The impact of e-government on sustainable development: a logit model

Cristina Lopes
cristinalopes@iscap.ipp.pt
CEOS.PP, ISCAP
Politécnico do Porto

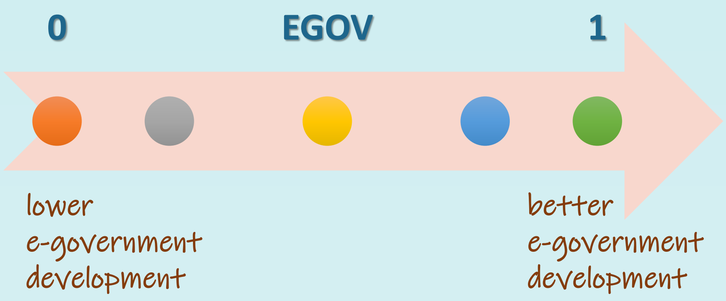
Conceição Castro
mariacastro@iscap.ipp.pt
CEOS.PP, ISCAP
Politécnico do Porto

e-Government

It is recognized that the quality of institutions affects sustainable development [1]. Better government may contribute to proper resource allocation fostering sustainable development [5]. The impact of e-government and other variables on sustainable development is analysed using a logit model with a sample of 103 countries in the period 2003–2018.

"the use of information and communication technologies (ICTs), and particularly the Internet, to achieve better government" **(OECD).**

e-Government Development Index:
(from the United Nations)



Sustainable Development

Sustainable development will be proxied by **Adjusted Net Savings** in percentage of Gross National Income (**ANS**), an indicator provided by the World Bank that embraces a country's economic, social and environmental development and that is commonly adopted as a broad indicator of sustainability over the long run [4].

$$ANS = \frac{GNS - D_K + GEE - D_{NC} - CO_2}{GNI}$$

GNS	gross national savings
GEE	government operational expenditure in education
DK	consumption of produced capital
DNC	depletion of natural capital (energy, mineral, net forest)
CO2	damages from carbon dioxide and particulate emissions
GNI	gross national income

A country with a non-negative derivative of wealth can be seen as a country in a sustainable development path [5]. As we are using ANS as a proxy for Sustainable Development, therefore we are interested in knowing when ANS is non-negative. Therefore, a binary variable was defined to flag when a country is in a sustainable path:

suggests that the present value of welfare is increasing

$$ANSbin_i = \begin{cases} 1 & \text{if} \quad ANS_i \geq 0 \\ 0 & \text{if} \quad ANS_i < 0 \end{cases}$$

persistently negative ANS are indicating that the economy is in an unsustainable path.

Logit Model

A logistic regression model was developed to relate the probability of having non-negative ANS with several key factors for sustainable development.

$$\ln\left(\frac{\mu_i}{1-\mu_i}\right) = \beta_0 + \beta_1 EGOV_i + \beta_2 AgeDep_i + \beta_3 EconGrowth_i + \beta_4 NatRents_i + \beta_5 GNI_i$$

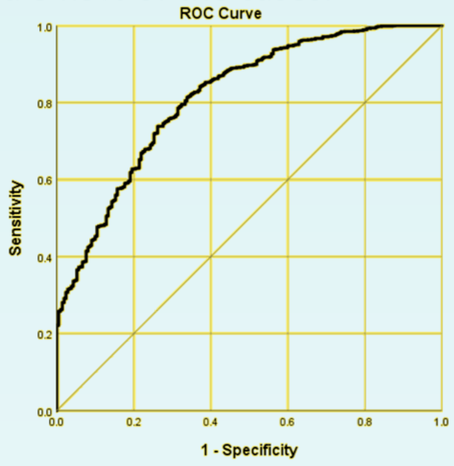
$\mu_i = P(ANSbin_i = 1)$ → probability of a country to achieve sustainable development

$\frac{\mu_i}{1-\mu_i}$ → the odds are the ratio of the probability of a country having sustainable development to the probability that ANS will be negative

The choice of the control variables was guided by previous empirical studies on the determinants of sustainable development.
It is expected that economic growth indicts an increase in investment resources, contributing to the accumulation of a productive base, and so increasing Adjusted net savings [5].
Nevertheless, economic growth can affect negatively sustainable development due to increases in environmental pollution [2].
Natural resources rents measure the degree to which an economy depends on natural resources to generate income.

