

Expenditure Analysis: Methodology

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Bratislava, November 2, 2015





Outline

- **Methodology for analyzing public spending**
- **Public investment**
- **Education**
- **Health**
- **Social Protection**

Methodology for Analyzing Public Spending



The Role of Public Spending

- **Public intervention is required in case of market failures to:**
 - Provide public goods (national defense)
 - Ensure positive externalities (education)
 - Manage natural monopoly (electricity grid)
 - Provide social protection (healthcare, social insurance)
- **The level of public intervention and the allocation of public spending is also a matter of political choice and social preferences**



Objectives for Reforming Public Expenditure

- **We generally advise targeted reforms, rather than across-the-board cuts**
- **Two principles should guide expenditure reforms:**
 - Improving efficiency: (i) allocate spending to priority sectors, cut low priority sectors; and (ii) improve the input mix for producing given outputs.
 - Improving equity: (i) reducing inequalities between rich and poor people, and combating poverty; and (ii) ensuring intergenerational equity



How to Analyze Public Spending

- **We generally divide the analysis into three steps:**
 - Inputs: is the level of spending on X high/low, and adequate (more difficult)?
 - Outcomes: are outcomes satisfactory, in relation to input levels?
 - Inputs Composition: what input components are responsible for high/low spending and outcomes?
- **And we benchmark input and output indicators in a cross-country context**



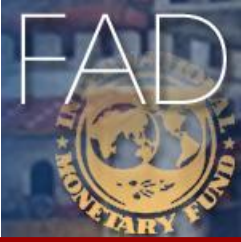
1/ Spending Objectives and Inputs: Assessing Expenditure Level and Trends

- **Clearly state the key dimensions of outcomes in each sector**
- **Relative spending levels** (total spending, public vs. private spending, aggregate, and per capita/student...)
- **Developments over time** (which may indicate whether there are smooth trends or sudden accelerations or stops)
- **Spending pressures** (spending projections)



1/ Spending Objectives and Inputs: Assessing Expenditure Level and Trends

- **When benchmarking spending, need to control for:**
 - Role of the public and private sectors in providing services
 - Income levels
 - Demographic factors
- **Be careful about averages and medians when benchmarking**
- **A lot of work to be done on resource allocation within the country**



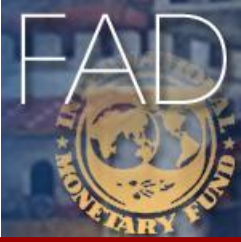
2/ Spending Outputs: Estimating the bang for the buck

- **Quantity indicators:**
 - Provision and access to services (infrastructure)
 - Coverage and participation in programs
- **Quality indicators:**
 - Composite indicators (PISA, HALE)
 - Detailed indicators (prevalence of various diseases)
- **Distributional analysis:**
 - Income inequalities indexes
 - Poverty indicators
 - Also requires micro data (household surveys)



2/ Spending Outputs: Estimating the bang for the buck

- **Rough aggregate assessment of efficiency can also be obtained looking into the relation between inputs and outcomes:**
 - Scatter plots of per-capita spending vs. a composite indicator may indicate whether outcomes are (or not) in line with comparator countries/regions
 - more sophisticated techniques (such as Data Envelopment Analysis – DEA – or stochastic frontiers) allow to control for various factors, besides inputs (PIE-X)



3/ Spending Composition : Explaining the high/low inputs/outputs

- **An analysis of the inputs structure and mix**
 - Spending allocation within a sector
 - Production costs within a sector
- **This part of the analysis should provide indications on the most promising areas for reform**
- **Classifications of spending:** Administrative, economic, and functional
- **Type of services provided:**
 - By types of interventions/programs
 - Physical resources indicators (hospitals vs. primary care)

Public Investment



1/ Spending Objectives and Inputs

- **Expected outcomes: public investment is a catalyst of economic growth and improve quality of life**
- **Public investment:**
 - Use gross fixed capital formation, rather than capital spending
 - Time trends: public vs. private investment spending, in percent of GDP (and real series, using different deflators)
 - Time trends in PPPs investment, in percent of GDP
 - Current vs. capital spending (GFCF): overcrowding of investment?
- **Capital stock:**
 - Constructed based on general government investment flows
 - Time trends: including real public capital stock per capita



2/ Spending Outputs

- **Access and quantity of infrastructure**
 - Sector-based indicators
 - Identify proxies for infrastructure quantity/access : electricity, health, water and sanitation, transport
 - Maintenance spending
- **Quality of infrastructure:**
 - Survey-based indicators (World Economic Forum), with composite index, or by sectors
- **DEA for public investment efficiency**



3/ Spending Composition

- **Public investment spending can be decomposed by:**
 - Level of governments: to identify the degree of decentralization of investment spending
 - Need also to determine state-owned enterprises investment
 - Functions, according to COFOG classification (10 sectors), or more aggregate (e.g., economic vs. social infrastructure)
- **Maintenance spending should also be factored in**
- **Also indicators of investment management (PIMA)**



