

Regional and Local Public Economics

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I thank Dirk Foremny, Zelda Brutti, and Candan Erdemli for useful materials compiled in previous years.

Spring 2024

Recap: Roadmap of the Course

I. Theory

1. **Income** Decentralization: taxation (8 lectures) with Andreu
 2. Government Levels and Functions & **Expenditure** Decentralization (4 lectures)
 3. **Provision of Public Goods** & Intergovernmental Grants (3 lectures)
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II. Cases and Policies

4. International **Comparison** (Spain **vs** Canada, China, Germany, US, etc.; 5 lectures)
 5. Application: **Policy** Analysis (education, health, transportation, development, etc.; 5 lectures)
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III. International Fiscal Federalism (1 lecture) with Andreu

Intergovernmental Grants

Lecture 1 Definition and functions of grants

April 4, 2024

Reading for this lecture: **Chapter 9**: “Intergovernmental grants?”

State and Local Public Finance, by Ronald C. Fisher

From Expenditure Decentralization to Intergovernmental Grants

- Last Unit: Local government's responsibilities: Optimal size for public goods/services provision
- Gaps!
 - Local govt revenue vs expenditure
 - Regional inequality

Basics of the Unit: Intergovernmental Grants

Three lectures on “**Inter-governmental Grants**”, discussing the following topics:

1. Introduction to Inter-governmental grants
2. Analysis of Economic Consequences of Inter-governmental Grants
3. (TBC) equalizing grants

Today's Agenda

1. Stylized Facts and Motivation: Why grants?
2. Basic Framework: How to conceptualize grants?

Types, Characteristics

What are intergovernmental grants?

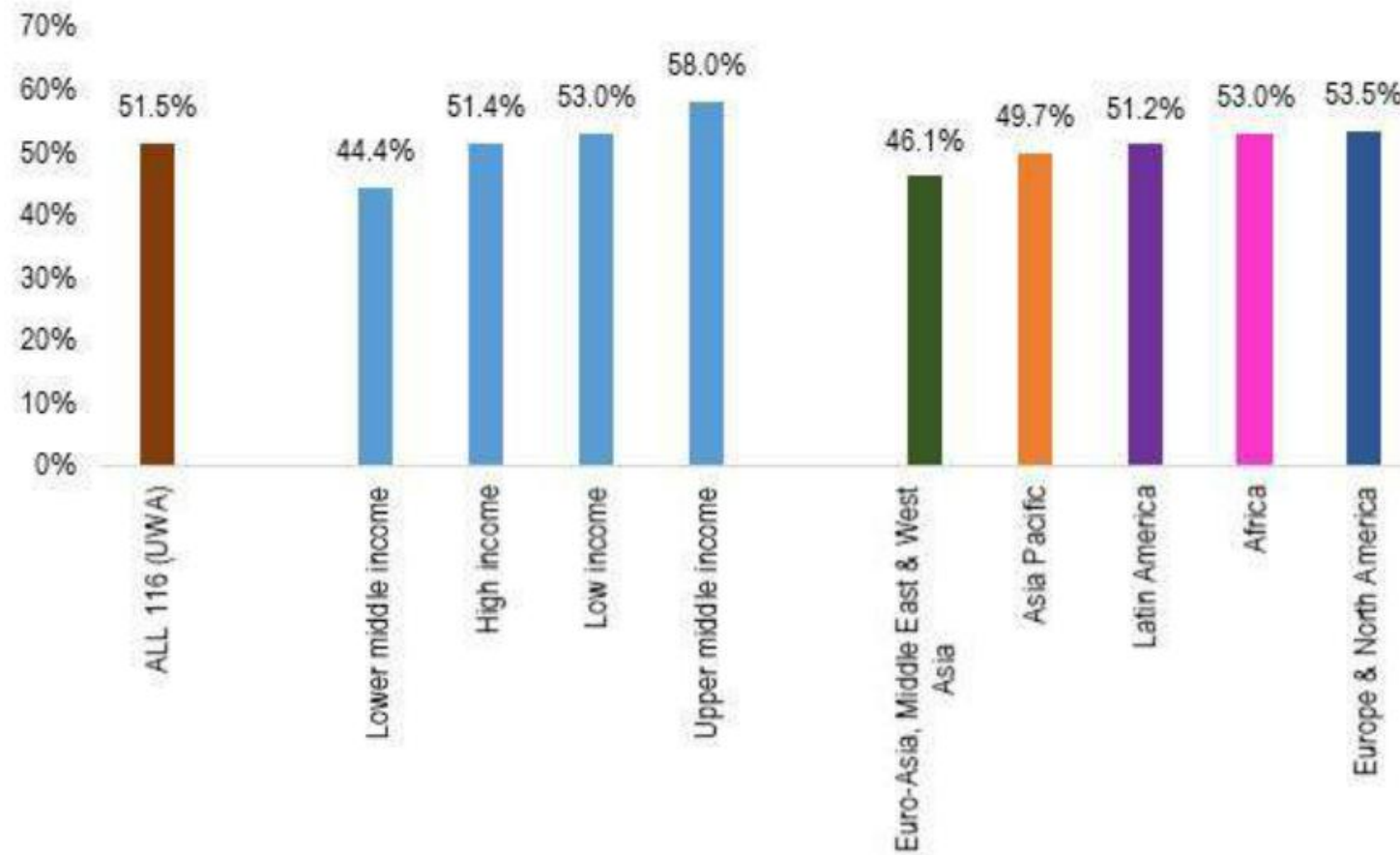
Definition

Transfers of funds from one government to another, *most often* from a higher-level government to lower-level ones

- not only in federal states but also in non-federal countries with multiple levels of governments

Part 1 Motivation: HALF of SNG income!

Grants and subsidies as a share of SNG revenue by income group and world region (2020)

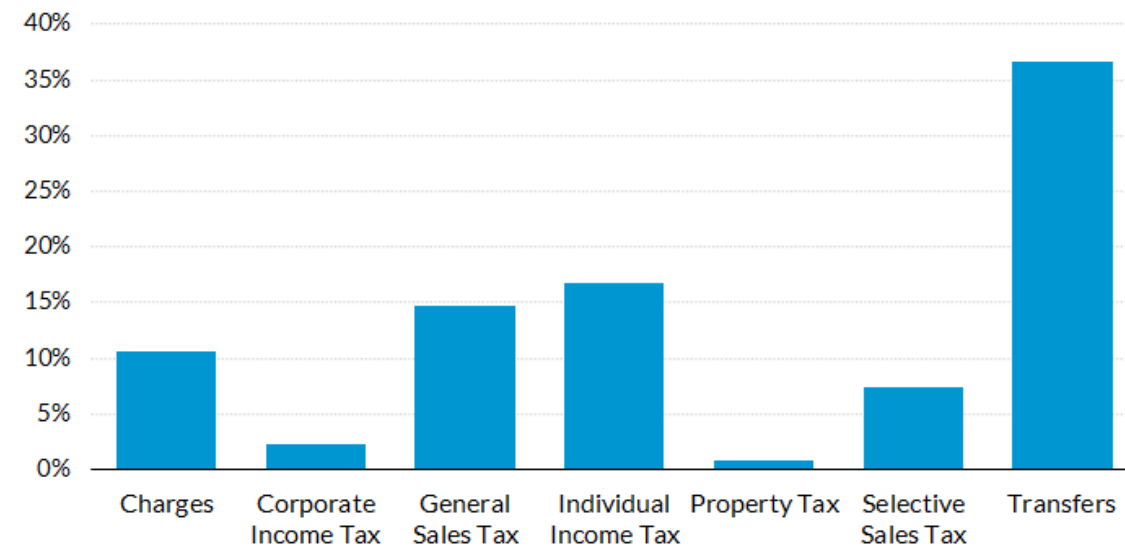


Source: OECD (2022), *2022 Synthesis Report World Observatory on Subnational Government Finance and Investment*, OECD Publishing, Paris, <https://doi.org/10.1787/b80a8cdb-en>.