	All countries			Developing and Transition economies		
	Coefficient	Odds ratio	p-value	Coefficient	Odds ratio	p-value
constant	1.628130	5.094339	0.0249**	0.623007	1.864526	0.4444
EGOV	2.352390	10.51066	0.0041***	3.106550	22.34383	0.0009***
Age dependency	−0.020412	0.979795	0.0024***	−0.010138	0.989913	0.1808
Economic growth	0.118523	1.125833	<0.0001***	0.136516	1.146273	<0.0001***
Natural rents	−0.059703	0.942044	<0.0001***	−0.083380	0.920001	<0.0001***
GNI per capita	0.000056	1.000056	<0.0001***	0.000123	1.000123	<0.0001***
Akaike Inform. Criterion	967.7789			802.7321		
Adjusted R-squared	0.219750			0.203445		
McFadden R-squared	0.229425			0.215353		
Log-likelihood	−477.8895			−395.3660		
Likelihood ratio test χ^2_5	284.566		<0.0001	217.023		<0.0001
Correctly predicted cases	1404	(88.5%)		930	(84.9%)	

The logit model was estimated for the whole sample, and separately for the subsample of developing and transition economies. The likelihood ratio tests, significant at a 1% level, show the overall goodness of fit. Although the values obtained from pseudo R^2 are moderate, the models correctly classify the outcome for 88.5% and 84.9% of the cases.



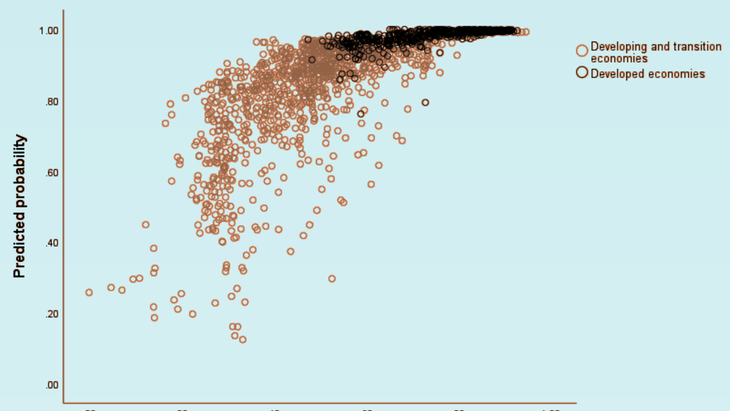
The areas under the ROC (Receiver Operating Characteristic) curves, 0.815 and 0.802, reveal a good discriminating capacity, demonstrating the usefulness of these logit models for classifying new observations.

Results

The results suggest that e-government is an important determinant of the odds of having sustainable development.
With an increase of 0.1 in e-Government Development Index, and maintaining the remaining variables constant, it is expected that the odds of having sustainable development increase about 26.52%:

$$\left(e^{\beta}\right)^{0.1} = \left(e^{2.35239}\right)^{0.1} = 1.2652$$

In the subsample of developing and transition economies, the odds of having sustainable development increase by about 36.43%, which is higher than in the whole sample.



Conclusions

The results show that

- **countries with higher e-government development are more likely to attain sustainable development**, particularly in developing and transition economies.

This evidence highlights the importance for developing and transition economies to invest in the use of ICTs by governments, as a part of an overall public policy strategy to achieve sustainable development.

The results also suggest that

- **economic growth** and **GNI per capita** are significant **positive** influences,
- increases in **age dependency** and **natural resource rents** may **reduce** the likelihood of a country having sustainable development.

The negative impact of natural resource rents is consistent with the resource curse hypothesis.

References

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JOCLAD 2021 — UNIVERSIDADE BEIRA INTERIOR
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CEOS.PP CENTRE FOR ORGANISATIONAL AND SOCIAL STUDIES OF POLYTECHNIC OF PORTO
FCT Fundação para a Ciência e a Tecnologia

This work is financed by Portuguese national funds through FCT - Fundação para a Ciência e Tecnologia, under the project UIDB/05422/2020