Sources and References

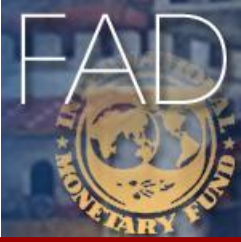
- **Investment spending and capital stock**
 - IMF Public Investment website: <http://www.imf.org/external/np/fad/publicinvestment/>
 - National data on SOEs' investment, and public maintenance spending
- **Economic and function classifications :**
 - Eurostat : http://ec.europa.eu/eurostat/web/products-datasets/-/gov_10a_exp
- **Maintenance spending:**
 - OECD International Transport Forum :
<http://internationaltransportforum.org/statistics/investment/inindex.html>
- **Useful analysis**
 - IMF (2015), Making Public Investment More Efficient:
<http://www.imf.org/external/np/pp/eng/2015/061115.pdf>
 - IMF (2014), “Fiscal Monitor: Public Expenditure Reform—Making Difficult Choices”
:<http://www.imf.org/external/pubs/ft/fm/2014/01/fmindex.htm>
 - IMF (2014), “World Economic Outlook: Is It Time for an Infrastructure Push? The Macroeconomic Effects of Public Investment”:
<https://www.imf.org/external/pubs/ft/weo/2014/02/pdf/c3.pdf>

Public Education



1/ Spending Objectives and Inputs

- **Expected outcomes: high student performance and equity**
- **Inputs for education can be measured by public spending levels and components.**
 - Public spending on education in percent of GDP
 - Public spending on education per pupil
 - Components of per-pupil spending: pupil to teacher ratio, teacher salary, class size, etc.
- **Demographic factors need to be taken into account.**
 - A young nation will need to have more teachers and classrooms than an aged nation



2/ Spending Outputs

- **Education outputs are usually measured by standardized test scores, such as OECD's PISA**
- **School enrollment is used in some cases, when standardized test scores are unavailable.**
- **Study fields of graduates of these schools should match with labor market needs.**



3/ Spending Composition

- **Education spending can be decomposed by education level and economic classification.**
 - Pre-primary, primary, secondary, and tertiary spending
 - Wage, goods and services, social benefits, capital etc.
- **Wages account for majority of education spending, and can be decomposed into demographics, employment, and wages:**

$$\frac{\text{wage spending}}{\text{GDP}} = \frac{\text{working age population}}{\text{total population}} \times \frac{\text{school age population}}{\text{working age population}} \\ \times \frac{\text{government employment in education}}{\text{school age population}} \times \frac{\text{average public sector education wage}}{\text{per capita GDP}}$$

- **Per-pupil education spending measures resources spent by the education system per student.**



3/ Spending Composition

- **Per-pupil education spending is usually uneven across regions within a country.**
 - These are driven by regional disparities in pupil-teacher ratio, class size, or spending per teacher/class.
 - Regions with high per-pupil spending may not necessarily have high education outcomes.
- **School network consolidation can generate savings without negatively affecting education outcomes.**
 - The number of schools is consolidated by transferring students in rural schools with low enrollment to nearby hub schools.
 - This can also help reduce maintenance costs, and finance a more cost-effective infrastructure upgrade (e.g., IT system).



Conclusions

- **Existing research is inconclusive on the positive effect of per-pupil spending on education outcomes.**
- **The weak input-output relationship suggests scope for efficiency gains.**
- **Recent research finds that better institutions can improve efficiency of education inputs.**



Sources and References

- **Education Spending and performance**

- OECD Education at a Glance database: <http://www.oecd.org/education/eag.htm>
- OECD PISA website: <http://www.oecd.org/pisa/>
- World Bank EdStats database: <http://datatopics.worldbank.org/education/>

- **Useful analysis**

- Hanushek and Woessmann, 2011, “The Economics of International Differences in Educational Achievement,” Chapter 2, Handbook of the Economics of Education, Volume 3
- OECD, 2013, “PISA 2012 Results: What Makes Schools Successful? Resources, Policies and Practices”: <http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-iv.htm>
- World Bank, 2011, “Making Schools Work: New Evidence on Accountability Reforms”:
<http://elibrary.worldbank.org/doi/abs/10.1596/978-0-8213-8679-8>

Health

1/ Spending Objectives and Inputs

- **Expected outcomes: adequate health status and financial protection against health risks**
- **Magnitude of financial resources absorbed by the health sector** (as a % of GDP and in per capita terms)
- **Several dimensions need to be taken into account:**
 - Organization of the system: relevance of the public vs. the private sector and magnitude of out-of-pocket spending (in particular for vulnerable households)
 - Spending trends
 - Demographic developments, in particular ageing

2/ Spending Outcomes

- **Proxies for health status**
 - Summary indicators: health adjusted life expectancy (HALE)
 - More detailed indicators
- **Assessment of efficiency :**
 - a scatter plot of per-capita health spending vs. HALE may indicate whether outcomes are (or not) in line with comparator countries

