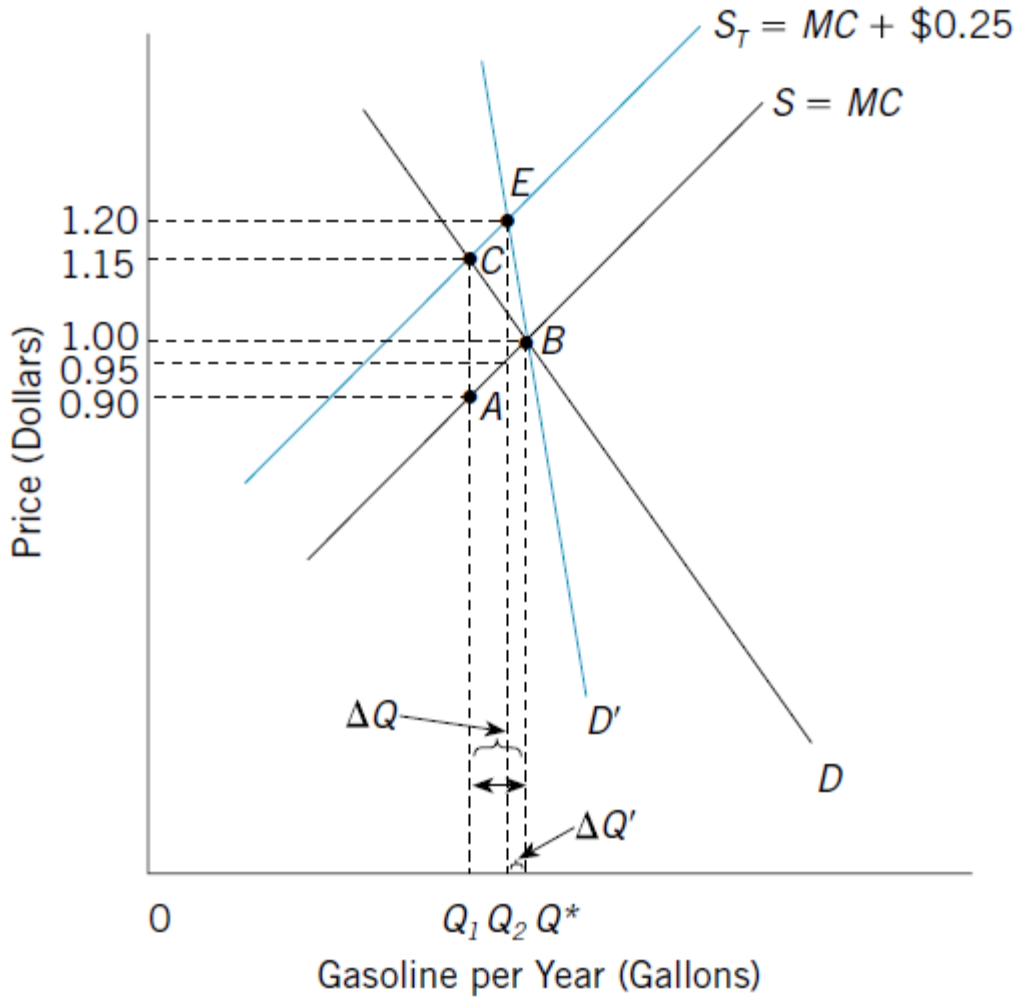
- perfectly elastic supply
- All tax collected from sellers is fully shifted to buyers
- Hint - check the change of price, is same as Tax).



Source: Author

PARTIAL EQ APPROACH

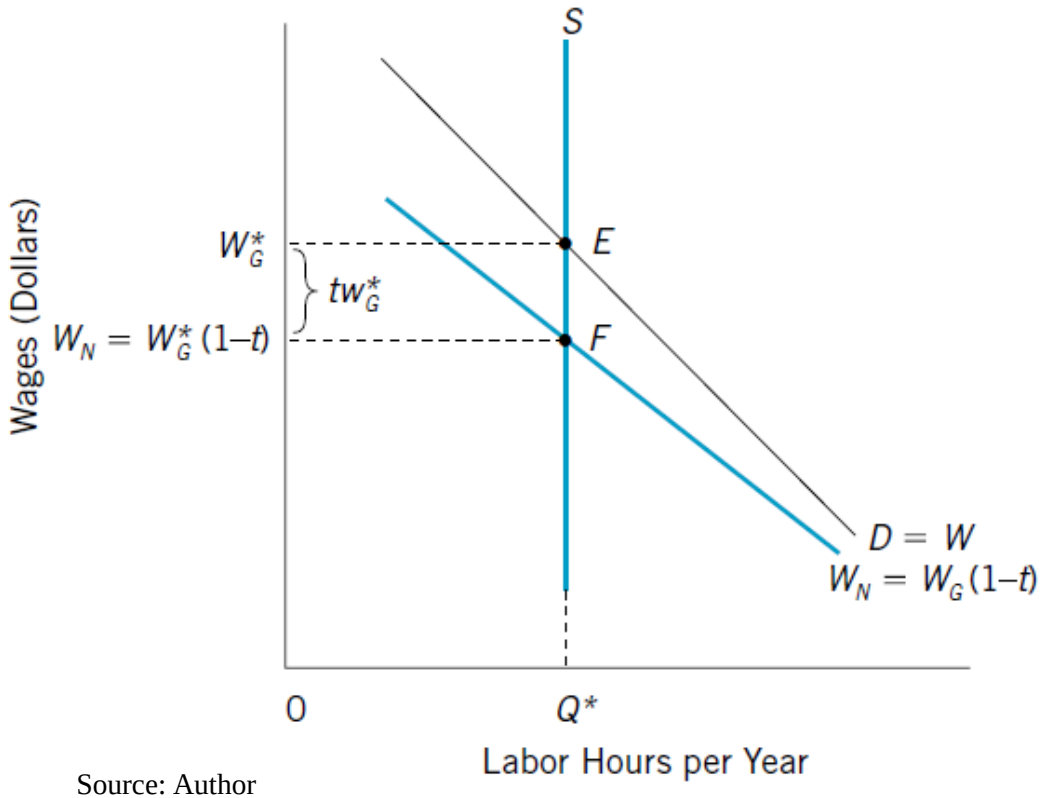
- The More Inelastic the Demand, the Greater the Portion of a Tax Borne by Buyers



Source: Author

PARTIAL EQ APPROACH

- If the supply of labor hours were perfectly inelastic, a payroll tax would decrease the net wage by the full amount of the tax per hour.
- Hint - Wage before tax is unchanged (w*)



