Optimal income tax and migration of top incomes

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1. Is 75% optimal ?

- François Hollande the socialist contender in the next French presidential election
  - a new bracket for top incomes beyond 1 Million of €
  - In fact more than 75% since on top of that, there is another income tax for financing social security, CSG, about 8% on labor incomes
  - At least 83% for about 3000 households.
- Escape by migrating
  - London, Bruxelles, Geneve
- Focus here on labor income

2. Important difference with the mobility of capital

- Financial capital can move from one place to the other to small expenses
- In first approximation, assumption of perfect mobility
  - Probably not true even if useful
- Imperfect mobilility of labor, High Migration costs (Borjas)
- Labor as been described as immobile. Is it a good first approximation for this century ?

3. Low Mobility but increasing

-
  - Fall of transportation costs all along the second half of the 20st century
  - Huge fall of communication costs (Internet,Skype)
  - Emergence of a lingua franca at the global scale: "globish".
  - Free movement of labor within the EU

Specific trade-off

4.

- Mobility for tax reasons is **specific** inducing losses of fiscal revenues & productive capacities
  - Different from the brain drain.
  - Different from tax evasion.
  - Specific trade-off between the redistributive aim and maintaining national productive capacities.
- Does imperfect mobility of top income earners changes the predictions of the Mirrlees model of income tax ?

5. To optimize on whom?

- The people who live (*resident criterion*)
  - Immigrants do not matter
- The citizens, whatever the country they live (*citizen criterion*)
  - Citizen abroad matter for the social welfare, if they migrate, they are more happy abroad that they would have been if they would have stay,
  - But they don't finance public goods and income support for the poor any more.
- All citizens decide to stay by interest .(*national criterion*)
  - The social decision maker aims at maintaining people at home.

6. Adapting the model of optimal income tax in a closed economy to an open economy

- Introduction of participation constraints
  - The indirect utility generated by the tax scheme must be as least as great to the indirect utility abroad = a reserve utility
  - Not new in contract theory but in optimal income taxation
- Possible pertubation of the incentive constraints.
  - "Countervailing incentives" (Jullien 2000)
  - Under some conditions (Guesnerie-Seade 1982), the incentive constraints are downward looking
  - Here, low types may want to imite the high types.

7. Key Questions

- An empirical question
  - What do we know about the tax mobility of top income earners ?
- Two theoretical questions
  - Shall we keep top income earners at home, maybe to the benefit of others ?
  - What are the maximum (average or marginal) tax rates that we can setup ?

8. Outline

- Estimation & use of migration elasticities
  - Mike Brewer, Emmanuel Saez and Andrew Shephard "Means-testing and Tax Rates on Earnings" *Mirrlees Review*
  - Liebig, T., P. A. Puhani, and A. Sousa-Poza (2007). Taxation and Internal Migration: Evidence from the Swiss Census using Community-Level Variation in Income Tax Rates," *Journal of Regional Science* 47(4), 807-836.
  - H.K Kleven, C Landais & Emmanuel Saez, "Taxation and International Migration of Superstars: Evidence from the European Football Market" *Sticerd*
  - H.K Kleven, C Landais, Emmanuel Saez & E. Schultz, Taxation and International Migration of Top Earners: Evidence form the Foreigner Tax Scheme in Denmark
- An attempt to integrate migration in optimal tax theory
  - Laurent Simula et Alain Trannoy « Shall we keep the highly-skilled at home? the optimal tax perspective forthcoming in *Social Choice and Welfare*.
  - Laurent Simula et Alain Trannoy "Optimal Income Tax under the Threat of Migration by Top-Income Earners" *Journal of Public Economics* 2010, 94 163-173

Part 1: Estimation & use of migration elasticities

- Reduced form model
  - Emmanuel Saez RES 2001 : To base optimal tax formula on parameters that we can estimate thanks to econometrics
  - Elasticité de migration :

$$\eta_m = \frac{\partial P}{\partial c} \frac{c}{P(c;z)}$$

  - $P(c;z)$: proportion of the population who lives in the country of origin and receives disposable income c for gross income z
  - When the elasticity is estimated, it is endogenous to the tax schedule

Part 1: Model à la Ramsey

- No adjustment for labor supply at the intensive margin
- Citizen criterion
  - Optimal tax formula T :

$$\frac{T(z)}{z - T(z)} = \frac{1}{\eta_m}(1 - G(z))$$

  - $G(z)$: Social weight of individuals who have an income z

Part 1 Marginal tax rates at the top

- e elasticity of the labor supply to the intensive margin
- The optimal income tax ends up with constant marginal tax rate
- No income effect
- Ralwsian case (peak of the Laffer curve)
  - Formula for the marginal tax rate at the top τ :

$$\tau = \frac{1}{1 + ae + \eta_m}$$

  - a : Pareto coefficient

Switzerland

- The "*only country*" where regions (cantons) are free to design regional income tax as they want
- "*For example, in 2000, for an unmarried individual with no children who earns CHF 100,000 per year,*

the combined cantonal and local tax burden across Switzerland in communities varied
from CHF 8,954 in Freienbach (Canton Schwyz)
to CHF 22, 784 in La–Chaux–de–Fonds (Canton Neuchatel)".

- "*In 2000, for the top income levels, total marginal rates (including all government levels) for an annual income of CHF 500,000 ranged*

from about 21 percent Freienbach, Canton Schwyz) to more than 46 percent (in Lauterbrunn, Canton Berne)".

