

Performance-based Funding in German Higher Education

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1. Introduction
2. Performance-based funding in Germany – an overview
3. The basic model – production in German universities
4. Does PBF change university behaviour?
5. Summary and Conclusion

2. Inventory of state-level steering instruments

Steering mechanisms	BW	BY	BE	BB	HB	HH	HE	MV	NI	NW	RP	SL	SN	ST	SH	TH
Regulations and Instruments with implications on the structure of the higher education system																
Structural and development planning																
Structural Planning at state level		X	X		X	X		X	X	X		X	X	X		X
Development planning at university level	X	X		X	X	X		X	X	X	X	X	X		X	X
Development planning as joint responsibility of state and universities		X					X	X					X			
Development planning at department level	X			X				X		X			X	X		
Contractual agreements																
Frame contracts	X	X	X	(X)	X		X		X	X			X	X	X	X
Target agreement between state and university	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X
Contracts with target agreement character with universities			X													
Appointment of Professors																
Appointment of Professors		(X)				X	X		Ü	X		Ü	X		(X)	Ü
Civil servant status on approval	X	X	X	X	X	X	X	X	X	(X)	(X)		X	X	X	X
Additional instruments impacting on the structure of the university system																
Functional supervision (largely) restricted										X						
Universities can become a foundation		(X)		X			(X)		X	X						
University board	X	X	X	X		X	(X)	(X)	X	X	(X)	X	X	(X)	X	X
Option to test new structures and organisation forms	E		E	X	E		E	E	X	X	E	E	E	E	X	E
Intra-university steering instruments																
Intra-university target agreement mandatory by law		X	(X)		X		X						X		X	X
Intra-university performance-based funding system mandatory by law		X	(X)			X		X	X		(X)	X	X			X
Quality assurance																
Introduction of quality assurance system	X	X		X								X	X			X
Establishment of quality assurance instruments	X	X	(X)	X	X	X	X	X	X	X	X	X	X	X	X	X
Instrumente der Hochschulfinanzierung																
Lump-sum funding	X	(X)	X	(X)	X	X	X	X	X	X	(X)	X	X	X	X	
Performance-based funding	X	X	X	X	(X)	X	X	X	X	X	X	(X)	X	X	X	X
Tuition fees	(X)	(X)				(X)	(X)		(X)	(X)		(X)				
Financial competitions among universities at state level	X	X	X	X		X	X	X	X	X	X	X	X	X		X
	BW	BY	BE	BB	HB	HH	HE	MV	NI	NW	RP	SL	SN	ST	SH	TH

2. Inventory - PBF in the 16 states

Performance-based allocation of funds is based on the following principles						
State	Target group		Allocation of funds		Reference level	
	Single circle	Two circles (Universities, UAS)	Price model	Distribution among Universities	Level	Differences
BY		X		X	X	
BW		X	Incentive part ¹	Volume part	Volume part	Incentive part
BB	X			X	X	
BE		X ²			X	
HB	Every single University has its own circle (suspended in 2008)			X		X
HH	Every single University has its own circle			X	X ³	
HE		X	X			
MV		X		X	X	
NI	No distinction across Univ./UAS, but between groups of subjects			X	X	
NW		X		X	X	
RP	X			X	X	Gender equality ⁴
SH		X		X	X	
SL		X		X		X
SN		X		X	X ⁵	
ST		X		X	X	
TH		X		X	X	

Remarks: 1: The allocation of funds from the incentive budget depends solely on the performance of this particular university. As the amount is flexible and no lump-sum, in fact, the incentive budget is identical with a price model; 2: Within each model (for Univ./for UAS) the groups of subjects compete amongst each other; 3: The core budget (85% of total allocation) is based on the graduate numbers established in the target agreements; 4: Difference in Performance between to points in time; 5: Indicators are weighted by size in relation to other HEI of the same type of HEI (U, UAS/ Arts univ.)