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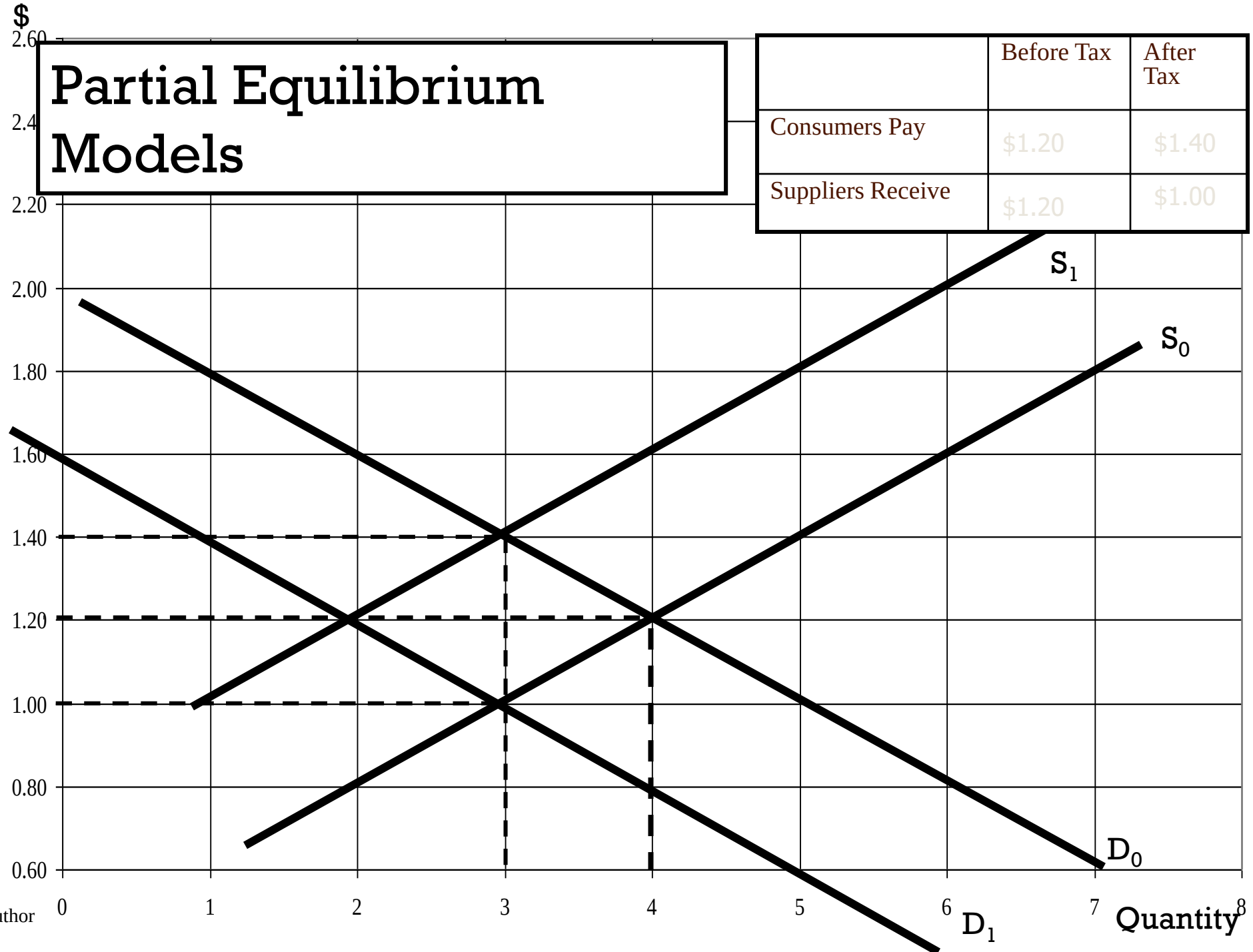
Partial Equilibrium Models

	Before Tax	After Tax
Consumers Pay	$1.20	$1.40
Suppliers Receive	$1.20	$1.00



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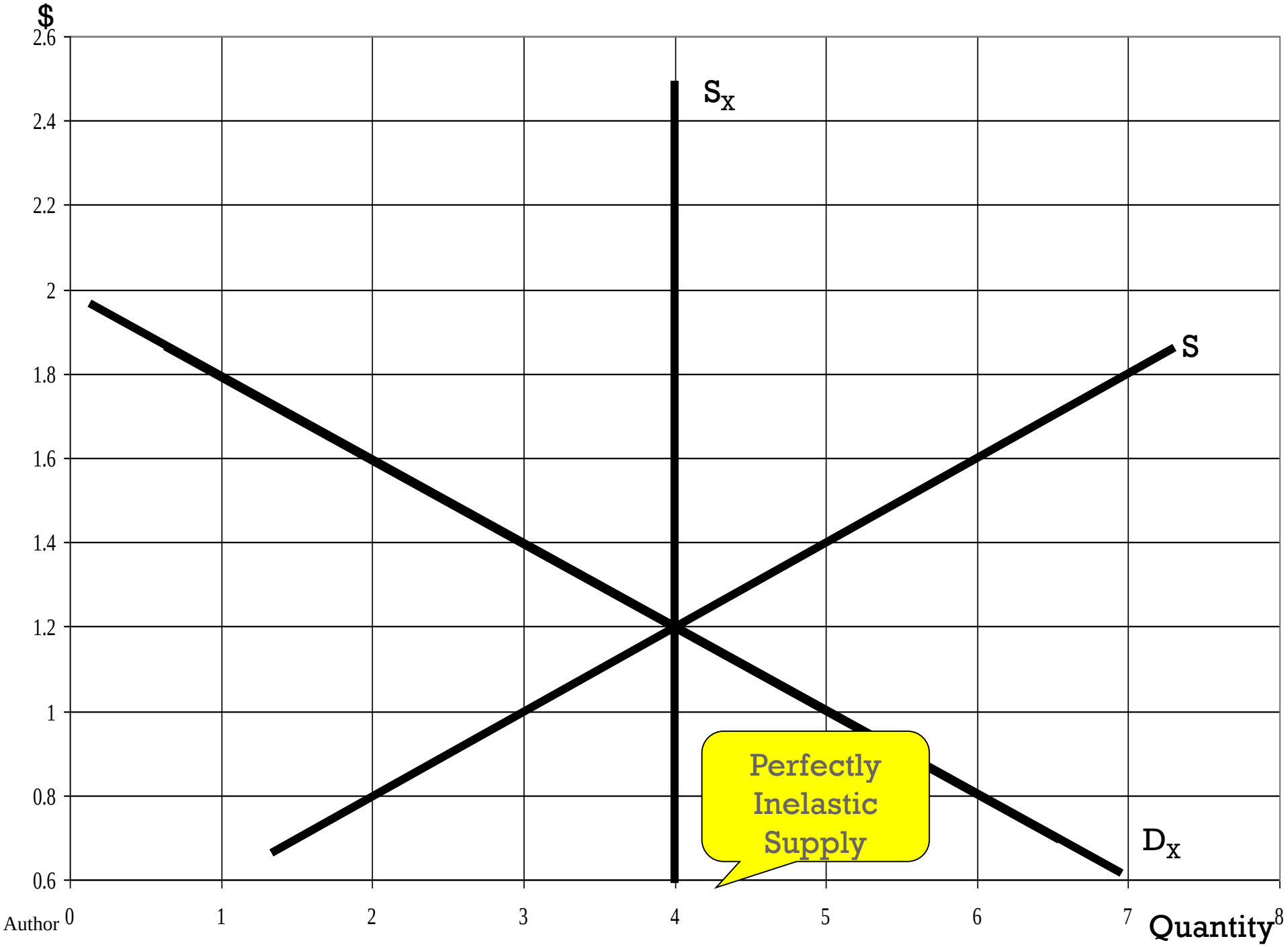