Empirical estimations

- A upper bound for the tax-migration elasticity at the international level (small country,very good transport infrastructures)
- Causal effect? Rich set of control variables but no instrumentation
- Significant impact of tax deviations & differences of tax increases between 1995 & 2000 **only** for young tertiary education
- An increase of 1 point of the total tax rate entails an emigration of 33 Swiss graduates over 1000
- We deduce

$$\eta_m \simeq 0,46$$

The european market of top footballers

- Exploitation of a "quasi-experiment"
- The 1995 Bosmans Rule that opened the job market
- Discriminatory tax regimes in favour of foreigners
  - In Spain the "David Beckam fiscal act": a flat tax of 24% for the foreigner footbal players
  - Similar tax regimes in Scandinavian Countries
- The increase of the top marginal tax rate from 40% to 50% in 2009 in GB
- Arsen Wenger, coach of Arsenal "*With the new taxation system,..., the domination of the Premier League will go, that is for sure*" (The Sunday Times, April 25, 2009)
- Really?

Résults of empirical estimates

- The location of the top players is elastic to the net-of-tax rate
- Not on middle-skill players
- Pb : the true wages are not observed
- Controle for fixed effects year-country-quality
- An estimation in the top part of the distribution

$$\eta_m \simeq 0,40$$

What optimal top tax rates in the Rawlsien case?

- In the "Ramsey " model
- The top average tax rate:

$$\frac{T(z)}{z} = \frac{1}{1+\eta_m} \simeq 70\%$$

- In the more sophisticated model

The top marginal tax rate

$$\tau = \frac{1}{1+ae+\eta_m} = 50\%$$

with $a = 2; e = 0,3$ (Lehman, Marical, Rioux 2011)

- Can we neglect tax migration elascitiy? It setting it at 0, we get $\tau = \frac{1}{1+ae} = 63\%$

Strengths and Weaknesses

- It allows to deduce predictions with a small theoretical apparatus
- To find plausible values
- Estimations of migration elasticity depend on the prevailing tax scheme
- Elasticity is a local concept.
- If one find that the optimal tax scheme coincide with the prevailing tax scheme, then fine.
- Otherwise we are still in the blue since we do not know the elasticity corresponding to the optimal tax scheme.

Partie 2 . ,A More "structural" approach

- 2 countries: A and B.
  - A: Mirrleesian economy which cannot levy taxes in B.
  - B: Low redistributive country: laissez-faire country or, more generally, a country with a low constant marginal tax rate, denoted t_B.
  - Both countries have the same production function.
- Population:
  - Agents differ in productivity $\theta \in \left[\underline{\theta}, \overline{\theta}\right]$: private information.
  - CDF of θ, denoted $F(\theta)$: common knowledge.
  - Individuals have the same quasilinear preferences over consumption x and labour ℓ: $U(x, \ell) = x - v(\ell)$.
  - Gross income: $z = \theta \times \ell$.
  - Personalized utility function: $u(x, z; \theta) = x - v(z/\theta)$.

Emigration

- An individual leaving A incurs a **migration cost** c:
  - Expressed as a loss in consumption, due to different material and psychic costs of moving.
  - Depends on productivities, $c = c(\theta)$.
- So, **reservation utility**: $V_B(\theta) - c(\theta)$.
  - Empirical studies: propensity to migrate increases with the skill level.
  - So, more productive individuals supposed to have more attractive outside options.
  - Reservation utility increasing in θ: $V_B'(\theta) - c'(\theta) > 0$.
- **Location rent**: $R(\theta) = V_A(\theta) - V_B(\theta) + c(\theta)$. An individual stays in A iff $R(\theta) \geq 0$. Otherwise, he emigrates.

Migration costs

Assumption that $V_B'(\theta) - c'(\theta) > 0$ allows for increasing, decreasing and constant migration costs.
2 interesting cases capture important features of the real world + make formulae more transparent.

Constant case:

- Cost of migration = fixed cost, independent of individual type and of any other variable;
- Focus on material costs.

Proportional case:

- Idea: how much extra money should I receive to compensate for the fact that I am not living in my home country?
- Focus on psychological costs.
- Cost expressed as a fraction of the indirect utility received abroad: $c(\theta) = \alpha V_B(\theta)$, with $0 < \alpha < 1$.

Migration costs: Linear Case

- Constant and proportional cases can be combined in the *linear case*:

$$c(\theta) = c + \alpha V_B(\theta).$$

- Constant term c may stand for material costs of migration while α captures home attachment.

Assumptions

- Focus on emigration of highly skilled. $\longrightarrow$ A's resident population assumed to be compact. $\hat{\theta}$ = highest productivity level in A.
  [Exhibit cases in which this is a property of optimum allocation (and not an assumption)]
- A's government is not able to levy taxes in B.
- Tax revenue constraint:

$$\int_{\underline{\theta}}^{\widehat{\theta}} (z_A - x_A)\, dF(\theta) \geq 0.$$

  Captures the fact that the tax policy is purely redistributive.

Social Objectives: Fixed vs Variable-Population Criteria

- **National** criterion: policymaker cares about the welfare of all its citizens and wants each citizen to choose to stay at home.

$$W_{A,\rho}^{N}\left(\widehat{\theta}\right) := \int_{\underline{\theta}}^{\widehat{\theta}} \phi_{\rho}\left(V_{A}\left(\theta\right)\right) dF\left(\theta\right) \text{ with } W_{A,\rho}^{N}(\widehat{\theta}) = -\infty \text{ for } \widehat{\theta} < \underline{\theta}.$$

- **Citizen** criterion: policymaker cares about the average social welfare of its citizens, irrespective of the country of residence.

$$W_{A,\rho}^{C}\left(\widehat{\theta}\right) := \int_{\underline{\theta}}^{\widehat{\theta}} \phi_{\rho}\left(V_{A}\left(\theta\right)\right) dF\left(\theta\right) + \int_{\widehat{\theta}}^{\overline{\theta}} \phi_{\rho}\left(V_{B}\left(\theta\right) - c\left(\theta\right)\right) dF\left(\theta\right)$$

- **Resident** criterion: policymaker cares about the average social welfare of its residents, irrespective of the citizenship.

$$W_{A,\rho}^{R}\left(\widehat{\theta}\right) := \frac{1}{F\left(\widehat{\theta}\right)} \int_{\underline{\theta}}^{\widehat{\theta}} \phi_{\rho}\left(V_{A}\left(\theta\right)\right) dF\left(\theta\right).$$

First-Best Allocations

- Each individual's productivity is public information.
- Tax scheme depending on productivity.

