Relationship between Fiscal Transparency and "Knowledge Diffusion Variables": A Cross-Country Analysis

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Research Question

Are ICTs and educational attainment associated with greater fiscal transparency around the world?

Findings

The study concludes that transparency of the national budget document and the budgeting process might be improved through actions enabled by ICT and education, which we referred to as “knowledge diffusion variables”. To date, no published research has examined the statistical relationship between fiscal transparency and “knowledge diffusion variables”. This research seeks to fill in the gap within the literature by introducing “knowledge diffusion variables” that correlate with the Open Budget Index, an established index that measures fiscal transparency across 94 countries.

Definition: Fiscal Transparency

Kopits & Craig (1998) offer the following encompassing definition for fiscal transparency:

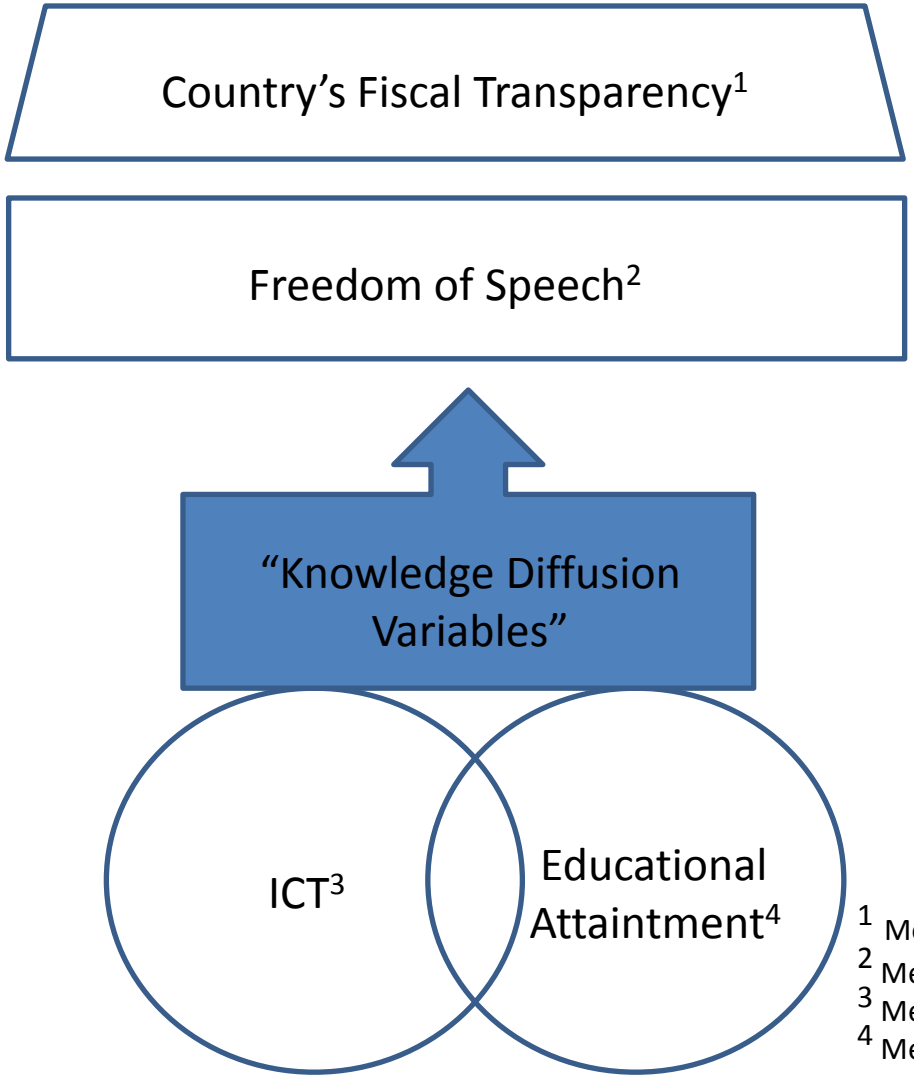
"Openness toward the public at large about government structure and functions, fiscal policy intentions, public sector accounts, and projections … so that the electorate and financial markets can accurately assess the government's financial position and the true cost and benefits of government activities, including their present and future economic and social implications."