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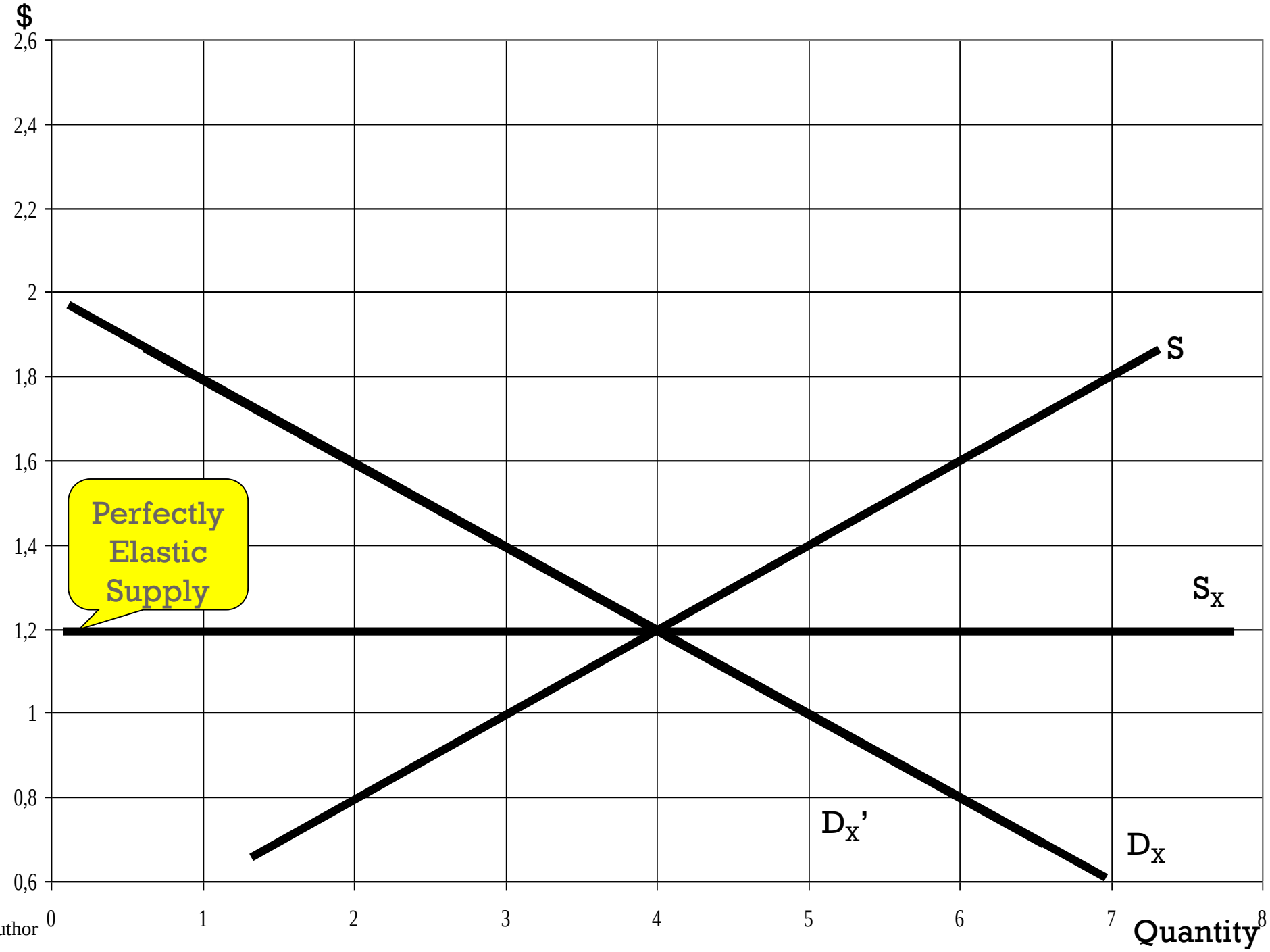


Source: Author

TOBACCO TAX (OR GREEN TAX REFORM) PARADOX

- Minister of F. really wants: get some additional money for public budget (but it means no or only small change in consumption). (inelastic d)
- On the other side he says to the public to justify - legitimize the new tax: smoking is unhealthy and it is necessary to eliminate this bad habit (it means a large decrease of consumption). (elastic d)

all mentioned above induce paradox …

ABSOLUTELY ELASTIC D

- Tax T1 on consumers OR
- Tax T2 on producer
- AND absolutely elastic demand results in…
- maximum pressure of consumers to producers to preserve effective price unchanged. Tax is shifted on producers. T1 and T2 are equivalent taxes

ABSOLUTELY INELASTIC D (TOBACCO)

- similar graphic analysis as above
- We can sum up: there is a minimum pressure of consumers to produces to preserve effective price unchanged. Tax is shifted on consumers. T1 (on consumers) and T2 (on producers) are equivalent taxes.