2. Inventory - PBF in the 16 states

State	Share of PBF on total funding	Competition between universities ¹	Reference year(s)	Remarks
BW	20,00 %	Incentive budget: no; Volume budget: yes	2007-2009	
BY	Uni 1,45 %, FH 0,57 %	yes	2010	Innovation funds: 2% Uni, UAS 0,7%
BE	27,78 %	yes	2008	Competition between groups of subjects
BB	20,40 %	yes	2007	
HB	10,00 %	no	2006	suspended since 2008
HH	12,00 %	yes	2007	
HE	16,00 %	no	2008 (up to 25 % in 2010)	
MV	8,00 %	yes	2009	
NI	9,71 %	yes	2008	Competition between groups of subjects
NW	19,42 %	yes	2007	
RP	17,4% (T&R)	yes	2005	One single frame for all HEI
SH	5,00 %	yes	2009	
SL	Uni 11,75 %, FH 11 %	no	2010	in ZV der Uni Saarland geregelt
SN	1,40 %	yes	2006	
ST	5,00%	yes	2011 (up to 15 % in 2013)	
TH	19 % (T&R 12 %, Personell 7 %)	yes	2009 (up to 40 % in 2011)	

2. Inventory: LOM-Indicators – Universities

Universities	Nominal values					In relation to total budget					Reference year(s)
	Teaching	Research	Gender equality	Internat.	Other	Teaching	Research	Gender equality	Internat.	Other	
BW: Volume part	55,00 %	45,00 %				5,50 %	4,50 %				2007-2009
BW: Incentive part	43,75 %	25,00 %	31,24 %			4,38 %	2,50 %	3,12 %			
BY	51,00 %	39,00 %	10,00 %			0,74 %	0,57 %	0,15 %			2006-2010
BE	50,00 %	45,00 %	5,00 %			13,89 %	12,50 %	1,39 %			2009
BB	50,00 %	40,00 %	10,00 %			10,20 %	8,16 %	2,04 %			2006-2007
HB	35,00 %	50,00 %				3,50 %	5,00 %				2006-2008
University of Hamburg	35,00 %	35,00 %	15,00 %	15,00 %		3,50 %	3,50 %				
TU Hamburg- Harburg	35,00 %	35,00 %	10,00 %	20,00 %		4,20 %	4,20 %	1,20 %	2,40 %		2005-2010
HE	Price model										2008/2010
MV	50,00 %	50,00 %				4,00 %	4,00 %				2008-2009
NI	48,00 %	48,00 %	4,00 %			4,66 %	4,66 %	0,39 %			2008-2009
NW	50,00 %	50,00 %				9,71 %	9,71 %				2007
RP	56,00 %	38,00 %			6,00 %	9,74 %	6,61 %			1,04 %	2005
SH	40,00 %	50,00 %	10,00 %			2,00 %	2,50 %	0,50 %			2009
SL: Funds for obligatory Deliverables	55,00 %	30,00 %	12,00 %		2,00 %	6,46 %	3,53 %	1,41 %		0,24 %	2008-2010
SL: Parameter for Minimum deliverables	60,00 %	40,00 %				7,05 %	4,70 %				2008-2010
SN	43,00 %	43,00 %			15,00 %	0,60 %	0,60 %				2008
ST	50,00 %	45,00 %	5,00 %			2,50 %	2,25 %	0,25 %			
TH: Research & Teaching	65,00 %	35,00 %				7,80 %	4,20 %				2008-2010
TH: Staff funding	50,00 %	50,00 %				3,50 %	3,50 %				

In most states, teaching & research are given the same share in PBF for universities