The Case of the US

Sources of State General Revenue

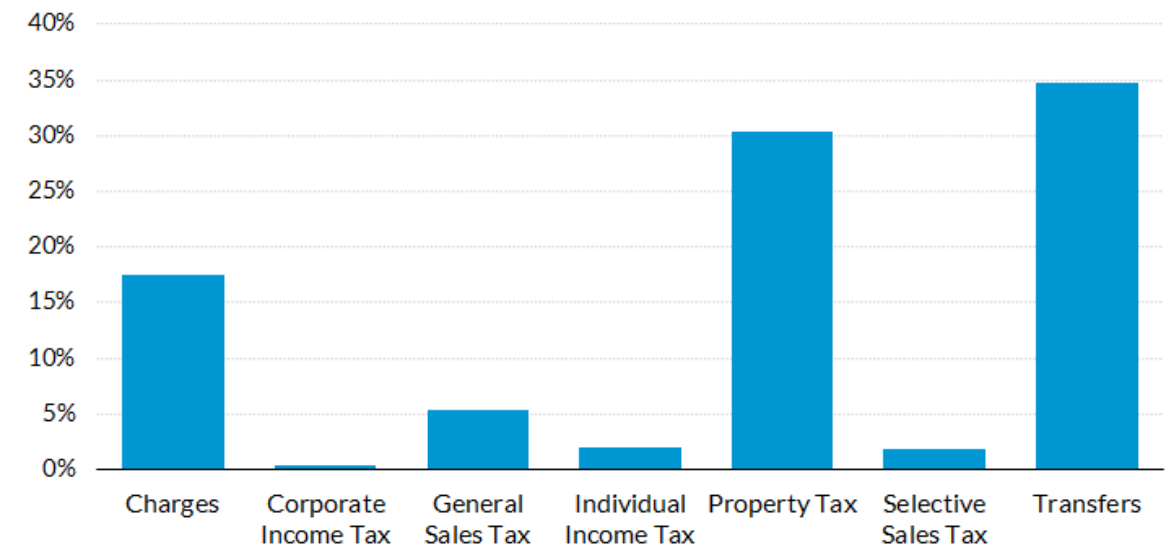
Share of total state general revenues, by source, 2020



Source: US Census Bureau Annual Survey of State and Local Government Finances, 1977-2020 (compiled by the Urban Institute via State and Local Finance Data: Exploring the Census of Governments; accessed 30-Sep-2022 06:07), <https://state-local-finance-data.taxpolicycenter.org>.
URBAN INSTITUTE

Sources of Local General Revenue

Share of total local general revenues, by source, 2020



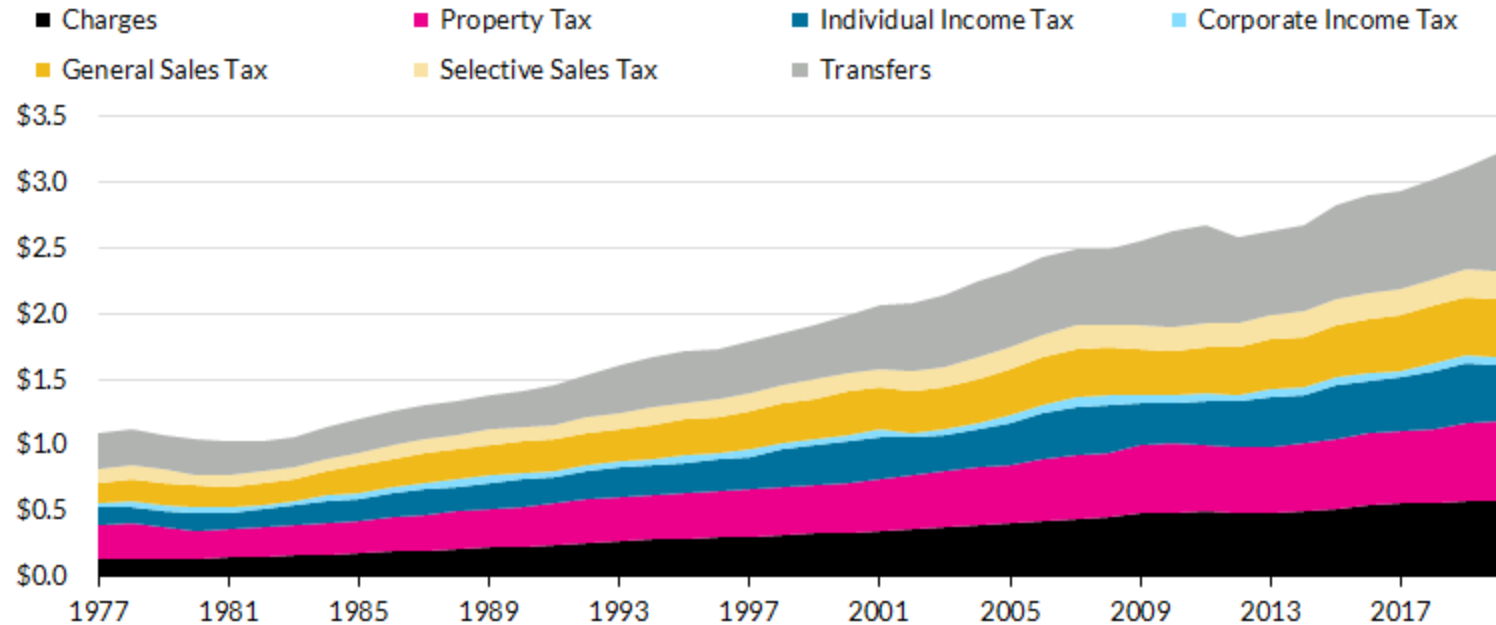
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URBAN INSTITUTE

Source: State and Local Backgrounders, Urban Institute (2022)

The Case of the US

Sources of State and Local General Revenue

Trillions of real 2020 dollars, by source, 1977–2020



Source: US Census Bureau Annual Survey of State and Local Government Finances, 1977–2020 (compiled by the Urban Institute via State and Local Finance Data: Exploring the Census of Governments; accessed 30-Sep-2022 06:07), <https://state-local-finance-data.taxpolicycenter.org>

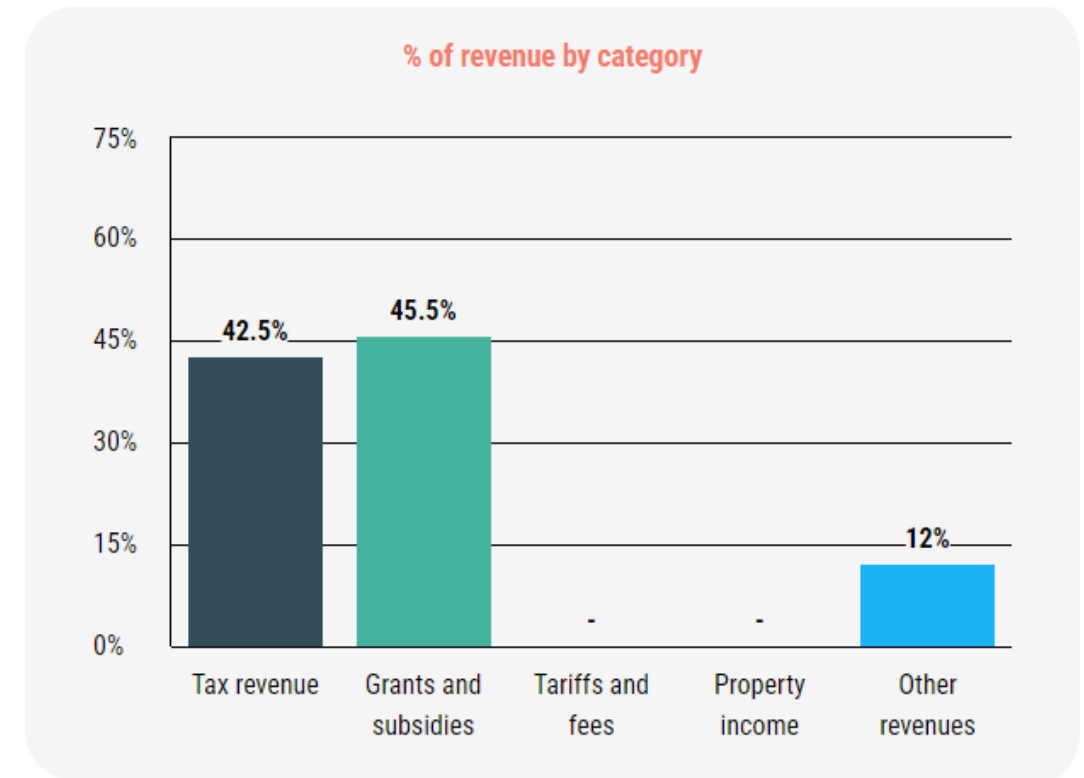
URBAN INSTITUTE

Source: *State and Local Backgrounders*, Urban Institute

The Case of China

■ SUBNATIONAL GOVERNMENT REVENUE BY CATEGORY

2020	DOLLARS PPP / INHABITANT	% GDP	% GENERAL GOVERNMENT	% SUBNATIONAL GOVERNMENT
Total revenue	3 386	19.7%	79.4%	100.0%
Tax revenue	1 438	8.4%	50.9%	42.5%
Grants and subsidies	1 541	9.0%	-	45.5%
Tariffs and fees	0	0.0%	-	0.0%
Income from assets	0	0.0%	-	0.0%
Other revenues	408	2.4%	-	12.0%

