Assesing the Impact of Public Research Funding on Scientific Production – the Case Study from Slovakia

Alexandra Lešková

Ph.D. Candidate

Department of Public Administration and Regional Development

Faculty of National Economy

University of Economics in Bratislava, Slovakia

E-mail: alexandra.leskova@euba.sk

4TH EUA FUNDING FORUM

FRAMEWORKS THAT EMPOWER, UNIVERSITIES THAT DELIVER

Hosted by Ramon Llull University, Barcelona, Spain

18 - 19 OCTOBER 2018

Introduction

- Governments all over the world spend annually millions on providing support for research and development
- Research requires substantial funding and states are interested in investing in this area as it contributes to scientific knowledge and economic growth (Romer, 2012)
- Moreover, knowledge produced by basic research provides positive externalities for the whole society (OECD, 2014)
- The key players in producing basic research in OECD countries are public universities (OECD, 2014)
- Thus a high volume of public funding is devoted to them by different schemes and ways of funding (EUA, 2015)

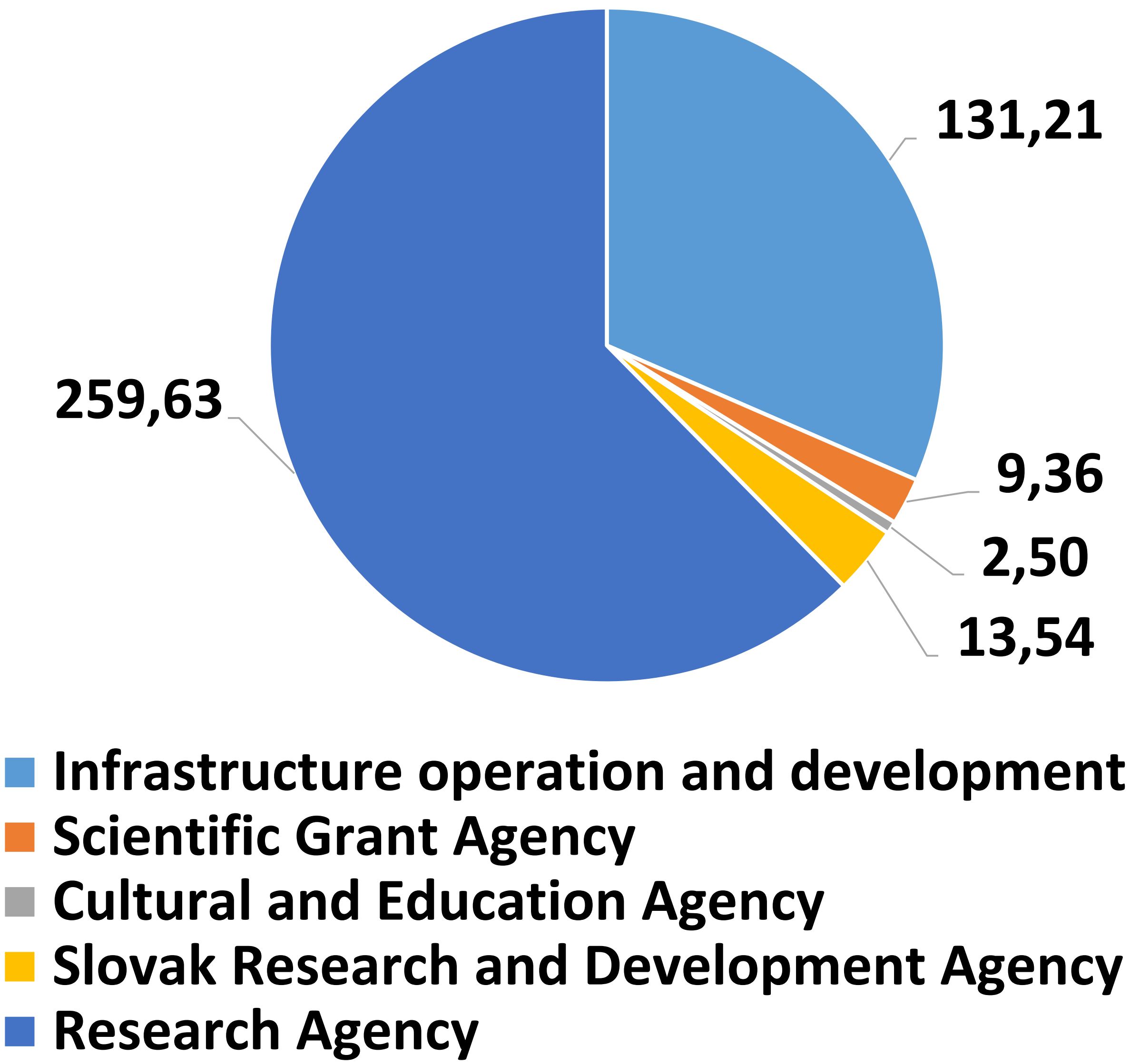
Research funding of universities in Slovakia