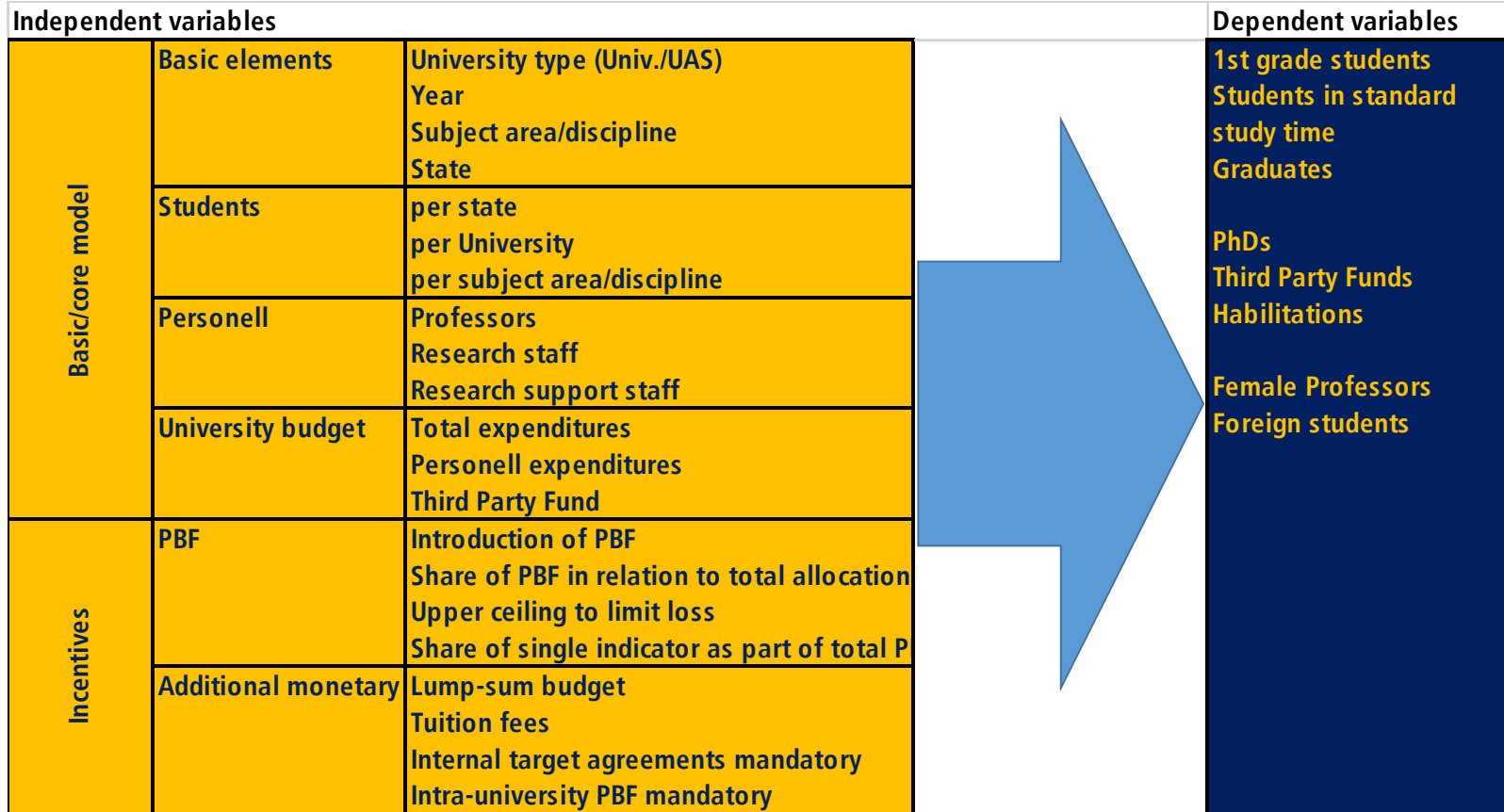
2. Inventory: LOM-Indicators – Universities

