MOBILITY AND FISCAL IMBALANCE

by

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Objective

- Examine how labor mobility affects optimal fiscal gap and fiscal imbalances in federations

- **Optimal fiscal gap**: Transfers required to achieve to second-best optimum

- **Fiscal imbalance**: Deviation from the optimal fiscal gap

- Sources of fiscal imbalance: productivity shocks and fiscal externalities

- Prominent issue in Canadian federation in recent years
  - Negative fiscal shock: Federal government reduced transfers to provinces to address own fiscal problems
  - Natural resource shocks exacerbated horizontal imbalances
  - Large migration flows to resource-rich provinces
Summary of Findings

- Role of fiscal gap (federal transfers):
  - Reduce differences in MCPF across regions
  - Induce efficient migration in response to productivity shocks

- Labor mobility increases optimal fiscal gap under reasonable circumstances

- Vertical fiscal externalities lead to fiscal imbalance

- If federal government can commit to future transfers:
  - Negative fiscal imbalance mitigates regions’ over-spending
  - Federal transfers lower than in second-best optimum

- If federal government cannot commit to future transfers:
  - Greater over-spending to attract federal transfers
  - Federal government desire to equalize MCPF across regions ex post leads to positive fiscal imbalance

- In both cases, labor mobility mitigates fiscal imbalances
Related Literature

- Optimal fiscal gap

- Vertical fiscal externalities

- Labor mobility and horizontal fiscal externalities

- Fiscal Imbalance and Commitment
The Benchmark Model

- Two regions: poor P and rich R
- Continuum of households of unit size in federation
- Households differ in an attachment-to-home parameter $a$, distributed uniformly over $[0, 1]$
- For a type $a$ household, utilities in regions P and R are:
  \[ c - h(y) + b(g) + B(G) + 1 - a \quad \text{and} \quad \bar{c} - h(\bar{y}) + b(\bar{g}) + B(G) + a \]
  - $(c, \bar{c})$: consumption in regions P and R
  - $(y, \bar{y})$: outputs endogenously supplied
  - $(g, \bar{g})$: regional public goods
  - $G$: national public good provided by federal government
  - $h(\cdot)$: disutility of supplying output
Production

- Production per person in regions P and R:
  \[ y + x + z \text{ and } \bar{y} + \bar{x} + \bar{z} \]
  - \( x, \bar{x} \): exogenous fixed components
  - \( z, \bar{z} \): exogenous stochastic components, where \( z, \bar{z} \in \{\varepsilon, -\varepsilon\} \)

- Each region can have a good shock \( \varepsilon \), denoted \( h \), or a bad shock \(-\varepsilon\), denoted \( \ell \)

- Four states of nature \( k \in \{hh, \ell\ell, h\ell, \ell h\} \)

- Probabilities of each state denoted \( p^k \)

- Assume that \( \bar{x} + \bar{z}^k > x + z^k \) in all states of nature

- Taxes and transfers:
  - Regional tax rates on production in state \( k \): \( t^k \) and \( \bar{t}^k \)
  - Federal tax rate: \( T^k \)
  - Federal transfers to regional governments: \( S^k \) and \( \bar{S}^k \)
Household Behavior

Household production decision in state $k$, $y^k$, solves:

$$\max_{\{c^k, y^k\}} c^k - h(y^k) \quad \text{st} \quad c^k = (1 - t^k - T^k)(y^k + x + z^k)$$

$\implies$ Output supply function: $y^k(1 - t^k - T^k)$

$\implies$ Value function: $v(t^k + T^k, x + z^k)$

Similarly for region R: $v(t^*k + T^k, x^* + z^k)$

Migration equilibrium condition in state $k$:

$$v(t^k + T^k, x + z^k) + b(g) + 1 - a^k = v(t^*k + T^k, x^* + z^k) + b(\bar{g}) + a^k$$

$\implies$ Populations in regions P and R are, respectively: $a^k$ and $1 - a^k$
The Second-Best Optimum