Definition: Information and Communication Technologies (ICT)

According to the Association for Progressive Communication, ICT is:

"Technology and tools that people use to share, distribute, and gather information and to communicate with one another, one on one, or in groups. ICTs can be grouped into three categories. Information technology uses computers, which have become indispensable in modern societies to process data and save time and effort. Telecommunications technologies include telephones (with fax) and the broadcasting of radio and television, often through satellites. Networking technologies, of which the best known is the Internet, also extend to mobile phone technology, voice over IP telephony (VoIP), satellite communications, and other forms of communication that are still in their infancy."

Model: Relationship between Fiscal Transparency and "Knowledge Diffusion Variables"



[1] Measured using the OBI, 2010
[2] Measured using Map of Press Freedom, 2011
[3] Measured using IDI, 2010
[4] Measured using SLE, updated weekly

Source: Lourdes Alers –Tealdi

Data Sources

- Open Budget Index, 2010
- ICT Development Index, 2008
- Map of Press Freedom, 2011
- CIA World Fact Book, updated every week

Highlights of Open Budget Index 2010

- Survey results published every 2 years since 2002 by the International Budget Partnership (IBP)
- Questionnaire contains 123 questions based on general accepted good practices related to public financial management.
- The responses to 92 of these, focusing on the public availability, content/comprehensiveness and timeliness of the seven key budget documents that all countries should issue, were averaged to form the Open Budget Index (OBI).
- Value of survey: (1) Questionnaire is filled by independent researchers in civil society or academic institutions. (2) OBI data goes through an extensive peer review process. (3) Data is based on objective assessment of the information contained in budget documents rather than on expert opinion or perception poll. (4) Survey is carried out simultaneously in all countries, providing truly comparative snapshot at a point in time.
- Scores countries on a 0 (worst) -100 (best) scale

Country Summary for Open Budget Index 2010

OBI score	Countries
Provides extensive information to citizens (81 - 100)	South Africa, New Zealand, United Kingdom, France, Norway, Sweden, **United States**
Provides significant information to citizens (61 - 80)	Chile, **Brazil**, South Korea, Slovenia, Germany, Sri Lanka, **India**, Peru, Poland, Spain, Czech Republic, Ukraine, Colombia
Provides some information to citizens (41 - 60)	**Russia**, Mongolia, Romania, Italy, Portugal, Papua New Guinea, Croatia, Slovakia, Turkey, Argentina, Bulgaria, Uganda, Philippines, Georgia, Ghana, Serbia, Namibia, Mexico, Bostwana, Indonesia, Jordan, Guatemala, Kenya, Egypt, Macedonia, Bangladesh, Malawi, Costa Rica, Nepal, Tanzania, Bosnia-Herzegovina, Azerbaijan, Thailand
Provides minimal information to citizens (21 - 40)	Liberia, Malaysia, Pakistan, Kazakhstan, El Salvador, Nicaragua, Zambia, Mali, Timor-Leste, Venezuela, Albania, Trinidad and Tobago, Lebanon, Ecuador, Mozambique, Morocco, Angola, Yemen, Afghanistan
Provides scant or no information to citizens (0 - 20)	Nigeria, Kirgiz Republic, Cambodia, Dominican Republic, Vietnam, Bolivia, **China**, Honduras, Rwanda, Sudan, Dem. Rep. of Congo, Burkina Faso, Niger, Senegal, Cameroon, Saudi Arabia, Algeria, Chad, Iraq, Equatorial Guinea, Fiji, Sao Tome E Principe
OBI, Open Budget Index	
Source: Adapted from International Budget Partnership (IBP)	

ICT Development Index (IDI) 2008

- Produced by the International Telecommunications Union (ITU)
- Tracks the progress countries are making towards becoming information societies.
- It is a composite index made up of 11 indicators covering ICT access, use and skills.
- Scores countries on a 0 (worst) -10 (best) scale
- The index covered 159 countries.