Problem (First-Best)

Maximise $W^i_{A,\rho}\left(\widehat{\theta}\right)$, $i = \{N, C, R\}$, *subject to:*

1. Participation constraints: $R(\theta) \geq 0$ for every θ in $[\underline{\theta}, \hat{\theta}]$;
2. Boundary condition under National criterion: $\widehat{\theta} = \overline{\theta}$;
3. Tax revenue constraint: $\int_{\underline{\theta}}^{\widehat{\theta}} (z_A - x_A)\, dF(\theta) \geq 0$..

National and Citizen Criteria

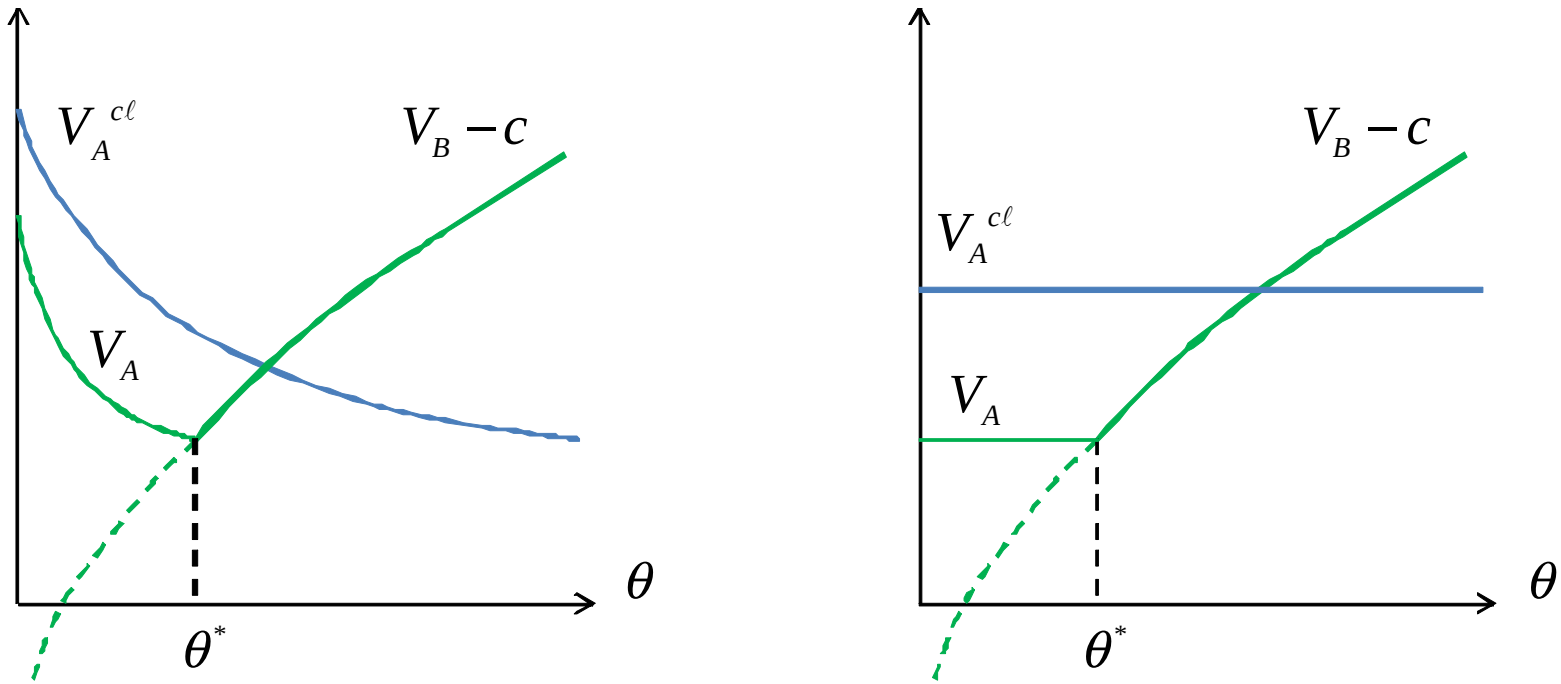


Figure: The Curse of the Middle-Skilled

Resident Criterion

- Trade-off between the "tax effect" and the "utility effect" of the presence in A of the marginal $\widehat{\theta}$-individuals:

$$\frac{\partial W^R_{A,\rho}(\hat{\theta})}{\partial \hat{\theta}} = \underbrace{\gamma T(\hat{\theta}) \frac{f(\hat{\theta})}{F(\hat{\theta})}}_{\text{Tax effect}} + \underbrace{\left[\phi_\rho\left(V_A(\hat{\theta})\right) - W^R_{A,\rho}(\hat{\theta})\right] \frac{f(\hat{\theta})}{F(\hat{\theta})}}_{\text{Utility effect}} \times \mathbf{1}_{\rho<\infty}$$

- Emigration of the highly skilled never optimal under maximin.
- Emigration of the highly skilled may be socially optimal for finite inequality aversion.