A planner chooses \((g, \bar{g}, G, \tau^k, \bar{\tau}^k)\) to maximize \(\sum E[v^k]:\)

\[
\sum_k p^k \left[ a^k \left( v(\tau^k, x + z^k) + b(g) + B(G) \right) + a^k - \int_0^{a^k} n^k dn^k \\
+ (1 - a^k) \left( v(\bar{\tau}^k, \bar{x} + \bar{z}^k) + b(\bar{g}) + B(G) \right) + \int_{a^k}^1 n^k dn^k \right]
\]

subject to migration equilibrium condition:

\[
v(\tau^k, x + z^k) + b(g) + 1 - a^k = v(\bar{\tau}^k, \bar{x} + \bar{z}^k) + b(\bar{g}) + a^k (\Phi^k)
\]

and national budget constraint:

\[
a^k \tau^k \cdot \left( y^k (1 - \tau^k) + x + z^k \right) + (1 - a^k) \bar{\tau}^k \cdot \left( \bar{y}^k (1 - \bar{\tau}^k) + \bar{x} + \bar{z}^k \right) = G + g + \bar{g} \\
\]

(\Lambda^k)
In absence of migration constraint, optimal allocation of population would satisfy:

\[ v(\tau^k, x + z^k) + b(g) + 1 - a^k - v(\bar{\tau}^k, \bar{x} + \bar{z}^k) - b(\bar{g}) - a^k = \Lambda^k(tr^k - \bar{tr}^k) \]

where \( tr^k \) and \( \bar{tr}^k \) are per capita tax revenues

Since \( \bar{tr}^k > tr^k \), the optimal population allocation is such that

\[ v(\tau^k, x + z^k) + b(g) + 1 - a^k > v(\bar{\tau}^k, \bar{x} + \bar{z}^k) + b(\bar{g}) + a^k \]

\( \Rightarrow \) Violates the migration equilibrium condition

\( \Rightarrow \) Migration decisions imply too little population in region R

**Interpretation:** Additional tax revenue generated by a new migrant is a fiscal externality

\( \Rightarrow \) Since net revenue benefit of migration to R is positive, should move persons such that utility in R is sufficiently lower than in P
Optimal Provision of Public Goods

Optimal provision of $G$ satisfies: $B'(G) = \sum p^k \Lambda^k$

$\implies$ Quasi-Samuelson condition

$\implies$ Aggregate marginal benefit set equal to expected MCPF

Optimal provision of $g$ and $\overline{g}$ satisfies:

$$\sum p^k (a^k + \Phi^k) b'(g) = \sum p^k (1 - a^k - \Phi^k) b'(\overline{g}) = \sum p^k \Lambda^k$$

- Quasi-Samuelson conditions would apply if migration constraint not binding ($\Phi^k = 0$)
- Since $\Phi^k < 0$, $g$ under-provided and $\overline{g}$ over-provided

**Intuition:** Distortions in $g$ and $\overline{g}$ induce more migration to R
Optimal Allocation of Taxes

Optimal tax rates, $\tau^k$ and $\overline{\tau}^k$, satisfy:

$$\Lambda^k = 1 + \frac{\Phi^k}{a^k} \frac{y^k + x + z^k}{y^k + x + z^k - \tau^k y^k'} = 1 - \frac{\Phi^k}{1 - a^k} \frac{y^k + x + z^k}{y^k + x + z^k - \tau^k y^k'}$$

where $\frac{y^k + x + z^k}{y^k + x + z^k - \tau^k y^k'}$ is the MCPF in state $k$

With migration constraint binding ($\Phi^k < 0$), taxes are such that:

$$\text{MCPF}^k > \Lambda^k > \overline{\text{MCPF}}^k$$

$\Rightarrow \tau^k$ higher and $\overline{\tau}^k$ lower than without migration constraint

$\Rightarrow$ Induces more migration to R to offset the tax externality

Without migration, MCPF$\text{s}$ equalized between regions
Optimal Fiscal Gap

- **Optimal fiscal gap**: Transfers to regions \((S^k, \bar{S}^k)\) required to implement the planning optimum under cooperative decentralization.

- Optimal fiscal gap is indeterminate
  - Relative size of transfers is determinate, but not absolute level.

- Assume smallest non-negative transfers are used: In benchmark case, \(S^k > 0, \bar{S}^k = 0\) for all \(k\).