ICT Development Index: Indicators and Weights

Figure 2.2: ICT Development Index: indicators and weights

ICT access	Ref. value	(%)
1. Fixed-telephone lines per 100 inhabitants	60	20
2. Mobile-cellular telephone subscriptions per 100 inhabitants	180	20
3. International Internet bandwidth (bit/s) per Internet user	280'377*	20
4. Percentage of households with a computer	100	20
5. Percentage of households with Internet access	100	20

40

ICT use	Ref. value	(%)
6. Percentage of individuals using the Internet	100	33
7. Fixed (wired)-broadband Internet subscriptions per 100 inhab.	60	33
8. Active mobile-broadband subscriptions per 100 inhab.	100	33

40

ICT skills	Ref. value	(%)
9. Adult literacy rate	100	33
10. Secondary gross enrolment ratio	100	33
11. Tertiary gross enrolment ratio	100	33

20

ICT Development Index

Note: * This corresponds to a log value of 5.45, which was used in the normalization step.
Source: ITU.

Country Summary for ICT Development Index (IDI) 2008

IDI Percentile	IDI Score Range	Countries
> 80 percentile	7.85 - 4.54	Sweden, South Korea, Norway, UK, Germany, New Zealand, France, **United States**, Spain, Slovenia, Italy, Portugal, Croatia, Czech Republic, Slovakia, Poland, Bulgaria, Romania, **Russia**
> 60 percentile	4.38 - 3.25	Argentina, Macedonia, Saudi Arabia, Serbia, Chile, Malaysia, Turkey, Ukraine, Trinidad and Tobago, **Brazil**, Venezuela, Colombia, Bosnia and Herzegovina, Kazakhstan, Costa Rica, Jordan, Thailand, Peru, Mexico
> 40 percentile	3.23 - 2.61	**China**, Georgia, Azerbaijan, Lebanon, Albania, Vietnam, Ecuador, Dominican Republic, Philippines, Fiji, South Africa, Mongolia, Egypt, Morocco, Kyrgyz Republic, Algeria, Bolivia, El Salvador
> 20 percentile	2.53 - 1.41	Guatemala, Sri Lanka, Honduras, Indonesia, Bostwana, Nicaragua, Namibia, **India**, Ghana, Cambodia, Kenya, Nigeria, Sudan, Pakistan, Yemen, Senegal, Dem. Rep. of Congo, Zambia, Bangladesh
> 6 percentile	1.4 - 0.79	Cameroon, Angola, Nepal, Uganda, Malawi, Rwanda, Mali, Tanzania, Papua New Guinea, Mozambique, Burkina Faso, Equatorial Guinea, Niger, Timor-Leste, Sao Tome, Liberia, Iraq, Chad, Afghanistan

Map of Press Freedom

- Survey conducted since 1980 by Freedom House of media independence in 196 countries and territories
- 23 Methodology questions and 109 indicators divided into three subcategories: the legal environment, the political environment, and the economic environment.
- Findings are reached after a multilayered process of analysis and evaluation by a team of regional experts and scholars. Although there is an element of subjectivity inherent in the index findings, the ratings process emphasizes intellectual rigor and balanced and unbiased judgments.
- Scores countries on a 0 (best) -100 (worst) scale
- Provides numerical rankings and rates each country's media as:
    - "Free": 0 - 30
    - "Partly Free": 31 - 60
    - "Not Free": 61 - 100

Country's Summary for Map of the Press Freedom 2011

Freedom of the Press Category	Country
Free	Chile, Costa Rica, Czech Republic, France, Germany, Ghana, Mali, New Zealand, Norway, Papua New Guinea, Poland, Portugal, Sao Tome, Slovakia, Slovenia, South Korea, Spain, Sweden, Trinidad and Tobago, UK, **United States**
Partly Free	Albania, Argentina Bangladesh, Bolivia, Bosnia and Herzegovina, Botswana, **Brazil**, Bulgaria, Burkina Faso, Colombia, Croatia, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Georgia, Guatemala, Honduras, **India**, Indonesia, Italy, Kenya, Lebanon, Macedonia, Malawi, Mexico, Mongolia, Mozambique, Namibia, Nepal, Nicaragua, Nigeria, Peru, Philippines, Romania, Senegal, Serbia, South Africa, Tanzania, Thailand, Turkey, Uganda, Ukraine
Not Free	Afghanistan, Algeria, Angola, Azerbaijan, Cambodia, Cameroon, Chad, **China**, Dem. Rep. of Congo, Equatorial Guinea, Iraq, Jordan, Kazakhstan, Kyrgyz Republic, Liberia, Malaysia, Morocco, Niger, Pakistan, **Russia**, Rwanda, Saudi Arabia, Sri Lanka, Sudan, Timor-Leste, Venezuela, Vietnam, Yemen, Zambia