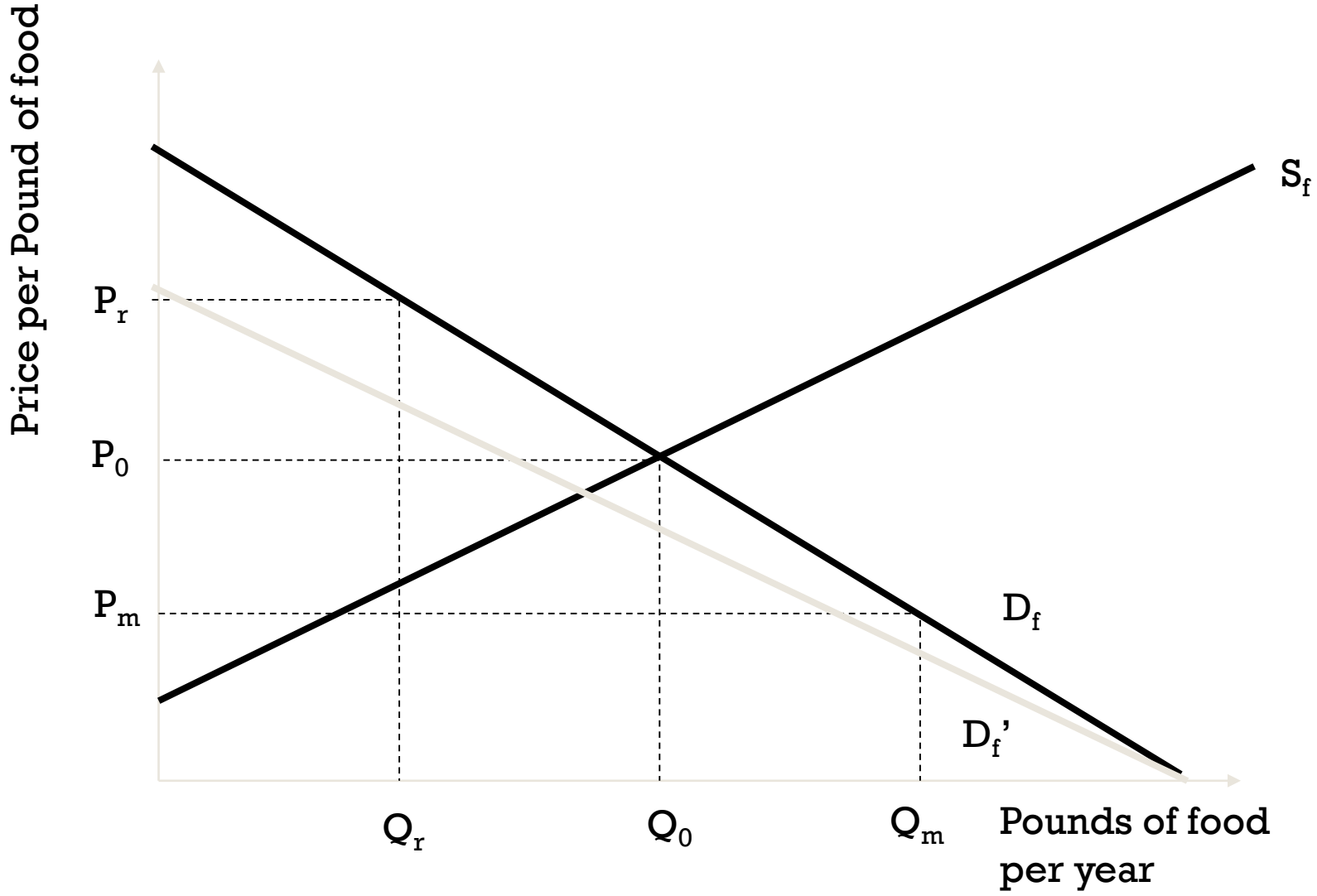
INELASTIC SUPPLY (AGRICULTURAL PRODUCTION, LAND PROPERTY ACTIVITIES, METALURGY)

- The aim or result – to punish producers
- We can sum up: there is a minimum pressure of producers to consumers. Tax is shifted on producers. T1 (on consumers) and T2 (on producers) are equivalent taxes.

ELASTIC SUPPLY

- The aim or result – discourage the activity, production…
- We can sum up: there is a maximum pressure of producers to consumers. Tax is shifted on consumers. T1 (on consumers) and T2 (on producers) are equivalent taxes.

AD VALOREM TAXES



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INCIDENCE ANALYSIS OF PENSION SECURITY IN THE CZECH REPUBLIC

PENSION SECURITY SCHEME - ANNUAL VIEW

- is a compulsory public insurance scheme
- it is a „paygo“ system:

= today employees and self-employed contribute to the fund

= yesterday employees and self-employed = today retirees draw pensions

INDIVIDUAL LIFETIME PARTICIPATION

- when works, an individual pays a share of his earnings to the fund
- when retired, an individual receives a pension

↓

- what is his net benefit over the life?

= *lifetime pension – lifetime tax*

- how the pension security changes lifetime income inequality?

DATA FOR THE LIFETIME INCIDENCE ANALYSIS

- panel data for a long period are necessary
- absence of the real panel data in CR

  → modelling of pseudo panel data
- Information System on Average Earnings

  → coverage of 1,3 mil. employees

  → data on income and various personal characteristics

  → data on their employers

MODEL OF THE LIFETIME INCOME

fictional individual = group of real individuals of different ages (when they start – when they stop working)

lifetime income of fictional individual =

= sequence of average incomes of real individuals

lifetime income = earnings from employment

LIFETIME INCOME OF FICTIONAL INDIVIDUAL

Age	Average monthly earnings in CZK	Number of real employees	Standard deviation in CZK
29	21 784	441	5 683
30	21 974	481	5 849
31	22 158	526	5 691
32	22 117	529	6 054
33	22 555	558	6 434
34	21 655	432	5 586
35	22 225	423	6 975
36	22 007	403	5 811
37	22 279	361	5 776
38	21 755	391	5 765
39	21 732	386	5 684
40	21 499	401	5 830

Source: Author

MODELLING OF DATA: ASSUMPTIONS

1. sufficient number of real individuals of different age but the same characteristics related to income
2. minimal variance in incomes in age groups
3. stability of individual´s income profile over time

