

# Unemployment, Fiscal Competition, and the Composition of Public Expenditure

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1

## Introduction: Background

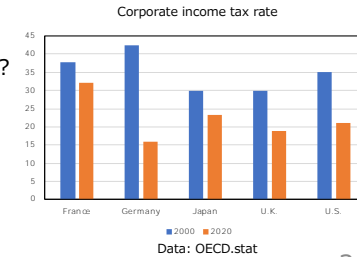
- Empirical studies
  - Tax competition (in corporate tax/property tax)  
Brueckner and Saavedra(2001), Devereux et al. (2008)
  - Expenditure competition (in public inputs)  
Bénassy-Quéré et al. (2007), Hauptmeier et al. (2012)

3

## Introduction: Background

➤ Tax and expenditure competition (OECD 2017, 2020)

- Widely observed
- Why do governments compete?
  1. Attracting capital
  2. Creating employment



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## Introduction: Background

- Theoretical studies under perfect labor market
  - Zodrow and Mieszkowski (1986) (ZM model), Wilson (1986)

### Results:

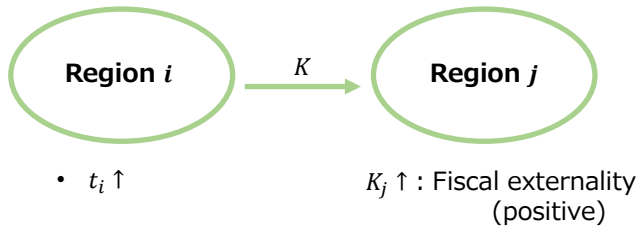
1. Zero capital tax rate with lump-sum tax
2. Under-provision of public goods/public inputs without lump-sum tax
3. Fiscal externality

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## Zodrow and Mieszkowski (1986)



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## Introduction: Background

- Theoretical studies under perfect labor market (cont.)
  - Keen and Marchand (1997) (KM model), Matsumoto (2000)

**Aims:** Examining efficiency in

1. Expenditure levels of public goods and inputs
2. Their expenditure composition

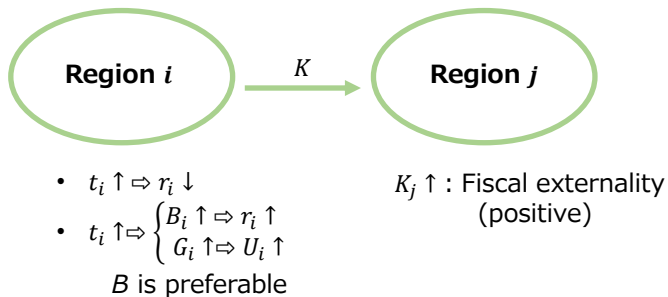
**Results:**

1. Under-provision of public goods and inputs
2. Excess expenditure for public inputs

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## Keen and Marchand (1997)



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## Introduction: Background

- Theoretical studies under imperfect labor market
  - Ogawa et al. (2006) (OST), Sato (2009), Eichner and Upmann (2012) (EUP)
  - Aronsson and Wehke (2008) (AW), Gillet and Pauser (2018) (GP)

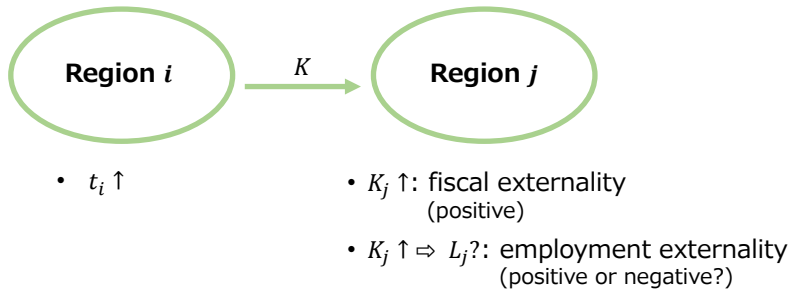
➤ Evidence of the effects of corporate taxes on unemployment

- Feld and Kirchgassner (2002), Harden and Hoyt (2003), Bettendorf et al. (2009), Felix (2009), Zirculis and Šarapovas (2017)
- Feldmann (2011)

8

8

## Ogawa et al. (2006)



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9

## Introduction: Research question

### ➤ Research motivation and question

- Public inputs are used for attracting capital and creating employment (Bénassy-Quéré et al. 2007; Hauptmeier et al. 2012; OECD 2017, 2020)
- Are public inputs really underprovided?