Variables From CIA World Factbook

- **School Life Expectancy (SLE):** The total number of years of schooling (primary to tertiary) that a child can expect to receive, assuming that the probability of his or her being enrolled in school at any particular future age is equal to the current enrollment ratio at that age.
- **Urbanization:** Describes the percentage of the total population living in urban areas, as defined by the country. The theoretical model of the study assumes that urbanization improves the physical and technological infrastructure of a country and will allow citizens better access to obtain government information. Therefore, urbanization promotes information diffusion. Given that not all countries display similar urbanization rates and the model assess the impact of ICTs and country's educational achievement regardless of urban development, we have used urbanization as a control variable.
- **GDP per capita (PPP):** This entry shows GDP on a purchasing power parity basis divided by population as of 1 July for the same year. GDP per capita is a classic control variable in country-level analysis.

Regression Equation

$$Y(OBI) = a + IDI\ \beta + SLE\ \beta + GDP\ per\ capita\ \beta + Urbanization\ \beta + Freedom\ of\ the\ Press\ \beta$$

Dependent Variable: Open Budget Index (OBI)

Independent Variables:

- ICT Development Index (IDI)
- School Life Expectancy (SLE)

Control Variables:

- Freedom of the Press
- Urbanization
- GDP per capita

Regression Results

Dependent Variable: Open Budget Index (OBI), N = 94

Independent Variables	***Non-standardized Coefficients***	***Standard Error***	***Standardized Coefficients (Beta)***	***Significance (p)***
ICT Development Index (IDI)	4.25*	2.30	0.32	0.068 *
School Life Expectancy (SLE)	3.27**	1.23	0.39	0.010 **
Freedom of the Press	-9.93***	2.95	-0.29	0.001***
Urbanization	-0.16	0.12	-0.14	0.20
GDP per Capita (log)	-1.64	3.08	-0.08	0.60
Constant	32.82	22.85		0.15

R^2 = 0.55; Adjusted R^2 = 0.52

****p < 0.01; **p < 0.05; *p < 0.10*

Implications

- Legislators committed to promoting democracy and transparency must ensure that educational and ICT developments are prioritized domestically.
- If the directional effects of this study prove to be valid overtime, countries must at a minimum maintained educational enrollments and increase ICT access to achieve financial transparency.
- Disparities in accessing ICTs and education will significantly disadvantage societies from obtaining the freedom that a democratic regime can promise.

Limitations

- Might need to find additional independent variables to strengthen the 'knowledge diffusion' hypothesis.
- Further analysis is being explored around democracy indicators (i.e. head of state years in power).
- We wonder to what extent the financial information disclosed by the 94 countries is bias free and accurate.
- The research model does not take into consideration the source and nature of the users of ICT technologies. Is the nature of certain ICTs more directly link to fiscal transparency than others?
- It is not obvious at this time how ICT and education increases fiscal transparency. For example, it is not clear if ICTs reduce the cost of citizens in demanding information from government or, if the potential causation is reverse, ICTs reduces the cost of distributing budget information by the federal governmental institutions. Likewise, the impact of education in fiscal transparency could be caused by not yet observed confounding variables or it could represent a bi-directional relationship.