CREATION OF FICTIONAL INDIVIDUALS

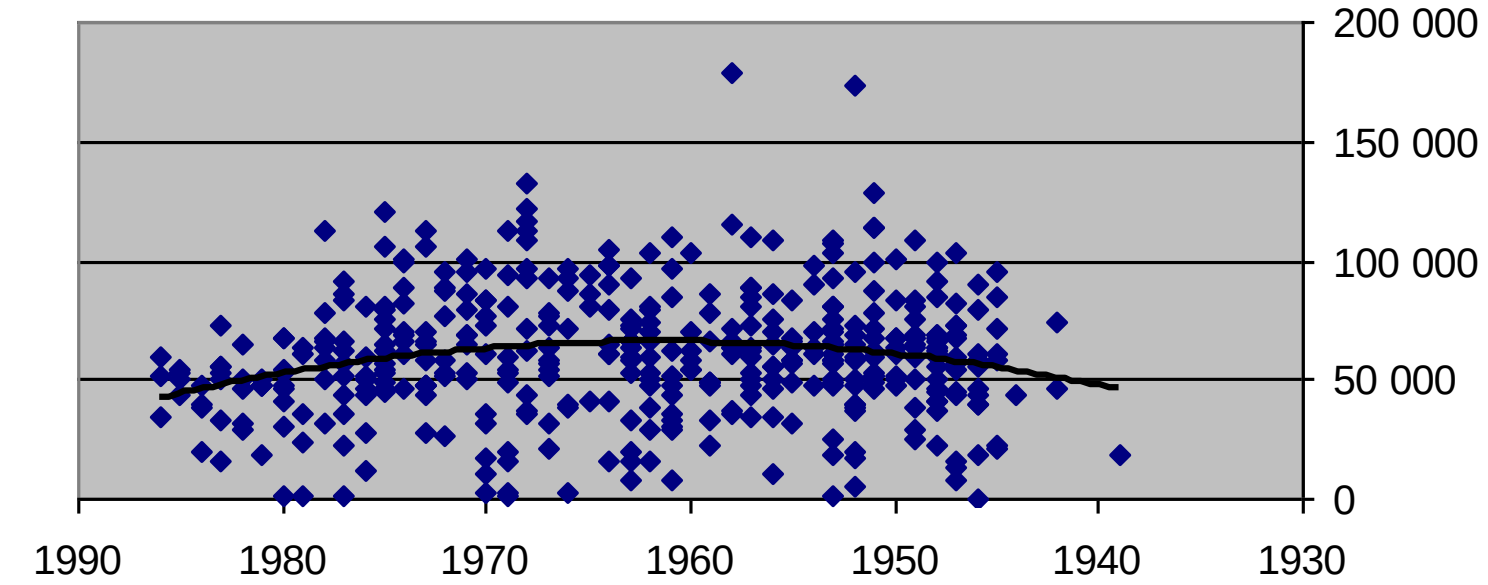
- One-factor ANOVA and regression analysis → characteristics with effect on income: gender, education, location, occupation
- excluded from the sample:

- part-time employees

- working in the country´s capital

- working in „financial services“ industry

LIFETIME PROFILE - EXAMPLE I.



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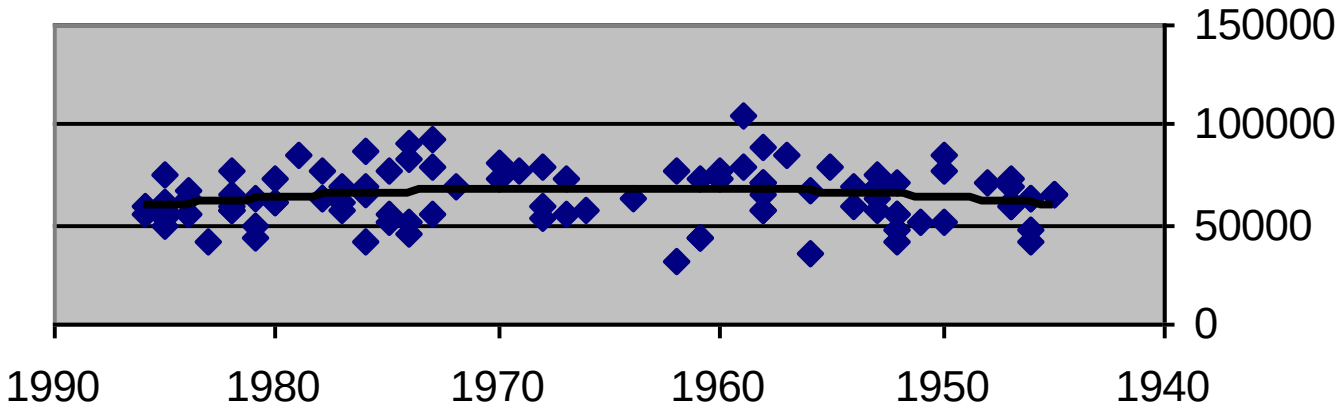
LIFETIME PROFILE – EXAMLE II.