3/ Spending Composition and Structural Indicators

- **Composition of health spending**
 - Economic classification
 - Types of care classification
- **Physical resources indicators**
 - Availability of physical inputs
- **The institutional set up should also be considered:**
 - Payment/reimbursement mechanisms (and their incentives)
 - Organization of financing and allocation of responsibilities between government levels

Sources and References

- **Health status, expenditure and structural indicators**
 - Advanced countries (plus few emerging countries) - OECD Health Data: <http://www.oecd.org/els/health-systems/health-data.htm>
 - European countries (including Central and Eastern European countries): European Health for All Database – WHO Regional Office Europe: <http://data.euro.who.int/hfad/>
- **Economic classification of public health expenditure**
 - European countries – Eurostat – Cofog Classification http://ec.europa.eu/eurostat/web/products-datasets/-/gov_10a_exp
- **Useful analysis**
 - OECD (2015), Fiscal Sustainability of Health Systems <http://www.oecd.org/health/health-systems/fiscal-sustainability-of-health-systems-9789264233386-en.htm>
 - OECD (2014), Geographic Variations in Health Care What Do We Know and What Can Be Done to Improve Health System Performance? <http://www.oecd.org/els/health-systems/medical-practice-variations.htm>
 - Health at a Glance: Europe 2014 <http://www.oecd.org/health/health-at-a-glance-europe-23056088.htm>
 - Health Care Quality Indicators and Reviews, OECD <http://www.oecd.org/els/health-systems/health-care-quality-indicators.htm>

Social Protection



Methodological Issues in Social Protection

- **Objective: Support income of selected groups of recipients**
- **Social expenditure in cash includes several items:**
 - Pensions
 - Other Social Insurance Schemes (such as Unemployment Benefits)
 - Social Assistance Programs (such as Guaranteed Minimum Income Schemes)
- **A benchmarking exercise would need to consider:**
 - Inputs: Expenditure levels and sustainability
 - Outputs: Distributive outcomes
 - Production function: means-testing, coverage, generosity

1/ Pensions

- **Spending Inputs:**
 - Cross country comparison of spending levels
 - Demographic factors (that can be summarized looking at *old-age dependency ratios*), and long-term spending projections
- **Spending Outputs:** Distributional analysis to assess performance in:
 - preventing poverty among the elderly
 - containing income inequality and
 - evaluate differences within pensioners (in case of special regimes and categorical programs)

1/ Pensions

- **Composition of Spending: Pension system rules**
 - Effective retirement age and eligibility criteria (which determine whether the pool of pensioners is large or small)
 - Generosity of the program: replacement rates at retirement (i.e. ratio of pension to wage) and indexation rule
- **These indicators are linked to the key policy levers for managing spending pressures (due to population ageing):**
 - (Gradual) changes in the retirement age
 - Changes in benefit rules/formulas
- **A third lever is related to pension system financing:**
 - Changes in contribution rates

2/ Income Support Programs

- **Spending Inputs:**
 - Cross country comparison of spending levels (in percent of GDP) by type of programs
- **Spending Outputs:** Distributional analysis performance in:
 - Preventing poverty (risk of poverty rate)
 - Containing income inequality (market vs. disposable Gini)
 - Further breaking down this type of analysis requires availability of micro data (household surveys)

2/ Income Support Programs

- **Spending Composition:**
 - **Coverage:** the share of households participating in the program (by income groups) to assess whether the program reaches the intended recipients
 - **Redistributive impact of social transfers and taxes** (reduction in Gini by instruments)
 - **Generosity:** the benefit/average income ratio to evaluate whether post-transfer income is adequate
 - **Incidence (leakage):** the share of benefits captured by each income group to ascertain the magnitude of resources that leak to the well off (and that could either be saved or better channeled towards the most vulnerable)

Useful Sources and References

- **Social protection statistics**

- European Countries – Eurostat – ESSPROS: <http://ec.europa.eu/eurostat/web/social-protection/statistics-illustrated>
- OECD Countries – OECD – Social expenditure database: <http://www.oecd.org/els/soc/expenditure.htm>
- EUROMOD, Statistics of income components, taxes and benefits <https://www.iser.essex.ac.uk/euromod/using-euromod/statistics>

- **Useful analysis**

- IMF (2014): “Fiscal Policy and Income Inequality” <https://www.imf.org/external/np/pp/eng/2014/012314.pdf>
- OECD (2013), Pensions at a Glance <http://www.oecd.org/social/pensionsataglance.htm>
- OECD, Employment policies and data <http://www.oecd.org/els/emp/>
- OECD Income Inequality and Poverty <http://www.oecd.org/els/soc/inequality-and-poverty.htm>
- European Commission – 2015 Ageing Report: http://ec.europa.eu/economy_finance/publications/european_economy/2015/ee3_en.htm



Thank you !