  [see previous Fig. when the reservation utility is quite flat]

Incentive-Compatibility Constraints

Because of asymmetric information, the policymaker must ensure that the income tax schedule $T(z_A)$ is incentive compatible. Equivalent to:

- A condition on the rate of increase in V_A,

$$V_A'(\theta) = \frac{z_A(\theta)}{\theta^2} v'\left(\frac{z_A(\theta)}{\theta}\right).$$

- A monotonicity condition on z_A, $z_A'(\theta) \geq 0$ for every θ.

$\Rightarrow$ More productive individuals have higher utility in country A.

[the worst-off citizens are the least productive ones + the indirect utility profile in the optimum cannot be V shaped.]

Optimal Income Tax Problem

Problem (Second-Best)

Find $T(z_A)$ *to maximise* $W^i_{A,\rho}$, $i = \{N, C, R\}$, *s.t.*

$$\text{for } \theta \leq \widehat{\theta} : \begin{cases} V'_A(\theta) = -\frac{z_A(\theta)}{\theta} u'_z(x_A(\theta), z_A(\theta); \theta), \\ z'_A(\theta) \geq 0, \\ R(\theta) \geq 0 \end{cases}$$

and the tax revenue constraint.

- We study this Problem in the interesting cases where there are individuals threatening to emigrate.
- The optimum schedule is the combination of pieces of solutions:

1. Part of the tax schedule where participation constraints are binding;
2. Impact of migration on the rest of the schedule.

Is it Optimal to Keep Everyone at Home?

- Intuition regarding why it may be too expensive in terms of social welfare to constrain the whole population to stay in A.
  - In closed-economy, usual incentive to *understate* productivity to obtain greater social benefit whilst enjoying more leisure. Cf. Hellwig (2007). Corresponds to simple monotonic chain to the left with discrete population (Guesnerie and Seade 1982, Weymark 1987).
  - In open economy: new upward mimicking behaviour. $\longrightarrow$ countervailing incentives.
- Under maximin and reasonable assumptions on the costs of migration, emigration of the highly skilled should prevented. Then, the optimum solution under Citizen and Resident criteria coincide with that obtained under the National criterion.

If one likes his poor, one

Proposition

Theorem

Let individuals have quasilinear-in-consumption preferences, with constant elasticity of labour supply, the government's objective be the maximin, the autarkic second-best indirect utility cross the reservation utility only once, from above, and let the reservation utility be convex with nondecreasing migration cost. Under the Citizen and Resident criteria, we have $\hat{\theta} = \overline{\theta}$ *in the optimum.*

Theorem

Let individuals have separable preferences $U(x, \ell) = h(x) - v(\ell)$*, let the policymaker adopt the maximin, and let the costs of migration be constant. When the substitution effect on labour supply prevails over the income effect, it is socially optimal to design the tax schedule so that everyone decides to stay in the home country, under the Citizen and Resident criteria.*

Optimal Tax Scheme for the Individuals Threatening to Emigrate

- Properties which are satisfied by all optimal tax schemes for the individuals threatening to emigrate. Independent of the chosen social criterion.
- We consider an interval, of positive length, on which the participation constraints $R(\theta) \geq 0$ are active.
- By definition, for every individual in this interval, the location rent is zero ($R(\theta) \equiv 0$).

Optimal Marginal Tax Rates

- To gain further insights, assume that the disutility of labour is isoelastic:

$$v(\ell) = \frac{\ell^{1+1/e}}{1+1/e}$$

- Then, the optimal marginal tax rates faced by individual threatening to emigrate are:

$$T'(\theta \ell_A(\theta)) = 1 - \theta^{-\frac{e}{1+e}} \left[V_B'(\theta) - c'(\theta)\right]^{\frac{1}{1+e}}.$$

- Implication: **the sign of the marginal tax rates is determined by the slope of the migration costs**,

$$T'(z_A(\theta)) \gtreqless 0 \Leftrightarrow c'(\theta) \gtreqless \theta^e \left[(1-t_B)^{1+e} - 1\right] \text{ for } \theta \text{ in } I.$$

Optimal Marginal Tax Rates: Constant Migration Costs

- In that case, $T\left(z_A\left(\theta\right)\right) = c\left(\theta\right)$ for the individuals threatening to emigrate.
- Hence, because of the threat of migration, **the optimal tax schedule becomes regressive**: highly skilled individuals for whom the participation constraints are binding pay less taxes in proportion to gross income than lower skilled individuals.

Optimal Marginal Tax Rates: Linear Migration Costs

- When migration costs and t_B are linear, the indirect utility in B is:

$$V_B(\theta) = \frac{\theta^{1+e}}{1+e}(1-t_B)^{1+e}.$$

- The optimal marginal tax rates faced by individuals threatening to emigrate are:

$$T'(z_A) = 1-(1-t_B)(1-\alpha)^{\frac{1}{1+e}}.$$

- Hence:
  - The larger t_B, the larger $T'(z_A)$;
  - The larger home attachment α, the larger $T'(z_A)$;
  - The larger e, the lower $T'(z_A)$ (efficiency).

Illustration on French Data (1.)

In France:

- The objective pursued by the government in recent years seems to be close to a Rawlsian criterion (Laroque, 2005);
- Top marginal tax rate equal to 40%;
- Potential threat of migration to very close tax havens (Monaco or Andora), to less redistributive countries (Switzerland or Luxembourg), to the US (top tax rate= 35%), to Eastern European countries (to tax rate= 21% in Estonia or 19% in Slovakia).