Appendix

Working Paper: Relationship between Fiscal Transparency and "Knowledge Diffusion Variables": A Cross-Country Analysis

Author: *Lourdes Alers-Tealdi, PhD Student at SPAA, Rutgers - Newark*

Abstract: This cross-country study examines the relationship between fiscal transparency and variables that promote 'knowledge diffusion ' such as information and communication technologies (ICTs) and educational attaintment. To examine this relationship, the researcher builds a theoretical and statistical model using data from the IBP's Open Budget Index, the ITU's ICT Development Index, the CIA's World Factbook and the Map of Press Freedom. In addition to democratic mechanisms, the study concludes that transparency of the national budget document and the budgeting process might be improved through actions enabled by "knowledge diffusion variables". The study uses multivariate regression analysis to establish empirical evidence. To date, no published research has examined the statistical relationship between fiscal transparency and "knowledge diffusion variables". This research seeks to fill in the gap within the literature by introducing "knowledge diffusion variables" that correlate with an established index that measures fiscal transparency across 94 countries.

Selected Literature Review

Theoretical Conceptualization

- We argue that the concept of an information society where the focus is mainly on information and communication technologies (ICT) is too limited and that a fuller and richer concept is denoted by the term Knowledge Society where the emphasis is on content – the creation, distribution and use of information and knowledge in society – and the development of human capacity" (Lor and Britz, 2007).
- "More and more public administration emphasizes how Information and Communication Technology (ICT) can be used to support transformational change in governmental functions globally to achieve efficiency and cost effective service delivery to citizens…Experience in some developing countries has shown that e-governance can improve transparency which leads to, among other things, corruption and poverty reduction" (Bhuiyan, 2010).

Selected Literature Review

Transparency and ICT Research

- By enhancing openness, transparency and accountability of public administration, ICTs will increase the degree of interest and involvement of citizens in politics (Norris, 2001)
- A.J. Meijer showed that increased transparency could be an unintentional effect of efforts of ICT-management to improve the support of and administration of government offices. As a result, it benefits parliament and the ombudsman through facilitating fact-finding within the government apparatus (2003)
- Because contemporary democracies have much more active groups now than in the past and many of these groups have greater access to budget makers than they once had, the budgeting process is more open to outside influences (Schick, 2003)

Selected Literature Review

Transparency and ICT Research

- The rule of law plays an important role when it gives the public a legal and constitutional right to request specific documents through enacted public records laws (Piotrowski, 2007).
- Empirically, V. Pina et al. were able to show that although ICTs do not promote financial accountability further away from legal requirements, the mere Internet capacity of dissemination of information improves accountability in all cases. Although the websites analyzed in this study were not interactive, the available evidence suggested that ICTs could increase transparency, empower citizens to monitor government performance more closely and bring about higher interaction between citizens and government (2007).
- Bastida and Benito found a significant relationship between budget transparency, fiscal situation and political turnout (2007).
- Holzer and Halachmi asserted that by adapting and exploiting the benefits of ICT, government agencies could significantly improve performance (2010).
- The right to access government information is “essential to participation in the democratic process” (Jaeger and Bertot, 2010).

CIA World Factbook

The World Factbook (ISSN 1553-8133; also known as the CIA World Factbook) is a reference resource produced by the Central Intelligence Agency of the United States with almanac-style information about the countries of the world. The Factbook is available in the form of a website, which is partially updated every week. It is also available for download for use off-line. It provides a two- to three-page summary of the demographics, geography, communications, government, economy, and military of 266 entities including U.S.-recognized countries, dependencies, and other areas in the world.

Summary of Variables within Code Book

Variable	Mean	Std. Deviation	Min	Max	N
OBI	42.21	24.53	0	92	94
IDI	3.15	1.85	0.79	7.85	94
SLE	12.13	2.96	4	19	94
Freedom of the Press	2.09	0.73	1	3	94
Urbanization	53.71	21.55	13	93	94
GDP per Capita (log)	8.71	1.17	5.70	10.99	94

Correlation Matrix with Significance

Variables	OBI	IDI	SLE	Freedom of the Press	Urbanization	GDP per Capita (log)
OBI	1.00					
IDI	0.66*	1.00				
SLE	0.66*	0.86*	1.00			
Freedom of the Press	-0.60*	-0.56*	-0.51*	1.00		
Urbanization	0.39*	0.68*	0.71*	-0.31*	1.00	
GDP per Capita (log)	0.54*	0.85*	0.79*	-0.44*	0.71*	1.00

*$p < 0.05$