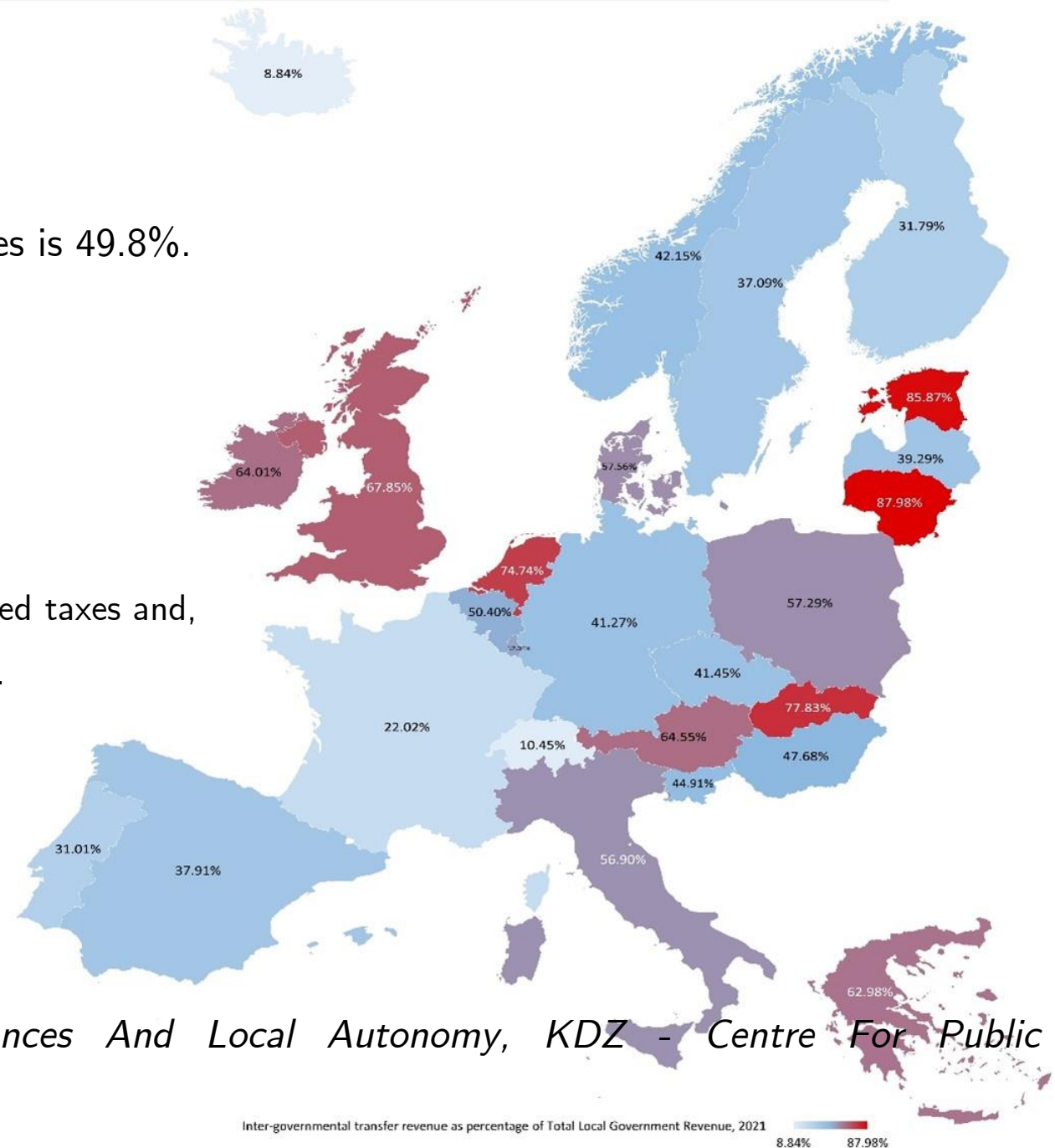


Source: OECD (2020), SNG-WOFI Database

Europe:

The average for the OECD-European countries is 49.8%.

* Intergovernmental transfers can also include shared taxes and, in some countries (e.g. Italy), regional budgets too.



Source: European Local Government Finances And Local Autonomy, KDZ - Centre For Public Administration Research, 2022

Some additional data to check if interested

“OECD Fiscal Decentralisation Database”: [Inter-governmental transfer revenue as percentage of total revenue for each level of government](#)

Purposes of grants

According to economic theory:

1. **Vertical** imbalances

1. Close vertical fiscal **gaps** (VFG)

2. **Horizontal** imbalances

1. Macroeconomic **stabilization**
2. Explicit **redistribution** of resources among regions or localities
 - “Equalization grants”
3. Improve the **efficiency** of fiscal decisions of sub-national governments
 - e.g., correcting for externalities

Purpose 1 VFG

Fiscal Gap: the difference between revenue means and expenditure needs

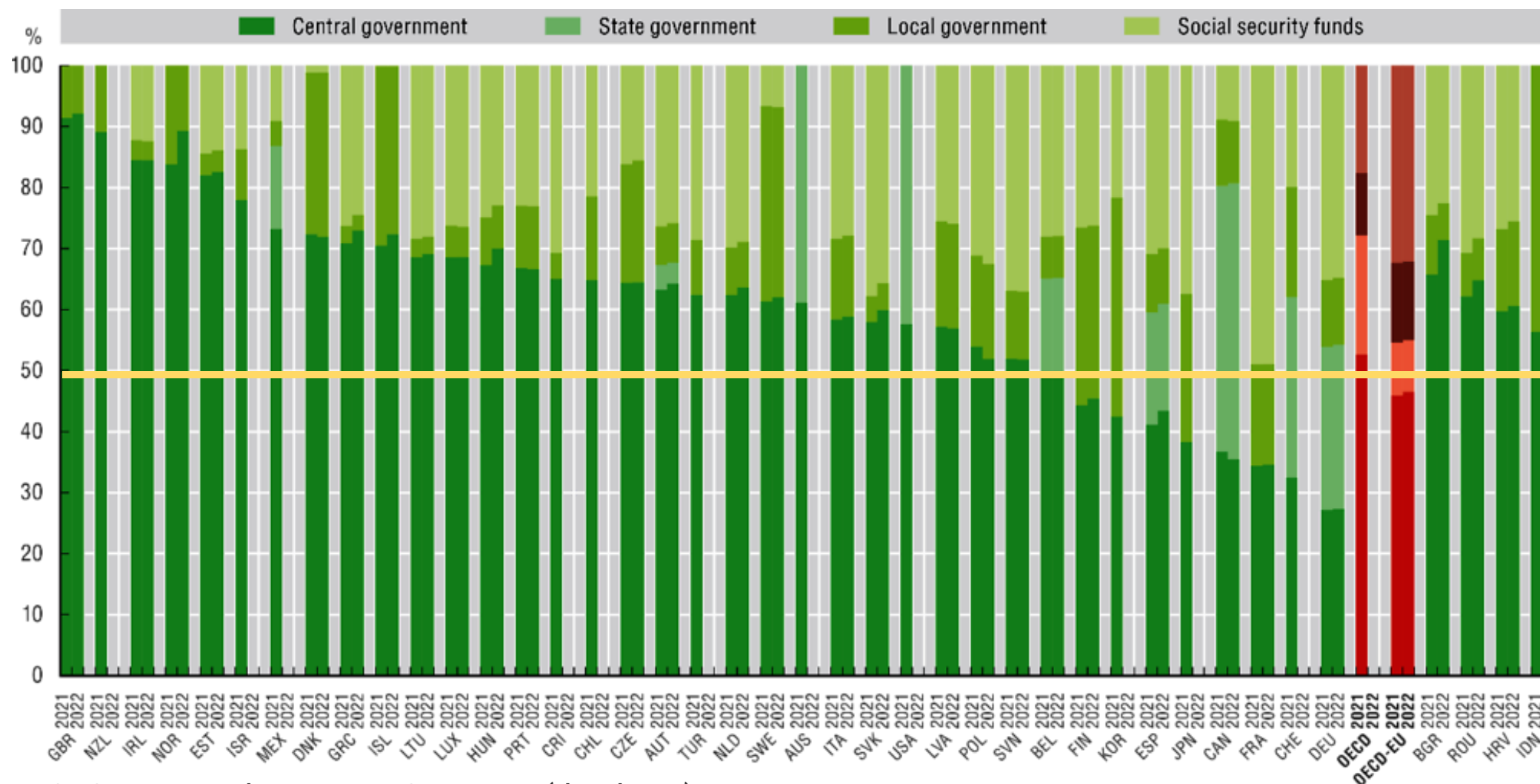
- Central government (+) raises more revenue than needed
 - redistribute the excess to support SNG (-).