- National institutional funding:
  - Subsidies for ***R&D infrastructure*** operation and development including scholarship for Ph.D. students and personal remuneration based on publications
    - dependent on performance indicators of university such as share of university on research grants in previous years, number of PhD. students or share on publications
  - Support for ***top research teams*** identified by Accreditation committee
  - ***The Cultural and Education Grant Agency***
  - ***The Scientific Grant Agency*** – both work on competitive basis and support public universities and the Slovak Academy of Science

- National funding of special purposes:
  - ***Slovak Research and Development Agency***
    - Basic and applied R&D carried out by public sector, universities, business sector and non-profit sector (Ministry of Education, 2015)

- Foreign sources:
  - ***Research Agency***
    - Sources from EU funds

Graph 1 – Sources of Funding for Public Universities in 2015 in million €



Source: Ministry of Education, Science, Research and Sport of SR. 2016. Report of the state of research and development in the Slovak Republic and its comparison with abroad for the year 2015

Introduction

- With limited finance, understanding the impact of government expenditures is crucial. Especially for policy makers, who may want to know how the marginal impact of a euro of research funding varies across researcher, institution or field
- This study is a pilot study in Slovakia measuring an effect of volume of funding on scientific production
- Moreover, we try to identify other variables that could have an influence on knowledge production

Methodology

- A good indicators of research output are considered to be scientific publications registered in important databases (Hicks, 2012, Moed et al., 2004; Ebadi a Schiffauerova, 2015; Tahmooresnejad et al., 2015)
- Especially in a field of social science where practically no patent activity exists
- Because EU funds do not always yield in publications, it would be difficult to analyse precisely outputs from this support
- Slovak Research and Development Agency usually supports huge research teams from different organizations (business sector) and the data about the outcomes from the projects are limited
- Thus we focus on the outcomes of the grants received from the Scientific Granty Agency

Methodology

- Focus on the field of economics since it is not highly dependent on infrastructure
- Projects run from 2010 to 2015 under two different faculties of economics - the Faculty of National Economy of the University of Economics in Bratislava (UEBA) and the Faculty of Economics of the Technical University of Košice (TUKE)
  - the best performers in the field of economics in Slovakia according to the yearly evaluation of the Academic Rating Agency
- 52 projects in total, 32 by UEBA

Methodology

- Our dependent variables are count data and various models for count data have been already used
- The Poisson model is often employed by studies (Tahmooresnejad et al., 2015; Riphahn et al, 2003).
- However, because of the over-dispersion in data, some authors recommend the Negative Binomial Regression (Payne and Siow, 2003; Tahmooresnejad et al., 2015; Ebadi and Schifauerova, 2015).