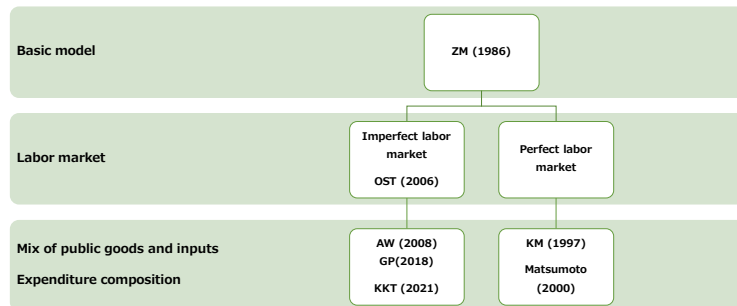
### ➤ To address this

- Incorporating labor market imperfection
- Examining expenditure levels of public goods and inputs
- Examining public expenditure composition

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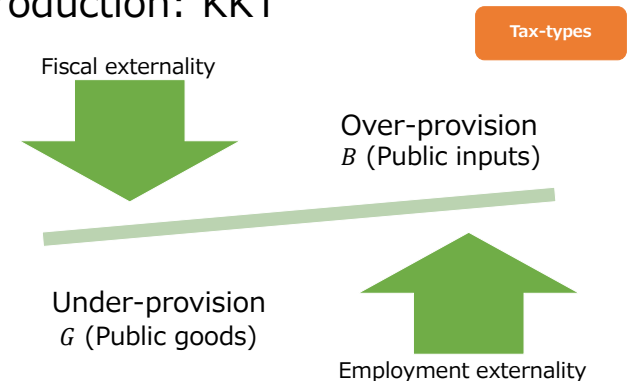
## Introduction: KM-M and KKT



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11

## Introduction: KKT



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## Model: Basic settings

➤Based on KM and OST

- $N$  regions
- Two consumption goods:  $X_i$  (private goods) and  $G_i$  (public goods)
- CRS production function in private inputs:  $F(K_i, L_i, Z_i, B_i)$
- Capital input:  $K_i$  (mobile), Labor input:  $L_i$  (immobile),  $Z_i$ : land input (immobile, normalized to unity), Public input:  $B_i$
- Fixed wage rate:  $\bar{w}$
- Fixed (total) capital stock:  $\bar{K}$
- Capital market:  $\sum_{i=1}^N K_i = \bar{K}$

13

13

## Model: Basic settings

➤Based on KM and OST (cont.)

- Utility function:  $U_i(X_i, G_i) = X_i + v(G_i)$ , where  $v'(G_i) > 0$ ,  $v''(G_i) < 0$ ,  $v'(0) = \infty$ ,  $v'(\infty) = 0$ .
- Capital tax:  $t_i$
- Labor tax:  $\tau_i$
- Lump-sum tax:  $h_i$
- Government's budget equation:  $t_i K_i + \tau_i L_i + h_i = G_i + B_i$

14

14

## Factor demands

➤Factor demand functions:

$$K_i = K(t_i, \tau_i, B_i), L_i = L(t_i, \tau_i, B_i)$$

➤Comparative statics:

	$t_i \uparrow$	$\tau_i \uparrow$	$B_i \uparrow$
$K_i$	-	-	+
$L_i$	-	-	+

15

15

## Criteria

➤First-best policy

$$v'(G) = 1, F_B = 1.$$

➤Second-best policy (constrained by fixed wage)

$$v'(G) = 1, F_B = 1 - \Omega < 1, \Omega \equiv F_L \frac{dL^*(B)}{dB} > 0.$$

16

16

## Equilibrium policy

➤ Government's optimization problem:

$$\max_{\mathbf{p}} [L \cdot U^e(C^e, G) + (1-L) \cdot U^u(C^u, G)]$$

$\mathbf{p}$ : vector of available policy instruments

	Capital tax	Labor tax	Lump-sum tax	All taxes
Capital tax	$t_i$	$t_i, \tau_i$	$t_i, h_i$	---
Labor tax	---	$\tau_i$	$\tau_i, h_i$	---
Lump-sum tax	---	---	$h_i$	---
All taxes	---	---	---	$t_i, \tau_i, h_i$

17

17

## Capital and lump-sum taxes

➤ Equilibrium policy:

$$t < 0, v'(G) = 1, F_B = 1 - \Omega < 1, tK + h = G + B > 0.$$

➤ **Result 1** (as a benchmark):

- Capital must **be subsidized** (OST, GP).
- Public goods are **efficiently provided** in the SB sense (OST).
- Public inputs are **efficiently provided in the SB sense** (GP).
- **Efficient** expenditure composition

18

18

## Capital and lump-sum taxes

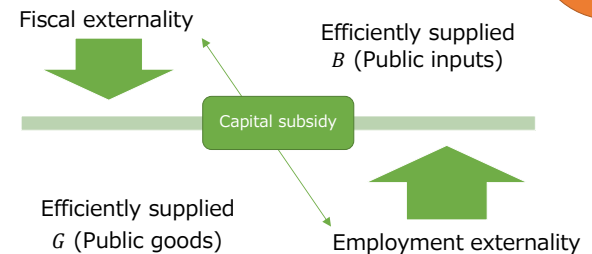
➤ **Interpretation of Result 1**

- For attracting capital, negative tax rate on capital is preferable if the government has other non-distortionary tax instrument.
- Negative capital tax rate perfectly removes fiscal externality and employment externality for supplying public goods (Pigouvian tax sense).
- Under fixed wage, (net) marginal product of public inputs must be maximized incorporating its employment-stimulus effect.
- In the constrained circumstance, expenditure levels are optimal. There is no need for changing expenditure composition.