Source: Author

RESULTING 331 FICTIONAL PERSONS

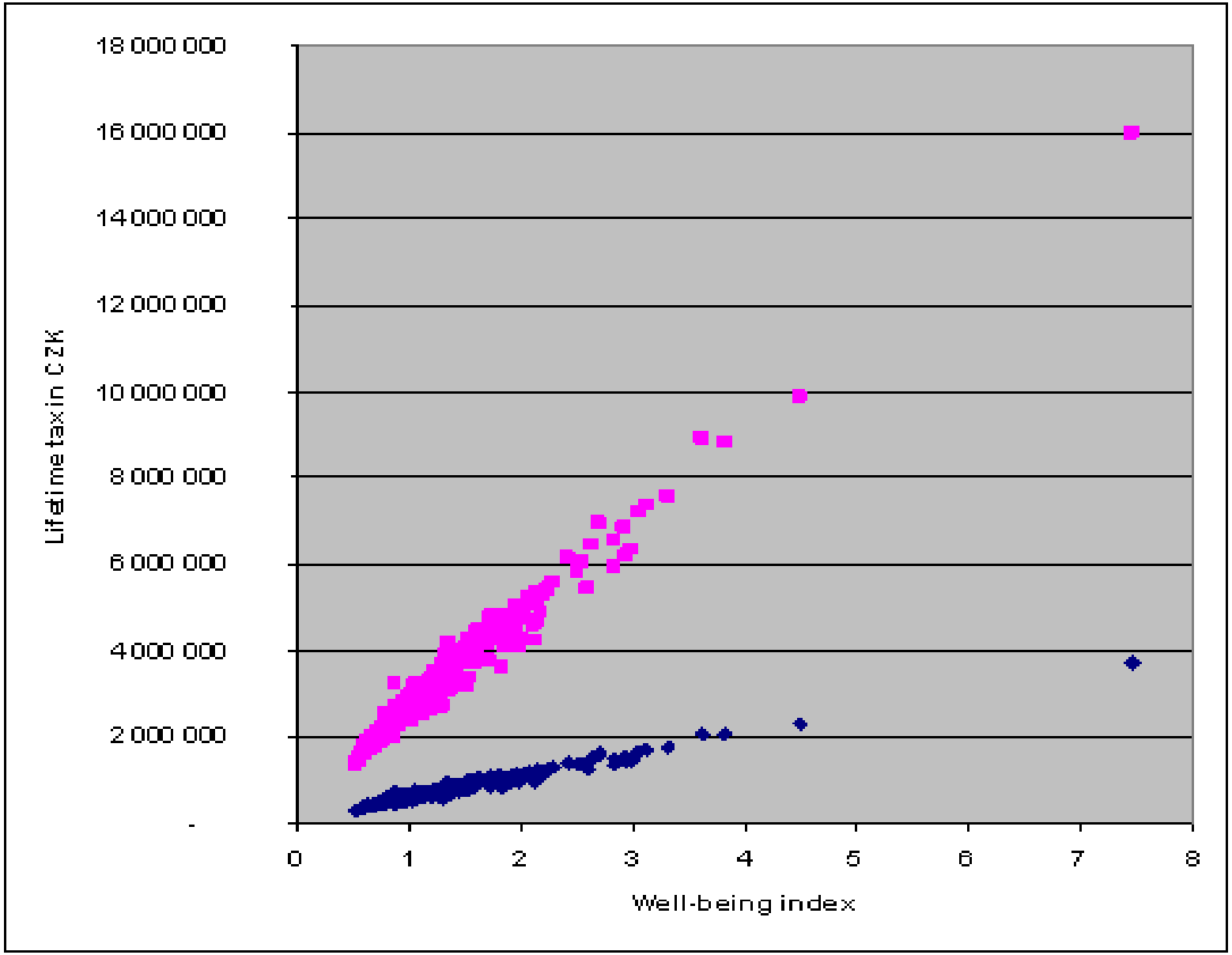
= men and women of different education and occupation working outside the capital

+

- working from the end of schoolling (18-23) until the legal age of retirement (62 x 59)
- without any break (illness, unemployment, child care etc.)
- with the same life expectancy (17 x 23)

ESTIMATE OF LIFETIME TAX

- 2006 law (2006 is the last working year)
- present value of lifetime tax = $\sum_{t=1}^{N} 12 v_t T_{TAX}$
- employee´s rate = 6,5 %
- employer´s rate = 21,5 %



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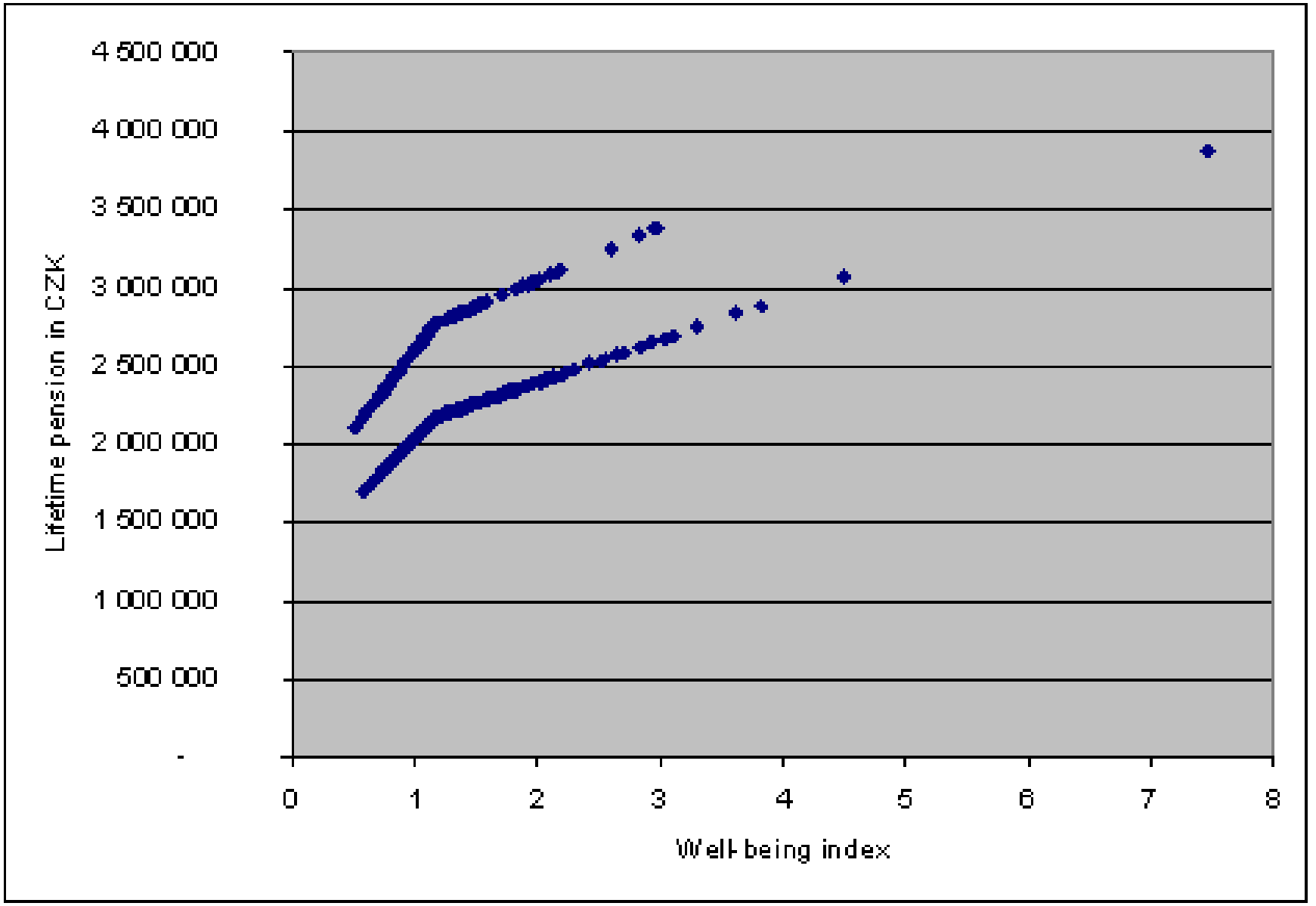
ESTIMATE OF LIFETIME PENSION

- 2007 law (2007 is the first retirement year)