Illustration on French Data (2.)

Parameters for the French economy (Landais, 2008):

- Pareto index for the upper tail of the population approximately equal to 2.25;
- Value of the taxable income elasticity is around 0.15 for the top 0.1% of the income distribution, but might be equal around 0.5 for self-employed.

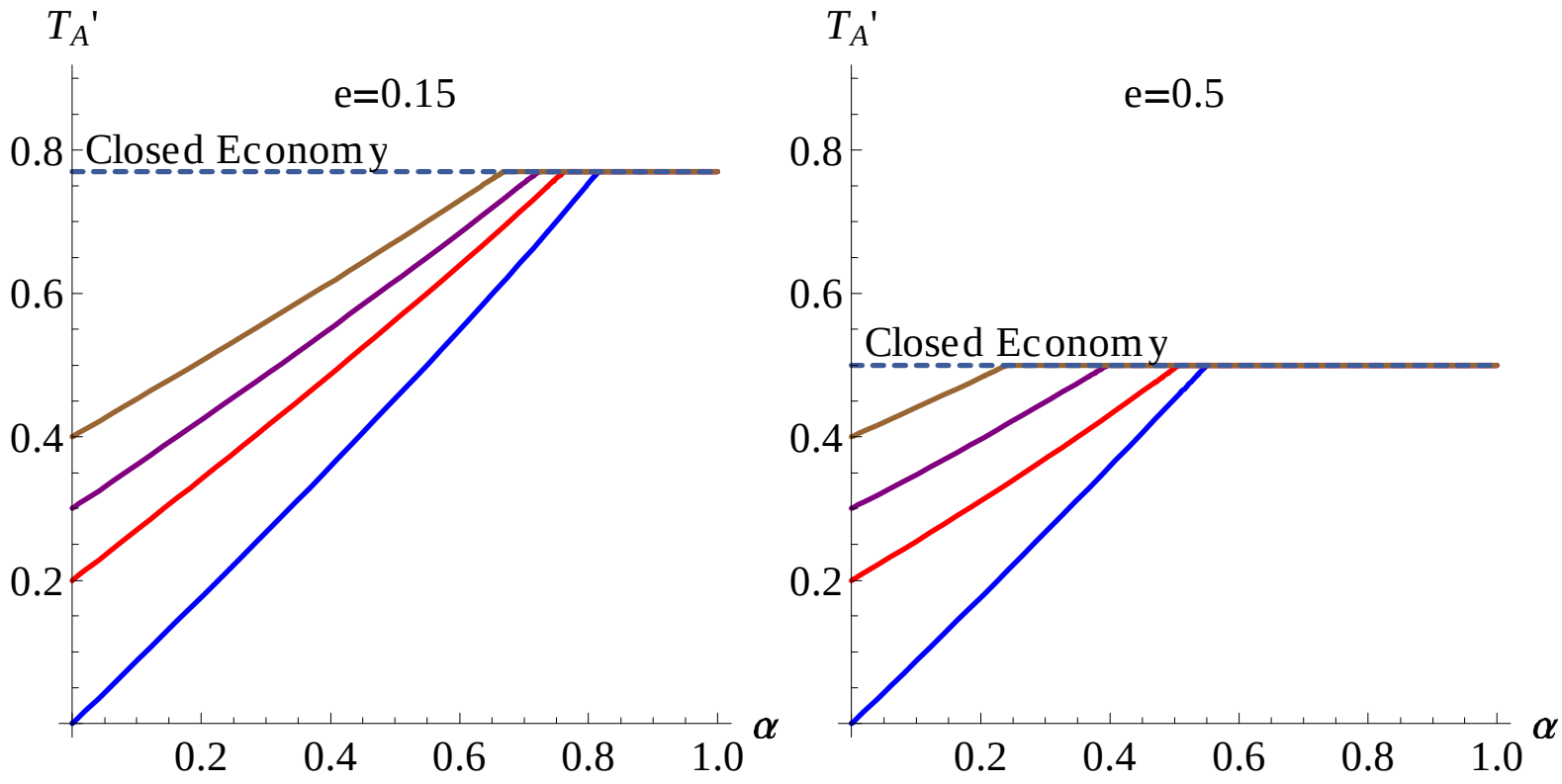


Figure: Top Flat Marginal Tax Rates under the Threat of Migration (Proportional Migration Costs). The value of t_B is given by the intercepts: 0, 0.2, 0.3, 0.4.

Implications?

Question: for which values of the parameters the actual top marginal tax rate of 40% is optimal?

- Regarding the competition with tax havens at the gate of France (Monaco, Andora, Liechtenstein and Channel Islands): actual French marginal tax rate would be too high to prevent French top-income earners from emigrating to these countries.
- Countries farther away, like Slovakia: would not represent a current threat for the sustainability of the French tax policy.

Optimal Tax Schedule – for Everyone

- Impact of the threat of migration on the complete tax schedule?
- For convenience, focus on maximin social utility + quasilinear individual preferences with constant elasticity of labour supply.
- Today: heuristic derivation (formal derivation in the paper).

Tax Reform Perturbation around the Optimal Tax Scheme

To this aim:

- Call $\Pi(\theta)$ the **average** cost, in terms of social welfare, of a slight uniform increase in the outside options for all individuals with productivity above θ;
- Assume $\underline{\theta} = 0$ so that maximin is equivalent to maximising tax revenue;
- Consider the **effects of a small increase dT' in the optimal marginal tax rates for incomes between z and $z + dz$** (cf. Piketty 1997 and Saez 2001 in closed economy).