The existence of a VFG:

1. Easier and more efficient to decentralize expenditures than taxes
2. Necessary for the central govt to transfer funds to SNGs to fulfill its responsibility for achieving efficiency and equity, and have some political control

Public Economic Structure by Level of Government: revenues

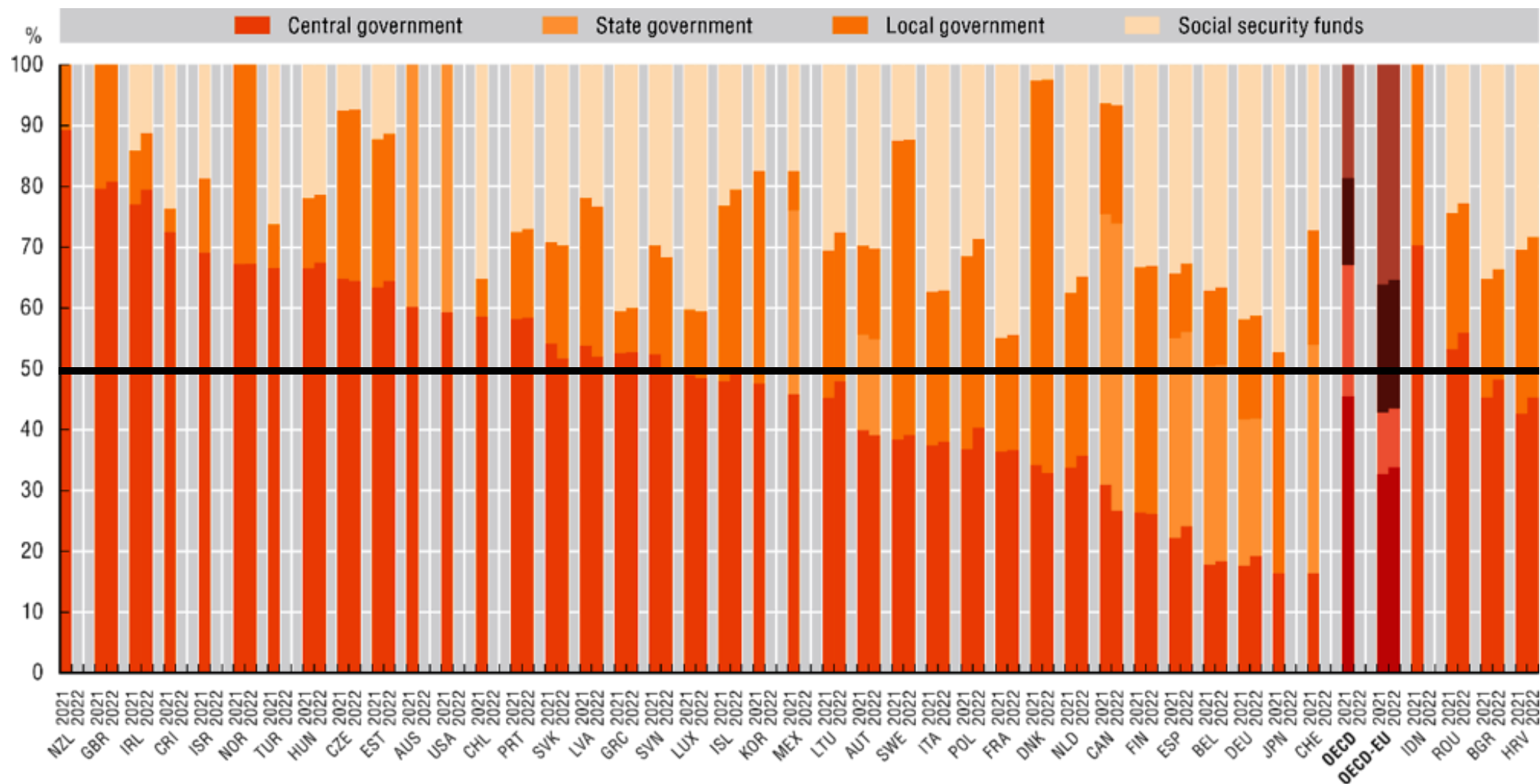
General Government Revenues across Levels of Government, 2021 and 2022



Source: OECD National Accounts Statistics (database).

Public Economic Structure by Level of Government: expenditure

General Government **Expenditure** across Levels of Government, 2021 and 2022



Source: OECD National Accounts Statistics (database).

Purpose 2-1 Macroeconomic Stabilization

Different regions may be affected by different shocks at different times, because

1) a country's economic structure is geographically heterogeneous

- e.g., more textile industry in one area, more tourism in the other

2) natural phenomena can influence local economies

- e.g., droughts, hurricanes, earthquakes

3) the country's demographic structure is geographically heterogeneous

- e.g., more youth in one area, more retirees in the other

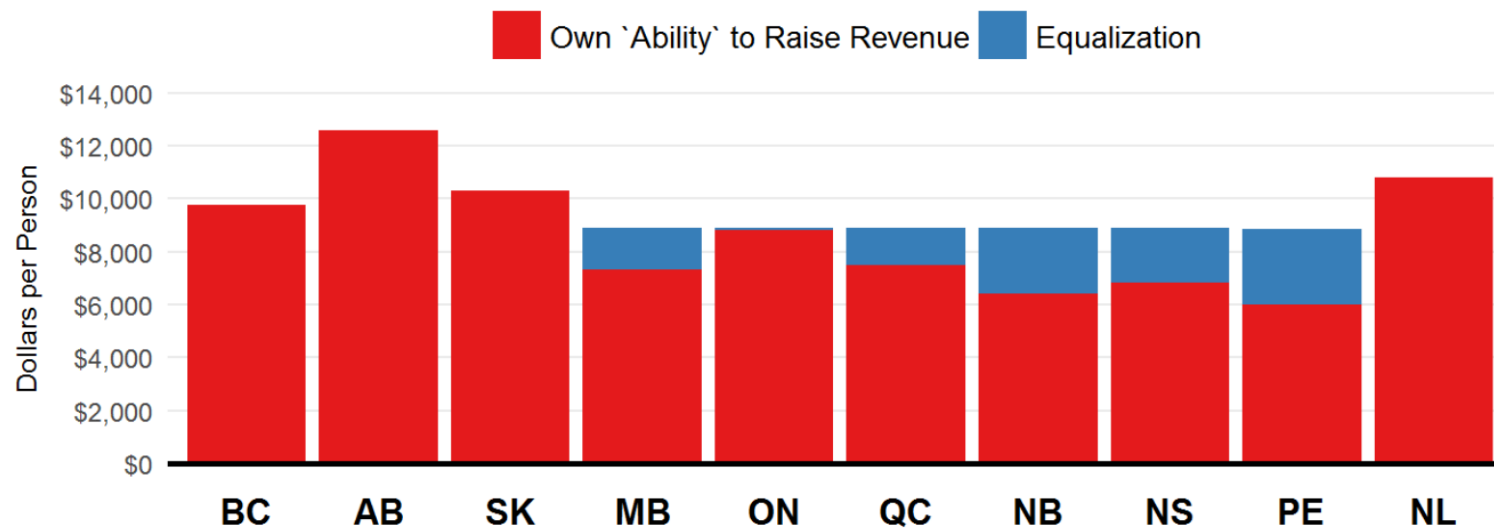
Purpose 2-2 Inter-regional redistribution

So-called “equalization grants”.