- present value of lifetime pension =
- [(earnings x rate) + lump sum] x months

- „months“ for women = 23 x 12
- „months“ for men = 17 x 12



Source: Author

UPDATING OF THE PAST EARNINGS

- reality:

indexation by a growth of wages:

$$\text{earnings}_{2001} \times \underline{\text{index}}$$

$$\text{index} = \text{avrg wage}_{2006} / \text{avrg wage}_{2001}$$

- simulation:

$$\text{earnings}_{2001} = \text{earnings}_{2006} \text{ of 56-years old}$$

RESULTS

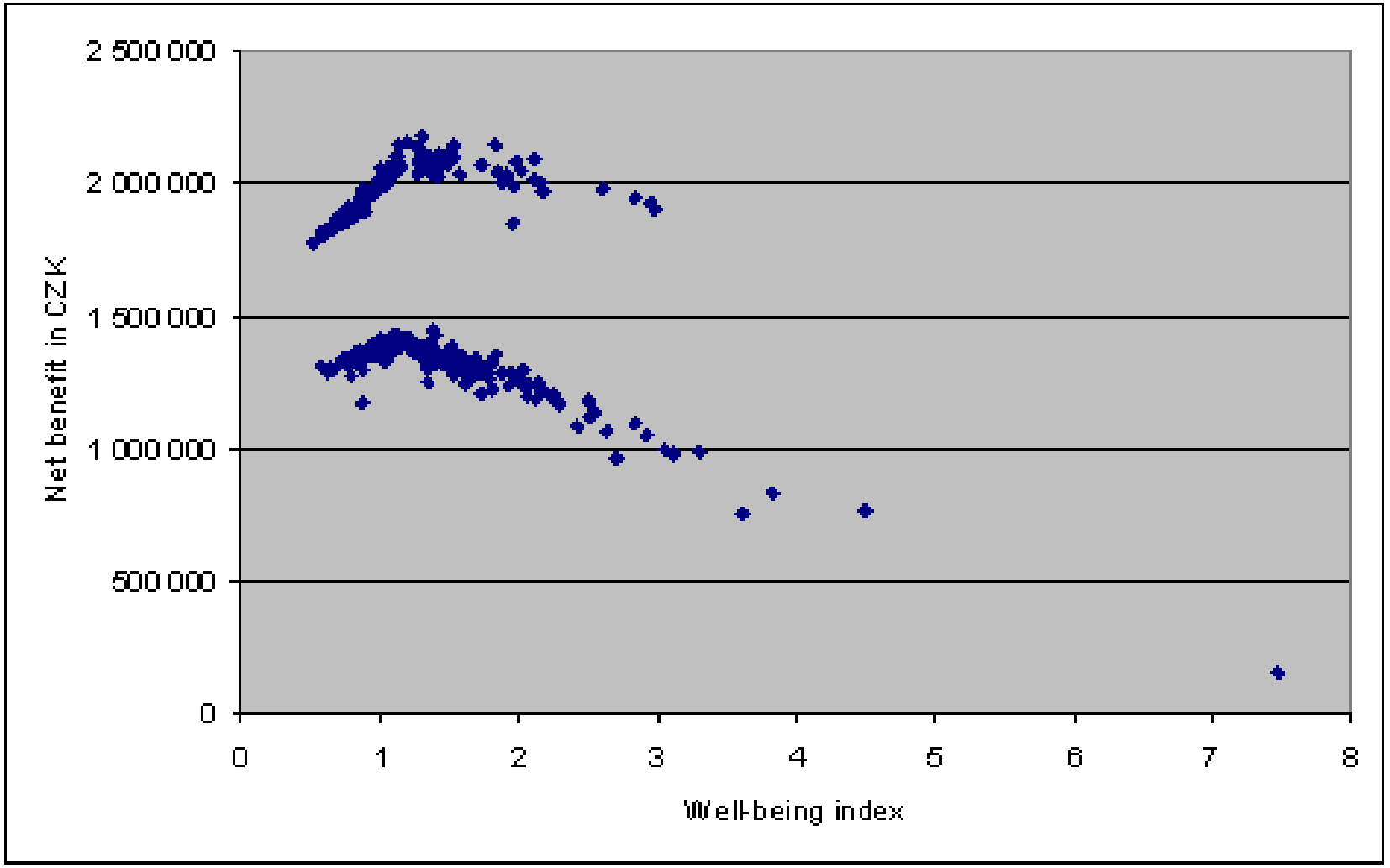
1. distribution of net benefits

2. distribution of rates of return

welfare measure for ranking of individuals =

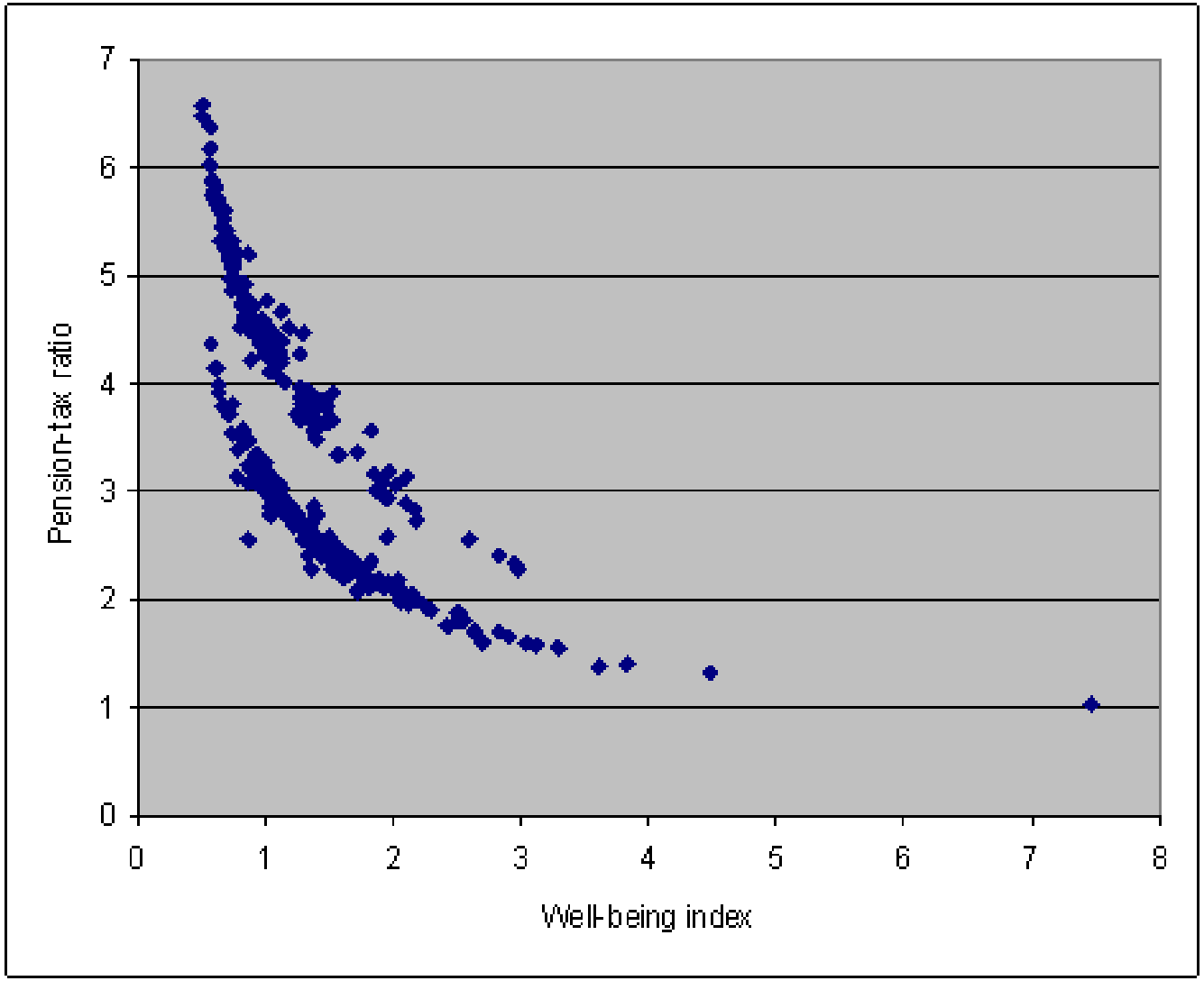
= lifetime average earnings/national average wage

