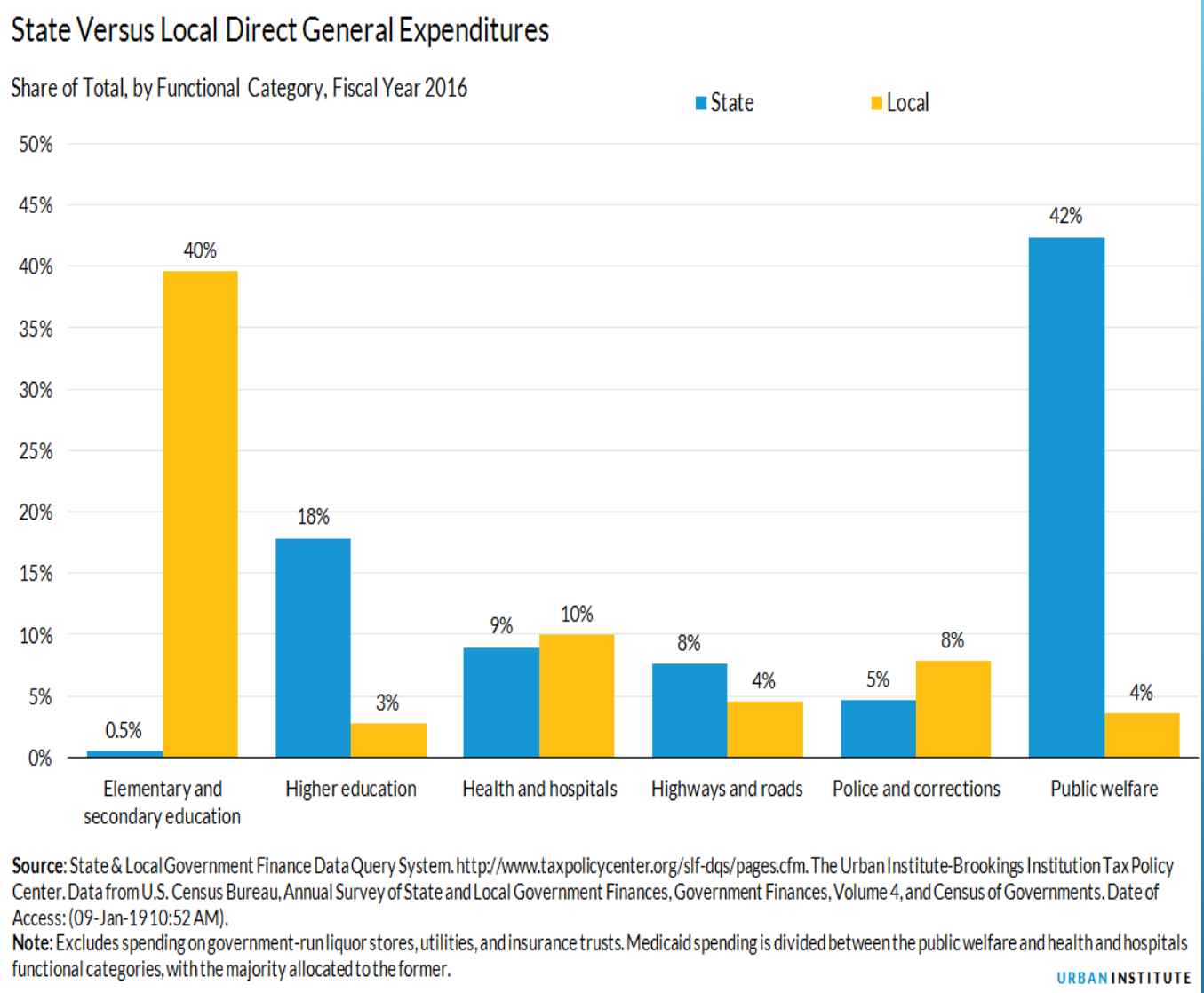
USING PERFORMANCE MEASUREMENT TO INFORM BUDGET ALLOCATION: THE CASE OF ILLINOIS

Arwi Srithongrung Kriz, DPA

Research Fellow

Illinois Institute of Public Finance

University of Illinois-Springfield



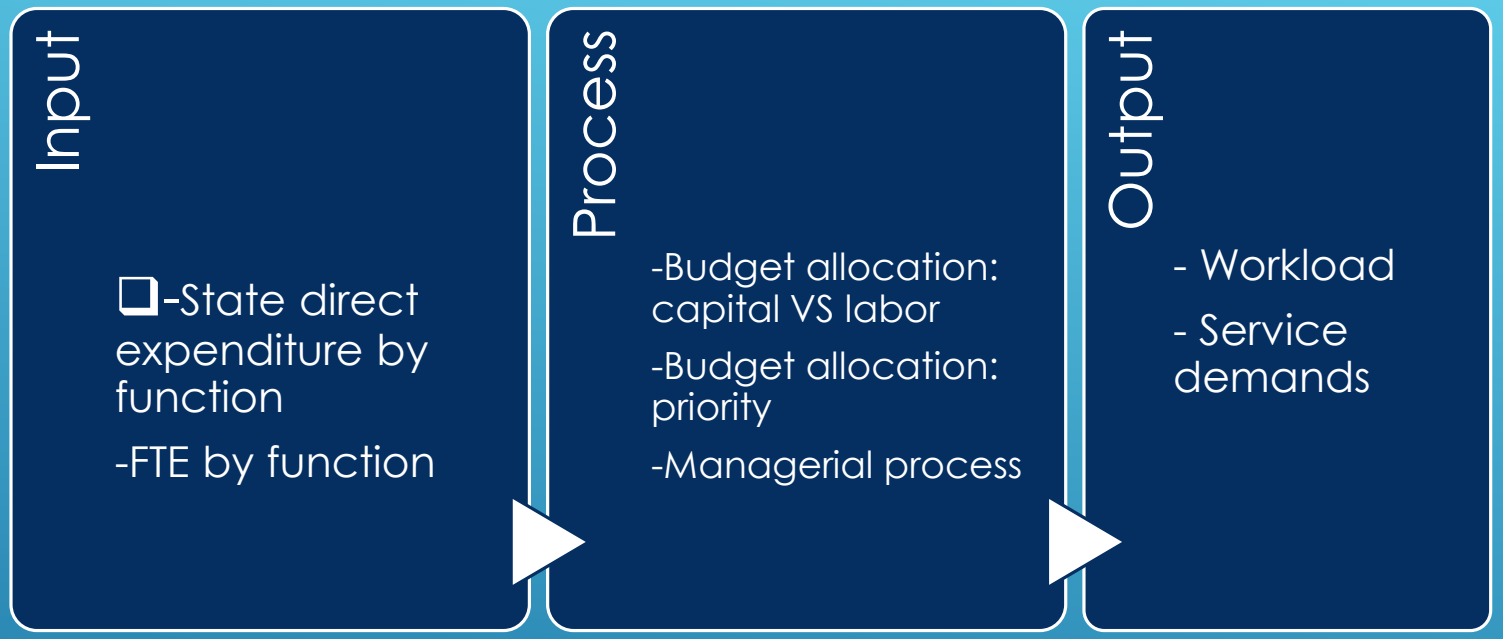
State	Welfare (% to total direct exp.)	Higher Ed. (% to total direct exp.)	Health & Hos. (% to total direct exp.)	Road (% to total direct exp.)
MN	40	15	2	6
UT	9	28	13	5
MO	18	13	15	**5**
ND	20	**5**	21	17

PURPOSES

- Understand state budget allocation and results – particularly for efficiency
- Obtain state ranking and peers
- Obtain directions to improve budget for a state: IL
- Further examination for linkage between PBB & efficiency

State Service Functions (Areas)
1. Higher education
2. Elementary and secondary education
3. Welfare
4. Health and hospital
5. Safety
6. Environment
7. Transportation
8. Other state infrastructure

METHODOLOGY: DATA ENVELOPMENT ANALYSIS



- **Why DEA?**
  - Multiple outputs/inputs-weighted
  - 3000 peer reviewed journal articles in performance measurement
  - Simple ratio of input/output by Osborne & Gaebler (1992)
  - CAFR's Operational Indicators
  - Stochastic Frontier Analysis (SFA)

Input	Mean
HIGHER EDUCATION	
Total state direct expenditure, operational	4,312,806
Total FTE	53,511
ELEMENTARY AND SECONDARY EDUCATION	
Total state direct expenditure, operational	1,169,332
Total FTE (state only)	1,621
PUBLIC WELFARE	
Total state direct expenditure, operational	664,764
Total FTE	4,910
HEALTH AND HOSPITALS	
Total state direct expenditure, operational	2,392,819
Total FTE	12,333
TRANSPORTATION	
Total state direct expenditure, operational	2,175,260
Total FTE	5,169
PUBLIC SAFETY	
Total state direct expenditure, operational	1,427,392
Total FTE	10,961
ENVIROMENT AND HOUSING	
Total state direct expenditure, operational	669,612
Total FTE	3,847
INFRASTRUCTURE	
Total state direct expenditure, operational	63,838
Total FTE (infrastructure only)	72