- How do we calculate a “fair” method to redistribute resources?
- Will those grants reach the desired objective of helping low-income residents?

Fiscal Capacity and Equalization, by Province (FY 2018-19)

Displays each province's own fiscal capacity, the equalization payment required to bring it up to an 'average' level, and the 'adjustment payment' to fix the pool of equalization paid. In 2018/19, adjustments totalled \$1.76b.



Source: Federal Equalization Workbooks, Table 1. Graph by @trevortombe

Purpose 2-3 Spillovers and mobility

- In the presence of inter-jurisdictional externalities/spillovers, decisions of individual sub-national governments can be inefficient
- Migration among communities may impose extra costs on residents

If nonresidents benefit from a good/service provided by a local government, but their benefits are not taken into account when deciding on the amount provided, **social marginal benefits are underestimated** and sub-optimally low quantity is decided for.

Part 2 Conceptualization

SO!

Grants are important.

BUT...

What are they, specifically speaking?

How do we design them?

Today's Agenda

1. Stylized Facts and Motivation: Why grants?

2. Basic Framework: How to conceptualize grants?

Types, Characteristics

Scenario 1: Too many Darios

Dario is a (fiscal) resident in Madrid but comes to Barcelona every summer for a break.

- He enjoys free health services here!! Barcelona is paying

A non-negligible number of “Dario”s—inducing inefficient fiscal decisions of both Madrid and Barcelona

- Can use inter-govt grants to “correct” for this

*In-class **News Reading** (English translation in handout):* <https://govern.cat/salaprensa/notes-premsa/135733/boi-ruiz-demana-ana-mato-fons-compensacio-territorial-financar-atencio-sanitaria-dels-pacients-procedents-altres-comunitats-autonomes>

How should we design a grant?

Categorical grants

- Conditions on use: **Categorical**/Activity-specific (e.g. education, health, environment...)
- Allocated based on
 - a formula (e.g. based on local wealth, resident counts, etc.)
 - a specific project (with an associated budget)
- Amount
 - Lump-sum
 - **Matching**: CG covering for xx% of the actual expenditure (either w/ or w/o an upper limit)

Scenario 2: COVID

COVID hits the country! SNGs are facing a large mismatch between rising costs and falling revenues.

“In addition to helping these governments address the revenue losses they have experienced as a result of the crisis, it will help them cover the costs incurred due to responding to the public health emergency and provide support for a recovery...”

“Intergovernmental transfers were relatively high in 2020 because of federal spending in response to the COVID-19 pandemic. In 2020 and 2021, Congress transferred a large amount of funds to state governments as part of the [CARES Act](#), the [Coronavirus Response and Relief Supplemental Appropriations Act](#) (part of the December 2020 omnibus bill), and the [American Rescue Plan](#). ”

The central government will give grants to help SNGs bridge the sudden gaps in all aspects.

How should we design such a grant, according to the criteria above?

Design your transfer to deal with COVID

In-class practice: **5-min independent** thoughts!

Topic: How should we design such a grant?

SNGs are facing a gap mismatch between rising costs and falling revenues due to COVID. The central government will give grants to help bridge the gaps in all aspects. How will you design such a grant, according to the criteria above?

- Within 5 minutes, describe your grant(s) in these dimensions.
- Please briefly justify for your grant design.

*To have a clear mind,
and know how to design a policy according a framework.*

Topic: How should we design such a grant?

SNGs are facing a gap mismatch between rising costs and falling revenues due to COVID. The central government will give grants to help bridge the gaps in all aspects. How will you design such a grant, according to the criteria above?

- Now **discuss** in groups of two or three.
- Compare and contrast your plan with your colleague's.

*To have a structured mind,
be able to compare and contrast different policy recommendations.*

Additional: From in-class discussion last time

Many of you agreed that the grant should only be spent on several important areas

- **block** grants—between general and specific grants
 - used to provide broad support in a some area(s) of expenditures (e.g. health, education)
 - recipients still decide on how to allocate the funds for this general purpose

What did they do?

- “In 2020 and 2021, Congress transferred a large amount of funds to state governments as part of the [CARES Act](#), the [Coronavirus Response and Relief Supplemental Appropriations Act](#) (part of the December 2020 omnibus bill), and the [American Rescue Plan](#). ”

The American Rescue Plan provides \$350 billion in emergency funding for state, local, territorial, and Tribal governments:

- \$195 billion for states, (a minimum of \$500 million for each State);
- \$130 billion for local governments (a minimum of \$1.25 billion per state is provided by the statute inclusive of the amounts allocated to local governments within the state);
- \$20 billion for tribal governments; and
- \$4.5 billion for territories

General grants

- Conditions on use: **General**/NOT activity-specific
- Allocated based on
 - a formula
- Amount
 - Lump-sum
 - **Revenue-sharing**: CG transferring $xx\%$ of some income to SNG

A side note: gaps between SNG revenue and expenditure are common in real life under specific revenue and expenditure responsibility sharing schemes a country adopts (not necessarily due to shocks like COVID.)

Summary: how to categorize grants

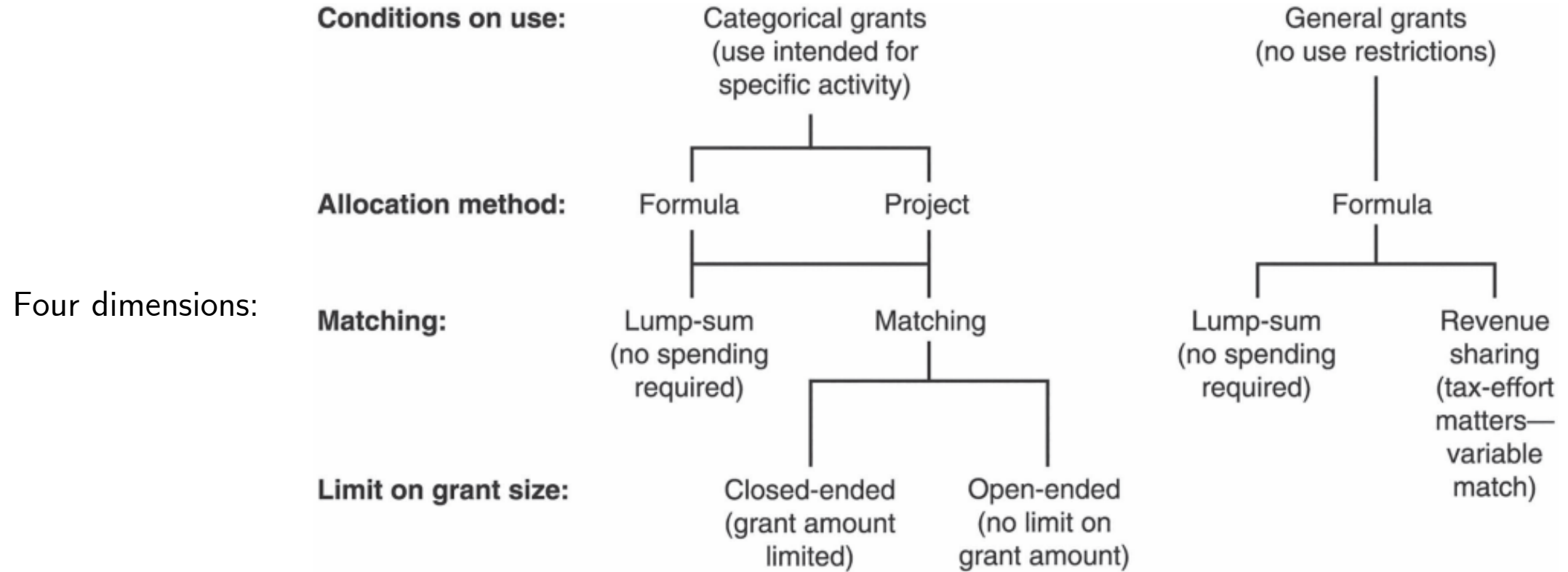


Figure 9.3 Types of intergovernmental grants

You can **categorize these grants differently**, according to the most important element in your analysis!