**Note**: In more general case with \(n\) regions, optimal fiscal gap positive for all regions except one with highest tax base.
Impact of Migration on Optimal Fiscal Gap

- Start with no-migration case where $x = \bar{x}$, $a^k = 1/2$, $g = \bar{g}$
- In the planning optimum, $MCPF^k = \bar{MCPF}^k \implies$ Positive transfer to low-shock region equal to fiscal gap
- With mobility: migration could go either way – high-shock region has higher exogenous income but also higher tax rate
- Suppose migration goes to high-shock region

Four effects on optimal fiscal gap:

1. Tax revenues fall in the low-shock region $\implies S^k \uparrow$
2. Migration increases national aggregate tax base: can reduce tax rates and MCPF in both regions $\implies S^k \uparrow$
3. Reduced MCPFs induces $g, \bar{g} \uparrow$: $\implies S^k \uparrow$
4. Planner moves away from equalizing MCPF: increase tax rate in low-shock region to encourage migration $\implies S^k \downarrow$

*First three reasonably dominate: migration increases fiscal gap*
Non-Cooperative Outcome with Federal Commitment

Timing of Decisions:
1. The federal government chooses $G, S^k, \bar{S}^k, T^k$
2. The regions simultaneously choose $g, \bar{g}$
3. Nature chooses shocks $z^k, \bar{z}^k$
4. The regions choose $t^k, \bar{t}^k$ to balance their budgets
5. Households choose their region of residence
6. Households in each region choose outputs $y^k, \bar{y}^k$

- Assume federal government can commit to its policies announced in Stage 1 before the regions choose $(g, \bar{g})$
- Characterize subgame perfect equilibrium
Regional Government Policies

Regions maximize the sum of their residents’ expected utility subject to budget constraint and anticipating migration decisions

- Vertical fiscal externality tends to induce rich region to over-provide public good
- For poor region, vertical externality is nullified by anticipated federal transfer
- In more general case, all regions face net vertical externality

- Migration generates horizontal fiscal externalities
  - New migrants contribute to the financing of public goods
  - Regional governments have incentives to attract migrants
  - Tend to set relatively low tax rates

Either vertical or horizontal externality could dominate
Federal Government Policy

Without mobility:

- To mitigate vertical externality, federal government reduces tax rate below second-best optimal value
- Requires reducing transfer to poor region negative fiscal imbalance
- MCPF higher in poor region than in rich region
- Public goods provision:
  - Negative imbalance lead to under-provision of $g$ in poor region
  - Vertical fiscal externality lead to over-provision in rich region
  - $G$ set such that marginal benefit equals expected MCPF in poor region
    - Intuition: alternative use of federal revenues is transfer to poor region
    - Federal public good under-provided
Federal Government Policy, cont’d

With mobility:
- Migration introduces horizontal fiscal externalities
- Tends to mitigate vertical fiscal imbalance
  - Mobility increases MCPF perceived by regions
  - Tends to lower public good provision
  - Partly offsets vertical externalities
  - Allows federal government to increase transfers to poor region
- If horizontal externalities are strong enough, negative imbalance might disappear, although optimal fiscal gap also larger (but, second-best optimum not achieved)
Non-Cooperative Outcome with No Commitment

Assume that federal government cannot commit to taxes and transfers before regions choose expenditures

**Tax and transfer policy of federal government:**

- $(g, \bar{g})$ fixed $\Rightarrow$ optimal for federal government to set transfer to equalize MCPF across regions ex post

**Regional policies:**

- Regional governments anticipate federal policy
- Incentive to over-spend by all regions
  - Poor region wants to attract larger transfer
  - Rich region increases spending to reduce transfer to poor region
Inability to Commit and Fiscal Imbalance

- Equalizing MCPF ex post requires larger transfer than in second-best optimum
- Positive fiscal imbalance

Impact of labor mobility:
- Horizontal externalities increase perceived MCPF
- Lowers regional spending
- Reduces the size of the fiscal imbalance
Conclusions and Extensions

- Mobility enhances the case for centralized revenue-raising in a federation

- Mobility mitigates the fiscal imbalances arising from asymmetric shocks or ex ante asymmetry

- Extensions
  - Soft-budget constraints
  - Migration decisions made before government policies are chosen
  - Fiscal equity motive for federal transfers