2 Effects Are the Same as in Closed Economy:

- Positive **mechanical effect** on tax revenue:

$$dG^{+} = (1 - F(\theta_z)) \times dT' dz.$$

- Negative **elasticity effect** on tax revenue:

$$dG_1^{-} = -\frac{T'}{1 - T'} \frac{e}{1 + e} \times \theta f \times dT' dz.$$

New Participation Effect

- **Individuals already threatening to emigrate prior to the tax reform**:
  - Every of them must receive $dT' \times dz$ additional euros to stay in A.
  - $(1 - F(\theta_z)) \times \Pi(\theta_z) =$ total cost of a uniform increase in the location rent above θ_z before the tax reform. Hence, tax receipts are decreased by

$$dG_2^- := [1 - F(\theta_z)] \times \Pi(\theta_z) \times dT' \times dz.$$

- **Individuals whose location rents become negative** (decreased from $R(\theta)$ to $R(\theta) - dT' \times dz$): second-order effect.

Optimal Marginal Tax Rates

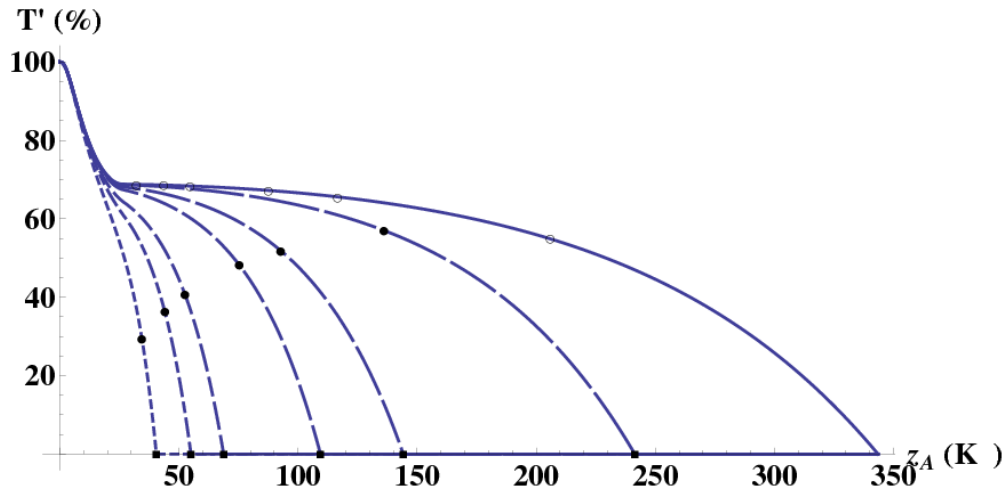
- At the social optimum, no first-order effect: $dG^{+} = dG_1^{-} + dG_2^{-}$.

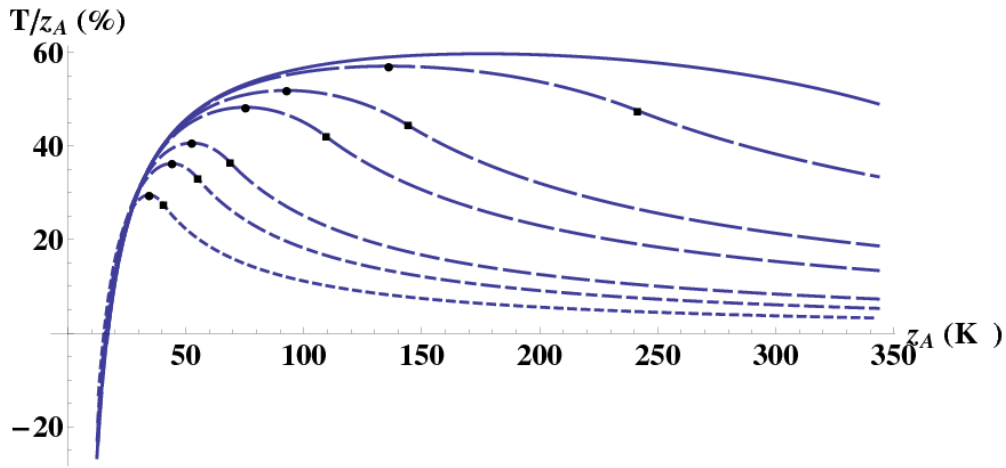
Theorem

The optimal marginal income tax rates are:

$$\underbrace{\frac{T'(z_A)}{1 - T'(z_A)}}_{\text{Optimal tax rates in open economy}} = \underbrace{\left(1 + \frac{1}{e}\right) \times \frac{1 - F(\theta)}{\theta f(\theta)}}_{\text{Optimal tax rates in closed economy}} \times \underbrace{(1 - \Pi(\theta))}_{\text{New "participation" factor} \leq 1}$$

- Because $\Pi(\theta)$ is positive, **all** marginal tax rates are reduced compared to autarky.