Takeaways today

1. A sense of how important transfers are
2. Important characteristics of grants & how to categorize them accordingly

Next Lecture

1. Some more details of different dimension of a grant
2. Analyze the effects of intergovernmental grants

Intergovernmental Grants

Lecture 2 Effects of grants: theory (1)

April 15, 2024

Reading for this lecture: **Chapter 9**: “Intergovernmental grants?”

State and Local Public Finance, by Ronald C. Fisher

Today's Agenda

1. Basic Framework: How to conceptualize grants?

Types; Characteristics

2. Theoretical Analysis: effects of grants

Setup; Theoretical predictions

Summary: how to categorize grants

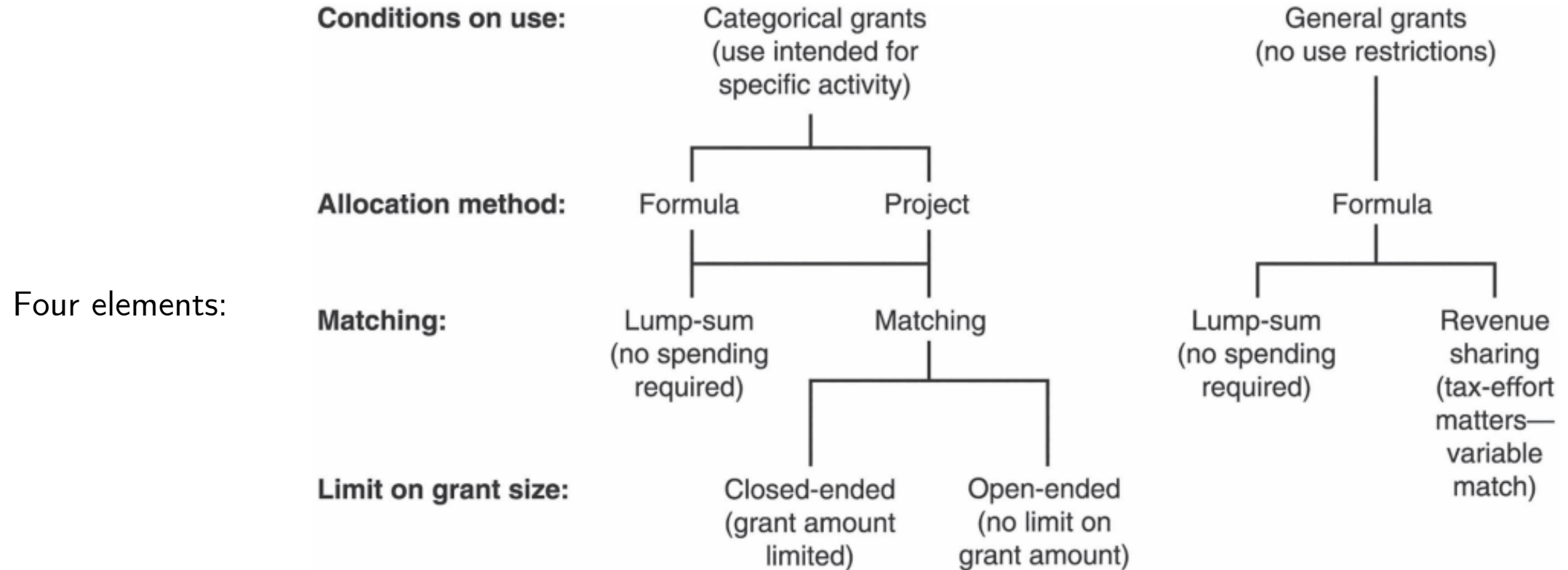


Figure 9.3 Types of intergovernmental grants

You can **categorize these grants differently**, according to the most important element in your analysis!

Matching & Revenue-sharing grants

- Both reflect “shared responsibility”.
- R = matching rate (or sharing rate)—1 euro spent or collected by the receiving government is “matched” with R euro grant money.
- M = share of spending financed by the grant:

$$M = R / (1 + R)$$

- Reduce marginal price (cost) of local goods/services for the recipient government

$$P = 1 - M = \frac{1}{1 + R}$$

Economic Thinking: How to analyze the effect of grants?

1. Effects on what? OR, what are the axes?

2. How to reflect the change?

Equilibrium → Comparative Statics (*ceteris paribus*)

1. Framework: Back to consumer theory

Commodity Set: choosing between governmentally provided good G and a composite good X

- **Budget Constraint AF** (slope representing this individual's tax price on G)
- **Indifference Curves**

Equilibrium: (X_0, G_0)

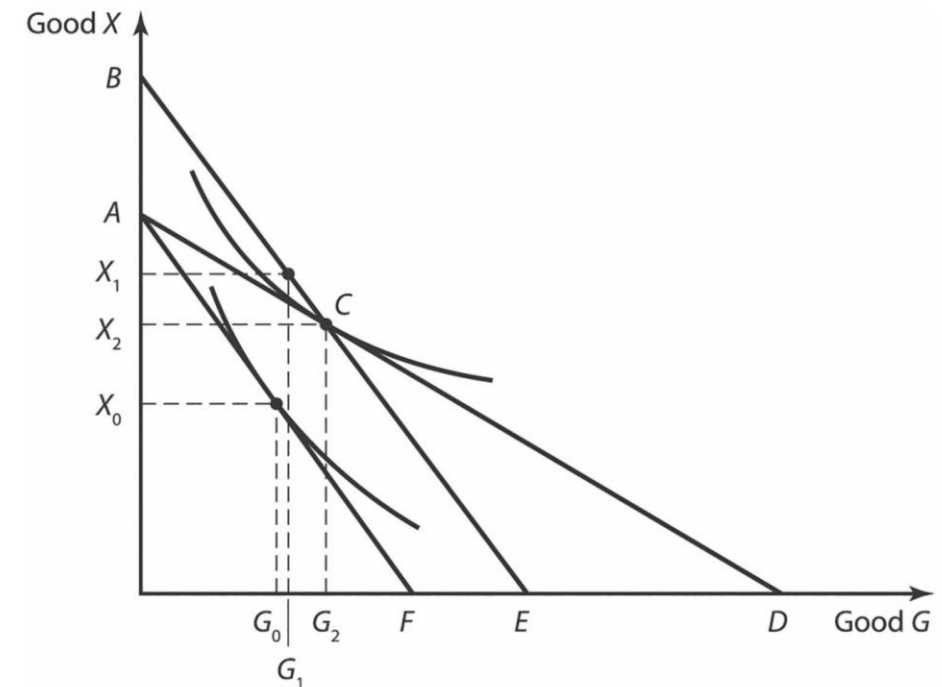


Figure 9A.1 A comparison of matching and lump-sum grants

1.1 Effect of an (open-ended) matching grant

With a matching grant, the price a citizen has to pay for each unit of public good provided by the local government) is reduced (because of the match: **from 1 to 1-M**)

- **Budget Constraint** $AF \rightarrow AD$
- **Indifference Curve** (out)

Equilibrium: $(X_0, G_0) \rightarrow (X_2, G_2)$

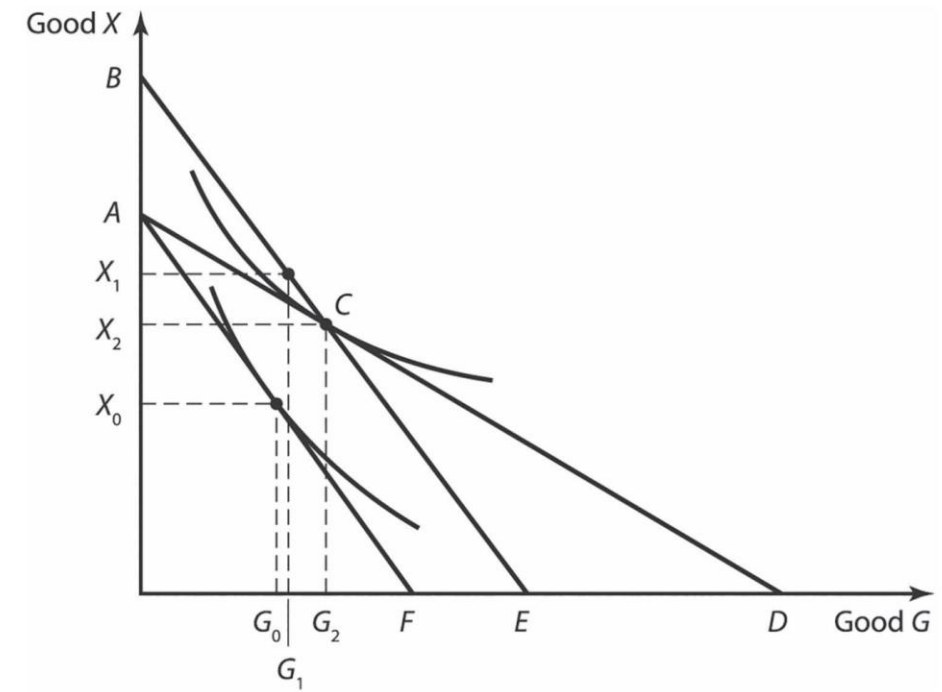


Figure 9A.1 A comparison of matching and lump-sum grants

1.1 Recall the decomposition of effects when prices change

Two main effects:

- **Income effect:**
 - $\uparrow\uparrow$ the resources available
- Price effect (“**substitution effect**”)
 - the product became cheaper relative to others

Decomposing the effect of an open-ended matching grant

Outline of steps

1. Rotate
2. Shift

Equilibrium: $(X_0, G_0) \rightarrow (X_2, G_2)$

Decomposing the effect of an open-ended matching grant

Outline of steps (Illustration on white board)

1. Rotate

1. AF out to AD (total effect) $G_0 \rightarrow G_2$

2. Shift

1. AD in to intersect with U
2. The intersection (G_0^*) divides TE to income and price effects

Equilibrium: $(X_0, G_0) \rightarrow (X_0^*, G_0^*) \rightarrow (X_2, G_2)$

1.2 Effect of a lump-sum grant

With a lump-sum grant, tax price (the citizen pays for each unit of public good provided by the local government) is not affected

- **Budget Constraint** $AF \rightarrow BE$
- **Indifference Curve** (out)

Equilibrium: $(X_0, G_0) \rightarrow (X_1, G_1)$

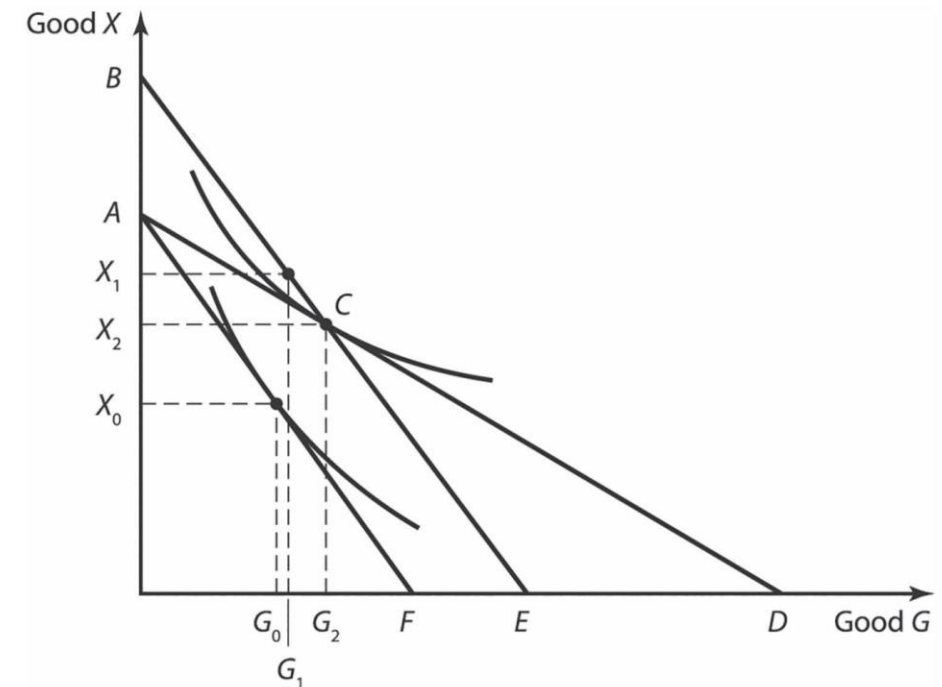


Figure 9A.1 A comparison of matching and lump-sum grants

Sidenote: What about a CLOSE-ENDED matching grant?

The budget line facing the consumer is now **ACE**

- Beyond consumption level G_2 , the price of additional units of G returns to the original price with no grant.
- The utility maximizing bundle is at C ; the consumer takes advantage of the full matching potential of the closed- ended grant

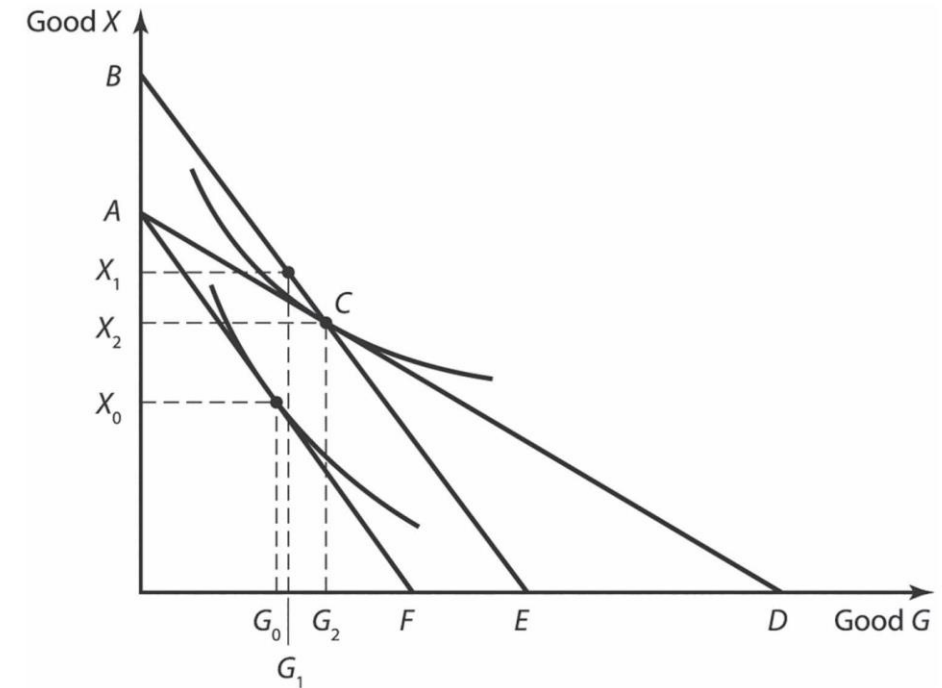


Figure 9A.1 A comparison of matching and lump-sum grants

Effects comparison: lump-sum vs (open-ended) matching

Price changes stimulate **greater changes** in consumption than equivalent changes in income.

What does this imply in terms of fiscal effects of lump-sum versus matching grants?

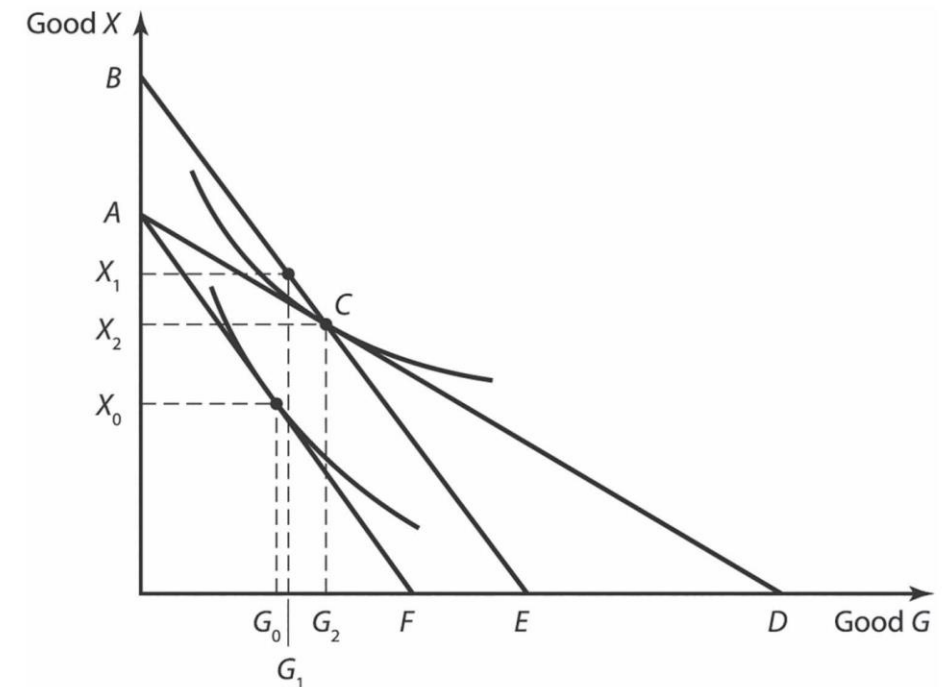


Figure 9A.1 A comparison of matching and lump-sum grants

Theoretical Predictions

- 1. Matching grants are more stimulative than lump-sum grants.**
2. Matching grants provide tax relief.
3. Categorical lump-sum grants may be no different than general grants.
4. Tax effort grants are matching.