19

19

## Capital and lump-sum taxes



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## Capital tax

➤Equilibrium policy:

$$F_B = v'(G) \left[ 1 - t \frac{\partial K}{\partial B} \right] - \bar{w} \frac{\partial L}{\partial B} \stackrel{\geq}{\leq} 1 \Leftrightarrow v'(G) \stackrel{\geq}{\leq} \frac{1 + \bar{w} \frac{\partial L}{\partial B}}{1 - t \frac{\partial K}{\partial B}},$$

$$v'(G) > 1,$$

$$tK = G + B > 0.$$

21

21

## Capital tax

➤Result 2:

- Public goods are **inefficiently underprovided** in the SB sense (ZM, KM, OST).
- Public inputs are **oversupplied/undersupplied** in the SB sense (depending on marginal cost of funding public goods, employment-stimulus effect, and fund-raising effect)
- **Excess** expenditure for **public inputs**

22

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## Capital tax

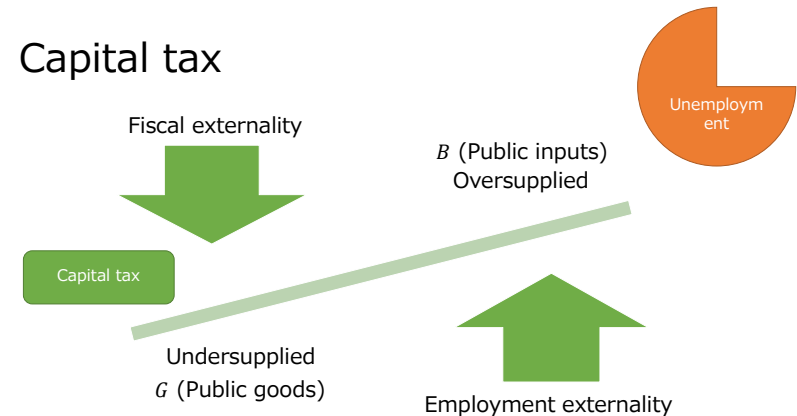
➤Interpretation of Result 2

- For attracting capital, capital tax rate is set to inefficiently low level.
- Public inputs increases the marginal productivity of capital and labor. It increases capital inflow (tax revenue) and the amount of employment.
- Given that public goods are non-productive and public inputs have employment-stimulus and fund-raising effects, expenditure for public inputs exceeds its optimal level.

23

23

## Capital tax



24

24

# All tax instruments

➤Equilibrium policy:  
 $t < 0, \tau < 0, v'(G) = 1, F_B = 1 - \Omega^* < 1.$

- Result 3:**
- Public goods are **efficiently provided** in the FB sense (e.g., ZM, KM).
  - Public inputs are **oversupplied** in the FB sense (contrasted with EUP and GP).
  - **Excess** expenditure for **public inputs**

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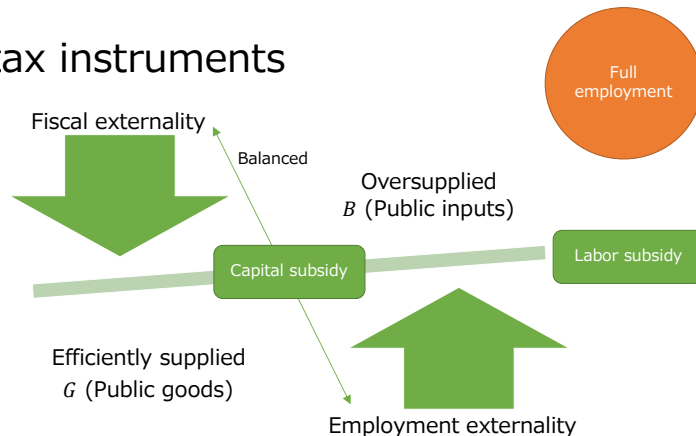
# All tax instruments

- Interpretation of Result 3**
- Capital subsidy removes fiscal and labor externalities by the mechanism explained already.
  - Labor subsidy stimulates employment and removes unemployment.
  - Public inputs increases the marginal productivity of capital and labor. It increases capital inflow (tax revenue) and the amount of employment.
  - Given that public goods are non-productive and public inputs have employment-stimulus and fund-raising effects, expenditure for public inputs exceeds its optimal level.

26

26

# All tax instruments



27

27

# Conclusions: Research question

- Research motivation and question**
- Public inputs are used for attracting capital and creating employment (Bénassy-Quéré et al. 2007; Hauptmeier et al. 2012; OECD 2017, 2020)
  - Are public inputs really underprovided?
- To address this
- Incorporating labor market imperfection
  - Examining expenditure levels of public goods and inputs
  - Examining public expenditure composition

28

28

## Conclusions: Comparison

- Comparison with previous studies
  - **Keen and Marchand (1997):** Undersupply of public goods and inputs, excess expenditure for public inputs
  - **Eichner and Upmann (2012), Gillet and Pauser (2018):** Efficient provision of public inputs with labor tax
  
- Contribution of our paper
  - **Overprovision/underprovision of public inputs**
  - Excess expenditure for public inputs
  - **Labor tax might generate other inefficiency** for providing public inputs

29

29