Input Price	Mean
Regional Price Parity (All Functions)	97.1
Average Monthly Wage per FTE	
Higher Education	3,378
Elementary and Secondary Education	4,365
Public Welfare	4,019
Health and Hospitals	4,395
Transportation	4,628
Public Safety	4,522
Environment and Housing	4,003
Infrastructure	5,046

Output Variable	Mean
HIGHER EDUCATION	
Degrees Awarded, 4-Year Public University, 2016	40,016
Degrees Awarded, 2-Year Public Institution, 2016	23,146
Total Enrollment, 4-Year Public University, 2016	224,503
Total Enrollment, 2-Year Public Colleges, 2016	162,845
ELEMENTARY AND SECONDARY EDUCATION	
Average-daily attendance (ADA), public schools, 2015-2016	943,355
Total enrollment, public schools, 2015-2016	1,007,080
4th Grade Math Average Score, 2017	239.4
4th Grade Reading Average Score, 2017	221.2
8th Grade Math Average Score, 2017	282.2
8th Grade Reading Average Score, 2017	265.8
Public high school 4-year adjusted cohort graduation rate (ACGR), 2010-11 to 2015-16	84
PUBLIC WELFARE	
Medicaid Enrollment, 2016	17,847,798
TANF Recipients, 2016	52,804
Affordable Care Act (ACA) Enrollment, 2016	253,184
HEALTH AND HOSPITALS	
Proportion of Adults Reporting Any Mental Illness, 2016	0.19
Hospital Admission per 1,000 Population, State Owned Hospitals	14.62
% Public Water System (PWS) Site Visits by State	36
Air Quality Control (AQC) Facilities Evaluated by State, 2016	1,238

TRANSPORTATION	
Lane Miles of Public Roads, State Owned, 2016	37,510
Annual Average Daily Travel (AADT)/Total Lane Mile (LANE), 2016	3,401
Average Passenger Trip Length (miles)	4.7
PUBLIC SAFETY	
Prisoners in State Correctional Facilities, 2016	26,324
Jail Population, 2016	15,521
Probation Population, 2016	74,035
Parole Population, 2016	14,989
ENVIRONMENT AND HOUSING	
State-Owned Park Visits, 2016	15,828,021
Total housing units (proxy for Solid Waste Management Users), 2016	2,707,781
INFRASTRUCTURE	
Levees (miles), 2017	592
State Parks (acres), 2016	371,951
State Trails (miles), 2016	796
State Prison Facilities, 2016	20
Jail Facilities, 2016	70

Service Function	Mean	Frontier States
HIGHER EDUCATION		
TE INPUT, VRS	0.78	11
SE	0.89	6
EE	0.71	9
AE	0.9	9
ELEMENTARY AND SECONDARY EDUCATION		
TE INPUT, VRS	0.67	16
SE	0.8	2
EE	0.62	15
AE	0.88	15
PUBLIC WELFARE		
TE INPUT, VRS	0.79	7
SE	0.9	4
EE	0.29	3
AE	0.35	3
HEALTH AND HOSPITALS		
TE INPUT, VRS	0.45	8
SE	0.91	6
EE	0.41	7
AE	0.93	7

Service Function	Mean	Frontier States
TRANSPORTATION		
TE INPUT, VRS	0.79	17
SE	0.87	8
EE	0.72	12
AE	0.9	13
PUBLIC SAFETY		
TE INPUT, VRS	0.75	9
SE	0.84	4
EE	0.72	10
AE	0.96	10
ENVIRONMENT AND HOUSING		
TE INPUT, VRS	0.72	11
SE	0.76	3
EE	0.62	6
AE	0.84	7
INFRASTRUCTURE		
TE INPUT, VRS	0.67	19
SE	0.77	9
EE	0.62	15
AE	0.91	15