1) Same results but with demand curves

Lump-sum - only income effect (E0 to E1)

- increases the recipient's utility more because the choice of consumption mix is not distorted by a price change.

Matching - income effect + price effect (E0 to E2)

- more effective at increasing consumption of G than an equal-size lump-sum grant:
- **increase government expenditure on the aided service by a greater amount than an “equal size” lump-sum grant**

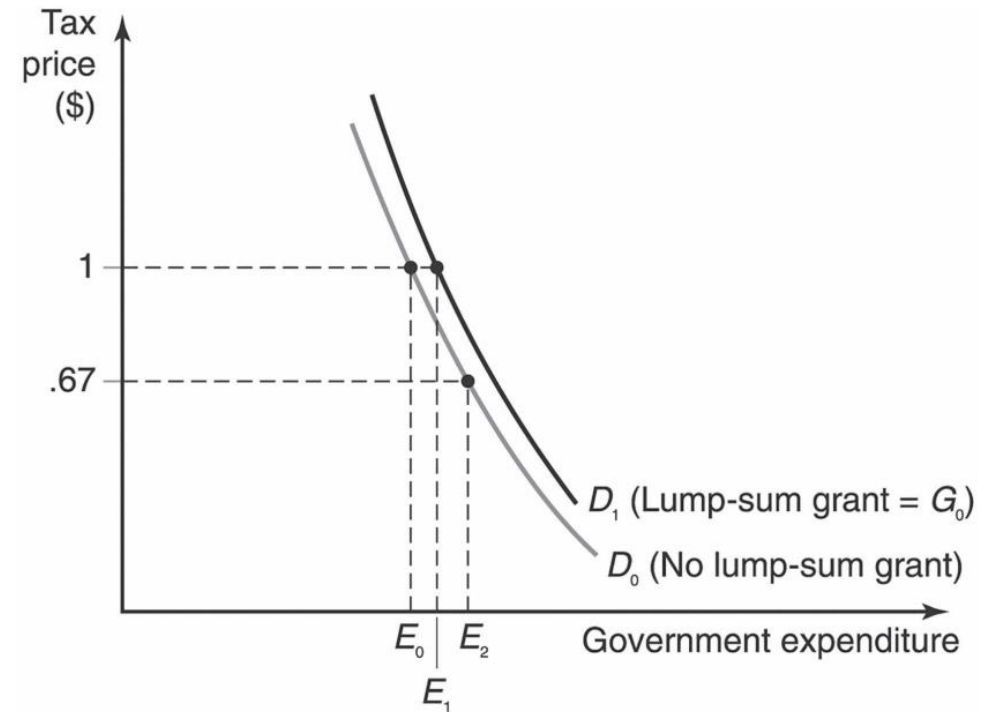


Figure 9.4 Income and price effects of a grant

“equal size”: a lump-sum grant large enough to allow the government the same expenditure as selected with the matching grant.

Takeaways

1. Vertical and horizontal imbalances and types of grants
2. Using consumer theory as a framework to analyze grants
3. Matching and lump-sum grants and their different effects

Intergovernmental Grants

Lecture 3 Effects of grants: theory and evidence

April 18, 2024

Reading for this lecture: **Chapter 9**: “Intergovernmental grants?”

State and Local Public Finance, by Ronald C. Fisher

Today's Agenda

1. Theoretical Analysis: effects of grants

Theoretical predictions: details

2. Empirics: effects of grants

Theoretical Predictions

1. **Matching grants are more stimulative than lump-sum grants.**
2. Matching grants provide tax relief.
3. Categorical lump-sum grants may be no different than general grants.
4. Tax effort grants are matching.

Exercise: A numerical example—theoretical prediction 1

“Matching grants are more stimulative than lump-sum grants.”

Question

PART A: Assume initial spending and taxes of \$1,000 per capita and a price elasticity of demand for government expenditure equal to -0.5 , a matching grant providing \$.50 for each \$1 of local tax.

- 1) What is the reduced tax price (i.e., marginal cost)? How large is this decrease in percentage?
- 2) What is the level of spending on public goods induced by the grant? How large is this increase in percentage?
- 3) What is the per-capita grant received?
- 4) To finance the remaining expenditure, what should the per-capita local taxes be?

Exercise: A numerical example—theoretical prediction 1

PART A: Assume initial spending and taxes of \$1,000 per capita and a price elasticity of demand for government expenditure equal to -0.5 , a matching grant providing \$.50 for each \$1 of local tax.

1) What is the reduced tax price (i.e., marginal cost)? How large is this decrease in percentage?

Answer: The share of spending financed by the grant $M = R/(1+R) = 0.5/(1 + 0.5) = 1/3$, and reduce marginal price $P = 1 - M = \$0.67$, or a 33% decrease.

2) What is the level of spending on public goods induced by the grant? How large is this increase in percentage?

Answer: Given the price elasticity of demand of 0.5, per-capita expenditure will increase by $0.33 \times 0.5 = 16.5\%$, from \$1,000 to \$1,165.

Exercise: A numerical example—theoretical prediction 1

PART A: Assume initial spending and taxes of \$1,000 per capita and a price elasticity of demand for government expenditure equal to -0.5 , a matching grant providing \$.50 for each \$1 of local tax.

3) What is the per-capita grant received?

Answer: $1,165 \times 13 = \$388.33$.

4) To finance the remaining expenditure, what should the per-capita local taxes be?

Answer: $1,165 - 388.33 = \$776.67$

Therefore, the effect of the matching grant is to increase per-capita expenditure by \$165 and to decrease local tax by \$223.33.

Exercise: A numerical example—theoretical prediction 1

“Matching grants are more stimulative than lump-sum grants.”

Question

PART B: If this jurisdiction received a lump-sum grant equal to \$388.33 per capita and assuming per capita income of \$5,000 and an income elasticity of 0.5.

- 1) What is the level of spending on public goods after receiving the grant?
- 2) How is this effect compared to the that in PART A?

Exercise: A numerical example—theoretical prediction 1

Table 9.2 Expenditure effects of matching and lump-sum grants

<i>Initial fiscal circumstances</i>			
Per capita expenditure		\$1,000	
Per capita local tax		\$1,000	
Price elasticity of demand		− 0.5	
Income elasticity of demand		0.5	
Per capita income		\$5,000	
<i>Grant conditions and effects</i>			
<i>Matching grants</i>		<i>Lump-sum grants</i>	
Matching rate	0.50 (\$.50 for each \$1.00 of each tax)	Per capita grant amount	\$388.33
Tax price with grant	\$0.67 (\$1.00/\$1.00 + \$.50)	Percentage increase in per capita income	7.76% (\$388.33/\$5000)
Percentage decrease in price	33%		
16.5%	Percentage increase in per capita expenditure		3.88%
\$1,165.00	Per capita expenditure with grant		\$1,038.80
388.33	Per capita grant		388.33
776.67	Per capita local tax		650.47
165.00	Increase in per capita expenditure		38.80
223.33	Decrease in local tax		349.53
388.33	Sum = grant amount		388.33

2) Matching grants provide tax relief

- matching grants will induce an increase in spending on the aided category, but the increase will not be as large as the grant.

Intergovernmental Grants

Lecture 4 Effects of grants: equalizing grants

April 18, 2024

Reading for this lecture: **Chapter 9**: “Intergovernmental grants?”

State and Local Public Finance, by Ronald C. Fisher

Summary of the Unit

A quiz to help you learn

Regional and Local Public Finance, Unit 3

Government: Levels and Functions

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