Regression Models

$$NoScop_{it} = f(fund1_{it-1} + size_{it} + aScop1_{it-1} + aReg1_{it-1} + aMono1_{it-1} + loc2_{it} + wom_{it} + aCoScop_{it})$$

$$NoReg_{it} = f(fund1_{it-1} + size_{it} + aScop1_{it-1} + aReg1_{it-1} + aMono1_{it-1} + loc3_{it} + wom_{it} + aCoReg_{it})$$

$NoScop_{it}, NoReg_{it}$ - number of indexed (Scopus, Wos) and non-indexed articles from project
$fund1_{it-1}$ - amount of funding in project
$size_{it}$ - the size of a project team
$aScop1_{it-1}$ - average past productivity in indexed journals
$aReg1_{it-1}$ - average past productivity in non-indexed journals
$aMono1_{it-1}$ - average past productivity in monographies and chapters
$loc2_{it}$, $loc3_{it}$- dummy for Bratislava region
wom_{it} - a share of women in project
$aCoScop_{it}$, $aCoReg_{it}$- average number of coauthors publishing an article

Table 1 – Regression results on number of articles indexed in Scopus, Web of Science

Zero-inflated negative binomial regression			Number of obs	=	416	
			Nonzero obs	=	40	
			Zero obs	=	376	
Inflation model = logit			Wald chi2(7)	=	107.39	
Log pseudolikelihood = -90.55709			Prob > chi2	=	0.0000	

noScop	Coef	Robust Std. Err.	z	P>z	[95% Conf.	Interval]
noScop						
aScop1	1.268688	.3182342	3.99	0.000	.6449604	1.892416
aReg1	-.0279947	.1750308	-0.16	0.873	-.3710488	.3150594
aMono1	.4914995	.4764852	1.03	0.302	-.4423944	1.425393
aCoScop	1.254197	.1675763	7.48	0.000	.925753	1.58264
wom	1.84876	.8851608	2.09	0.037	.113877	3.583644
size	.1003161	.0332663	3.02	0.003	.0351154	.1655168
lfund1	.0206672	.0572065	0.36	0.718	-.0914554	.1327898
_cons	-5.370841	.5196095	-10.34	0.000	-6.389257	-4.352425
inflate						
loc2	-21.92293	.4086606	-53.65	0.000	-22.72389	21.12197
_cons	-17.40921	.266004	-65.45	0.000	-17.93057	-16.88785
/lnalpha	-.4696039	.4577697	-1.03	0.305	-1.366816	.4276082
alpha	.6252498	.2862205			.2549173	1.533585

Table 2 – Regression results on number of non-indexed articles

Zero-inflated negative binomial regression			Number of obs	=	416	
			Nonzero obs	=	100	
			Zero obs	=	316	
Inflation model	= logit		Wald chi2(7)	=	624.42	
Log pseudolikelihood	= -248.4838		Prob > chi2	=	0.0000	

noReg	Coef	Robust Std. Err.	z	P>z	[95% Conf.	Interval]
noReg						
aScop1	.3086962	.3829817	0.81	0.420	-.4419341	1.059326
aReg1	.2850654	.1023728	2.78	0.005	.0844184	.4857124
aMono1	.3316173	.2454336	1.35	0.177	-.1494237	.8126584
aCoReg	1.199894	.2046403	5.86	0.000	.7988066	1.600982
wom	1.79404	.3645993	4.92	0.000	1.079439	2.508642
size	.1124644	.0168158	6.69	0.000	.079506	.1454228
fund1	.0000707	.0000219	3.23	0.001	.0000278	.0001135
_cons	-4.060813	.2183567	-18.60	0.000	-4.488785	-3.632842
inflate						
loc3	-26.11894	1.146485	-22.78	0.000	-28.36601	-23.87188
_cons	-15.70589	1.105392	-14.21	0.000	-17.87242	-13.53936
/lnalpha	-.8144709	.289519	-2.81	0.005	-1.381918	-.2470241
alpha	.4428736	.1282203			.2510966	.7811219

Conclusion

- Funding is not always a key factor of quality
- When the goal is quality, projects should be approved for larger research teams with previous publications of higher quality (indexed journals)
- Possibly with some share of women in project team
- Research colaboration is important factor with possitive effect
- Internal regulation at university may influence scientific outputs

Thank you for your attention.