PENSION – TAX (TAX RATE = 6,5 %)



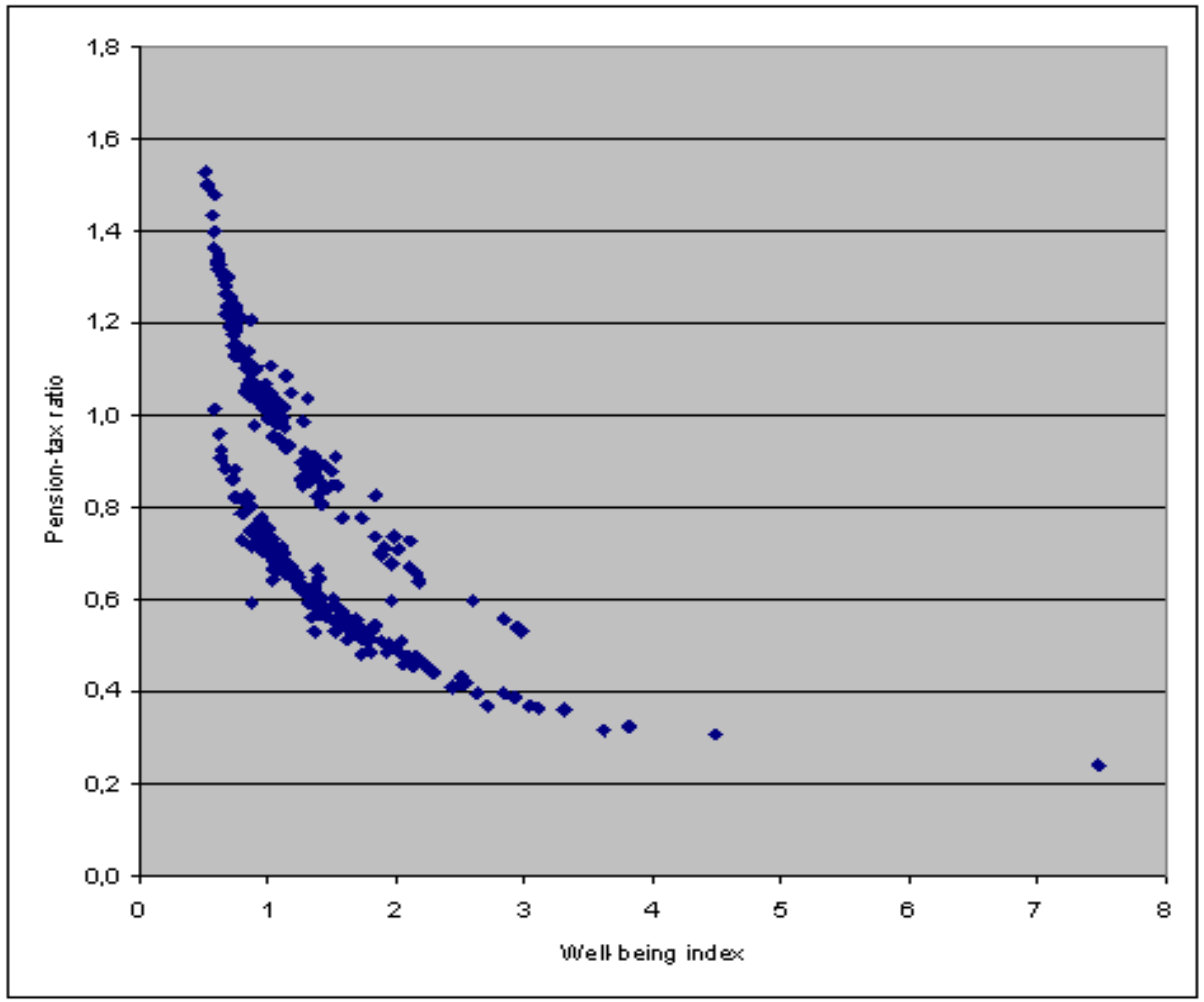
Source: Author

PENSION/TAX (TAX RATE = 6,5 %)



Source: Author

PENSION/TAX (TAX RATE = 28 %)



Source: Author

CONCLUSIONS I.

- considering the 6,5 % rate all the fictional individuals benefit more than they paid
- however, considering the 28 % rate especially lower-income women benefit
- rate of return decreases with well-being
- income is redistributed from higher-income to lower-income individuals or from men to women

CONCLUSIONS II.

- the pension security reduces the inequality of lifetime income
- lower-income individuals are better-off

↑

- regressive pension formula
- later earnings are relevant in calculation
- shape of lifelong earnings function