EMPIRICAL RESULTS

HIGHER EDUCATION	4-year Degree	2-year Degree	4-year Enrollment	2-year Enrollment	
Efficient States (EE = 1.0)	113,548	858,497	20,438	132,814	
Inefficient States (EE < 1.0)	119,834	286,350	22,275	39,073	
ELEMENTARY AND SECONDARY EDUCATION**	ADA Students	Enrollment			
Efficient (EE = 1.0)	1,322	1,246			
Inefficient (EE < 1.0)	1,828	1,700			
WELFARE	Medicaid Enrollment	TANF Recipients	ACA Enrollment		
Efficient (EE = 1.0)	505	241,831	33,854		
Inefficient (EE < 1.0)	766	374,801	66,249		
HEALTH AND HOSPITALS	Hospital Admission	Mental Illness (%)	PWS	AQC	
Efficient (EE = 1.0)	51,564	337,229	11,763,912	751,899	
Inefficient (EE < 1.0)	393,004	1,617,721	99,676,949	3,220,215	
TRANSPORTATION	Highway Lane Miles	AADT/ Lane Mile	Mass-Transit Passenger Miles		
Efficient (EE = 1.0)	139,202	1,093,257	571,763		
Inefficient (EE < 1.0)	66,129	719,304	429,055		
SAFETY	Prisoners	Jailers	Probationers	Parolees	
Efficient (EE = 1.0)	43,118	73,114	20,183	137,125	
Inefficient (EE < 1.0)	71,270	584,352	29,617	599,427	
ENVIRONMENT AND HOUSING	State Park Visits	Housing Units			
Efficient (EE = 1.0)	36	344			
Inefficient (EE < 1.0)	82	353			
INFRASTRUCTURE	Levee Miles	State Park Acreage	Trail Miles	Prison Facility	Jail Inmates
Efficient (EE = 1.0)	2,115,278	584	603,399	11,035,450	4,266,204
Inefficient (EE < 1.0)	2,460,232	1,638	2,328,452	14,044,140	4,017,194

AVERAGE COST PER OUTPUT BY EFFICIENT GROUP

AVERAGE INPUT PRICE AND MIX

	State Price Parity	Wage/FTE	Total Outlay	Total FTE
HIGHER EDUCATION				
Efficient States (AE = 1.0)	104	3,870	8,717,370	89,885
Inefficient States (AE < 1.0)	95	3,263	3,401,478	46,364
ELEMENTARY AND SECONDARY EDUCATION				
Efficient (AE = 1.0)	99	4,277	1,541,036	1,902
Inefficient (AE < 1.0)	96	4,403	1,010,031	1,500
WELFARE				
Efficient (AE = 1.0)	102	3,910	38,997,638	4,863
Inefficient (AE < 1.0)	97	4,026	9,891,898	4,913
HEALTH AND HOSPITALS				
Efficient (AE = 1.0)	94	4,263	673,496	4,825
Inefficient (AE < 1.0)	98	4,417	2,672,709	13,555
TRANSPORTATION				
Efficient (AE = 1.0)	101	5,228	2,821,543	6,272
Inefficient (AE < 1.0)	96	4,420	1,987,478	4,864
SAFETY				
Efficient (AE = 1.0)	94	4,233	2,889,844	20,926
Inefficient (AE < 1.0)	97	4,449	1,061,792	8,647
ENVIRONMENT AND HOUSING				
Efficient (AE = 1.0)	104	5,050	1,340,185	5,248
Inefficient (AE < 1.0)	96	3,832	560,449	3,619
INFRASTRUCTURE				
Efficient (AE = 1.0)	99	5,073	378,388	110
Inefficient (AE < 1.0)	95	5,034	175,488	59

SUMMARY FOR POSSIBLE MAIN CAUSES FOR TECHNICAL EFFICIENCY BY FUNCTION

Service Function	SE	EE	AE
Higher Education	X (CRS)		
Elementary and Secondary		X (LL)	X (L)
Welfare		X (LL)	X (L)
Health and Hospitals		X (LL)	X (C)
Transportation	X	X	
Safety		X (LL)	X (L)
Environment and Housing	X (CRS)		
Infrastructure	X	X	

	Achieving Efficiency	Inefficiency Cause	Recommendation	Special Note
HIED	YES	N/A	N/A	N/A
SCHOOL	NO	Diseconomy of Scale (DRS)	43% input cut; otherwise adopting centralized services by having state-hired instructional staff to help local services	Relatively large number of non-native English-speaking student
WELFARE	NO	Economic and Allocative Efficiency	11% input and 85% cut through operational outlay	Relatively low accessibility to receive welfare service as indicated by TPR rate and relatively small achievement in having TANF recipients exist program due to employment.
HEALTH & HOS.	NO	Economic Efficiency	80% input and cost cut through personnel size reduction; average wage is already efficient since it is equals to those benchmarks	New technology and equipment may be needed.
TRANS.	NO	Diseconomy of Scale (DRS) and Economic Inefficiency	55% input and 56% cost cut through capital project acquisition price	Consider financial management approaches to enhance credit rating to cut long-term borrowing cost
SAFETY	NO	Diseconomy of Scale (DRS)	27 % input and cost cut through operational outlay, otherwise consider expanding service facilities to utilize excess personnel and operational outlay	N/A
ENVI. & HOUSING	YES	N/A	N/A	N/A
INFRASTRUCTURE	YES	N/A	N/A	N/A

ILLINOIS PERFORMANCE