T' (%)
100
80
60
40
20
50
100
150
200
250
300
350
z_A (K)


T/z_A (%)
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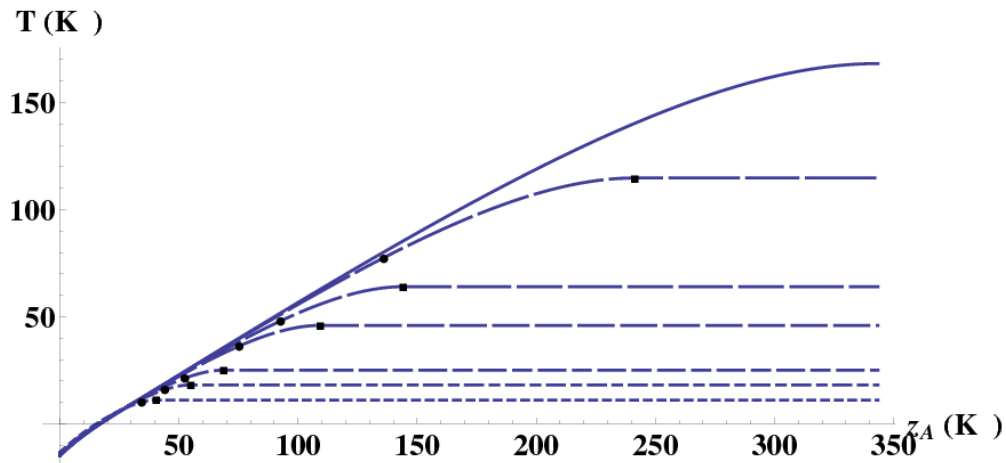
−20
50
100
150
200
250
300
350
z_A (K)


T (K)
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50
50
100
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200
250
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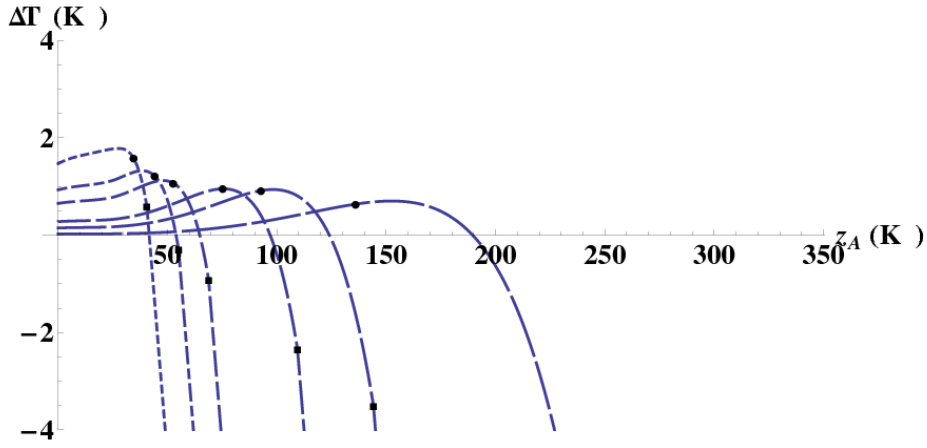
350
z_A (K)


ΔT (K)
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−4
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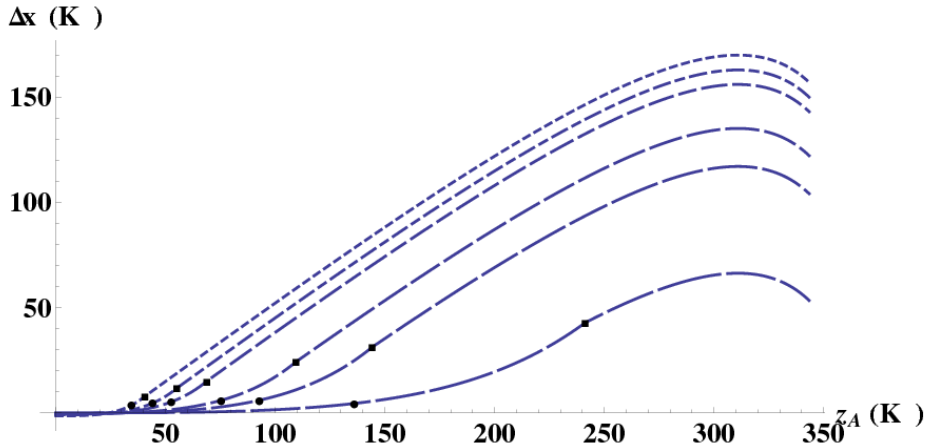
z_A (K)


Δx (K)
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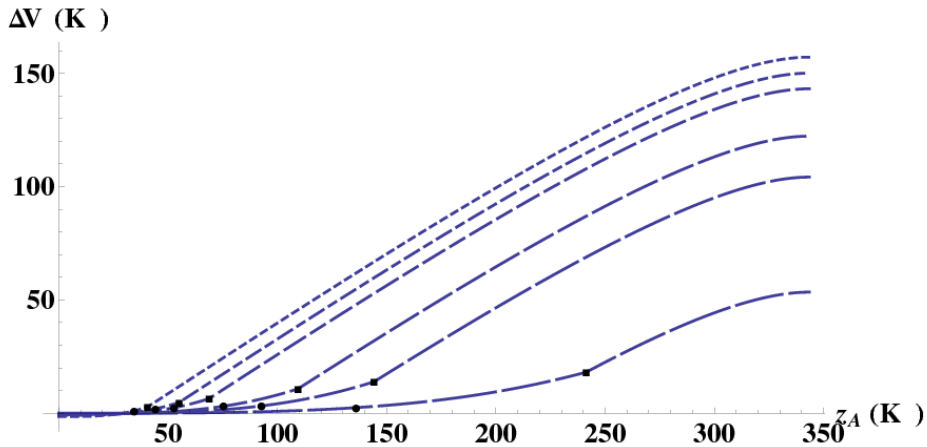
350
z_A (K)


ΔV (K)
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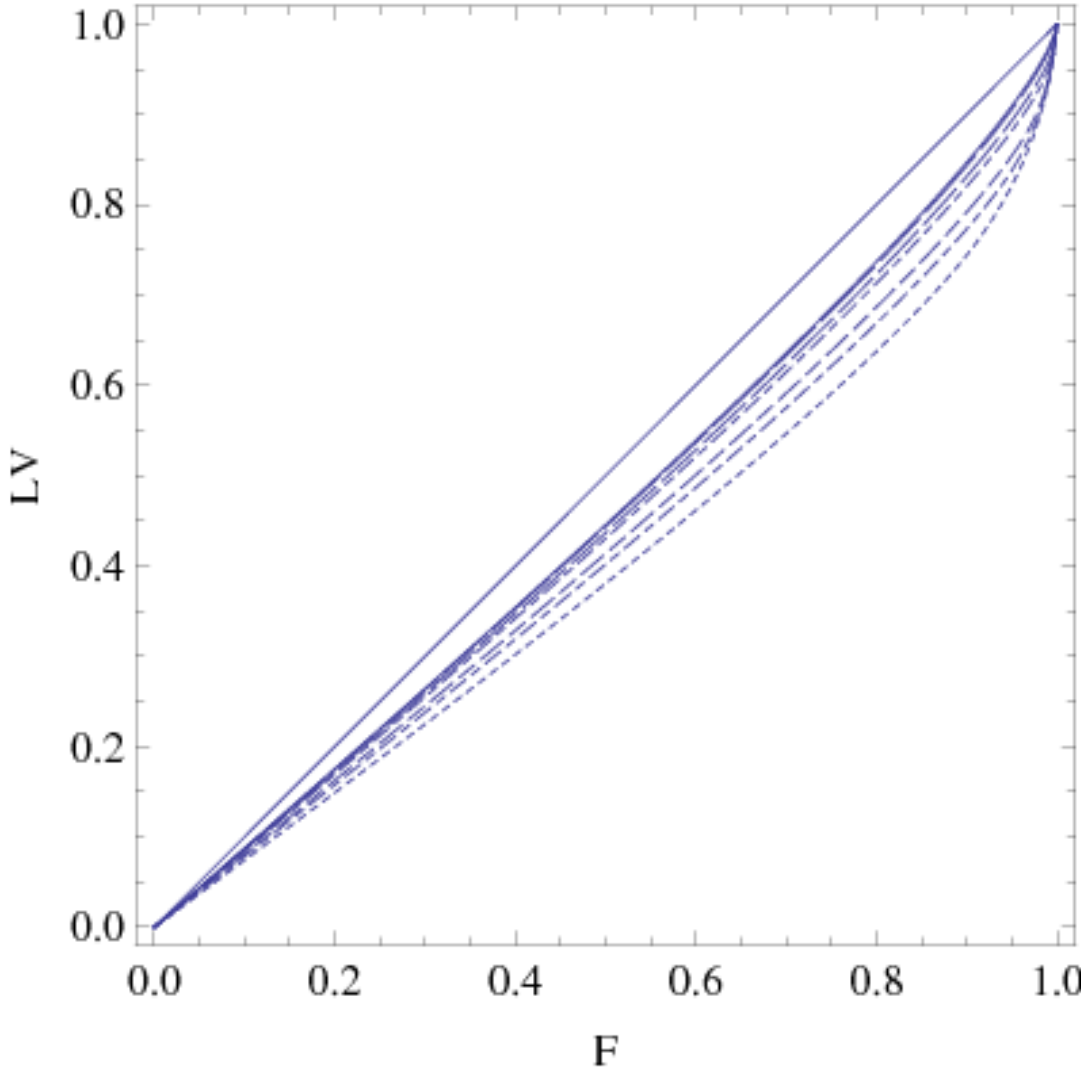
50
100
150
200
250
300
350
z_A (K)


1.0
0.8
0.6
0.4
0.2
0.0
LV
0.0
0.2
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0.6
0.8
1.0
F

Lien entre forme réduite et forme structurelle : Random Participation à la Rochet-Stole

- On introduit un cout de migration idiosyncratique ϵ distribué selon G sur $[0, b]$. (comme si on avait régressé linéairement les coûts sur le type, on a obtenu une partie systématique et une partie aléatoire)
- Calcul de la semi-élasticité par rapport au taux de taxe pour une taxe initiale qui rend l'individu dont le coût de migration idiosyncratique nul indifférent entre rester et partir.
- Soit T_0 un barème qui laisse l'individu de type $(\theta,0)$ indifférent entre rester et partir

$$z - T_0(z) - v\left(z/\theta\right) = V_B\left(\theta\right) - C(\theta)$$

- Soit une hausse de taxe de α. Les individus qui partent sont ceux tels que

$$V_B\left(\theta\right) - C(\theta) - \epsilon > z - T_0(z) - v\left(z/\theta\right) - \alpha \Leftrightarrow \epsilon < \alpha$$

- Ils sont en proportion $G(\alpha)$

Expression de la semi-élasticité

- En variation discrète, la semi-élasticité par rapport à une hausse de 1 point du taux de taxe moyen est

$$s = \frac{(G(\alpha) - G(0))\, f(\theta)}{\alpha} \frac{z}{f(\theta)}$$

- En passant à la limite, la valeur de la semi-élasticité d'immigration fiscale au point

$$s = G'(\alpha) z$$

- Cette valeur est indépendante de θ. Application si G est uniforme sur $[0, b]$,

$$s = \frac{z}{b}$$

- Elle croit linéairement en z et sa valeur est donnée par le rapport entre le revenu de l'individu et la borne maximale du coût de migration idiosyncratique.

Taux de taxe optimaux pour le critère national

- Toutes les formules de taux de taxe optimaux sont valables pour cette généralisation avec random participation et elles sont calculées pour chaque type pour celui qui a un cout de migration idiosyncratique nul.

- Est-il raisonnable de laisser les pays européens établir des barèmes fiscaux qui établissent une discrimination fiscale positive vis à vis des étrangers ?