Universities of Applied Sciences	Nominal values					In relation to total budget					Reference year(s)
	Teaching	Research	Gender equality	Internat.	Other	Teaching	Research	Gender equality	Internat.	Other	
BW: Volume part	80,00 %	20,00 %				8,00 %	2,00 %				2007-2009
BW: Incentive part	80,00 %	10,00 %	10,00 %			8,00 %	1,00 %	1,00 %			
BY	76,00 %	12,00 %	12,00 %			0,43 %	0,07 %	0,07 %			2006-2010
BE	80,00 %	15,00 %	5,00 %			22,22 %	4,17 %	1,39 %			2009
BB	50,00 %	40,00 %	10,00 %			10,20 %	8,16 %	2,04 %			2006-2007
HB: UAS Bremen	85,00 %	15,00 %				8,50 %	1,50 %				2006-2008
HB: UAS Bremerhaven	70,00 %	30,00 %				7,00 %	3,00 %				
HH	40,00 %	20,00 %	20,00 %	20,00 %		4,80 %	2,40 %	2,40 %	2,40 %		2005-2010
HE	Price model					Price model					2008/2010
MV	90,00 %	10,00 %				7,20 %	0,80 %				2008-2009
NI	84,00 %	12,00 %	4,00 %			8,16 %	1,17 %	0,39 %			2008-2009
NW	85,00 %	15,00 %				16,50 %	2,91 %				2007
RP	56,00 %	38,00 %			6,00 %	9,74 %	6,61 %			1,04 %	2005
SH	50,00 %	40,00 %	10,00 %			2,50 %	2,00 %	0,50 %			2009
SL: Funds for obligatory Deliverables	55,00 %	30,00 %	12,00 %		2,00 %	6,05 %	3,30 %	1,32 %		0,22 %	2008-2010
SL: Parameter for Minimum deliverables	40,00 %	40,00 %			20,00 %	4,40 %	4,40 %			2,20 %	2008-2010
SN	76,00 %	24,00 %				1,06 %	0,34 %				2008
ST	50,00 %	40,00 %	10,00 %			4,00 %	0,75 %	0,25 %			2011
TH: Research & Teaching	50,00 %	40,00 %	10,00 %			6,00 %	4,80 %	1,20 %			2008-2010
TH: Staff funding	75,00 %	25,00 %				5,25 %	1,75 %				

... while teaching plays a much stronger role for the UAS

Commonly, the share of PBF on total budget is limited, 1-25%

3. Statistical Analysis



Overall information:

- ~178 public universities
- On average: 5-6 departments
- Time frame: 2000-2008

3. Statistical Analysis – PBF system



	Teaching						Foreign students	Research						Female Professors		
	1st grade students		Graduates		Students in Standard Period of Study			PhD's		Third Party Funding		Habilitation				
	Beta	Sig.	Beta	Sig.	Beta	Sig.		Beta	Sig.	Beta	Sig.	Beta	Sig.		Beta	Sig.
(Konstante)				***				*				*				***
Students in discipline	0,88	***	0,61	***	n.v.		1,04	***	0,03		-0,23	***	0,26	***	0,18	***
Size of the University	-0,04	***	-0,08	**	0,22	***	0,04	**	0,11	***	0,03	*	0,04	*	-0,03	*
No of Professors	0,12	***	0,30	***	0,48	***	-0,07	***	0,48	***	-0,07	***	0,63	***	0,61	***
No of Researchers	-0,06	***	0,15	***	0,39	***	-0,23	***	0,06	*	0,59	***	-0,18	***	0,14	***
Share of BA/MA-Students	0,00		0,07	***	-0,04	***	-0,03	***	-0,01		-0,04	***	-0,01		0,08	***
Expenditures for Teaching and Research	-0,01		-0,01		-0,06	**	-0,03	*	0,10	***	0,53	***	-0,02		-0,04	*
Third Party Funding	0,08	***	-0,06	***	-0,16	***	0,28	***	0,24	***	n.v.		0,07	**	-0,20	***
University (vs. UAS)	0,04	***	-0,01		-0,01		-0,08	***	n.v.		0,02	*	n.v.		-0,02	*
Engineering	-0,04	***	-0,05	***	-0,19	***	0,04	***	-0,03		0,09	***	-0,07	**	-0,27	***
Science	-0,04	***	-0,09	***	-0,19	***	-0,01		0,13	***	0,05	***	0,07	**	-0,20	***
Trend over Time	0,00		0,08	***	0,03	***	0,00		0,01		0,04	***	-0,09	***	0,08	***
Quality of the Model (all R ² are significant)	Korr. R ²	0,95	Korr. R ²	0,89	Korr. R ²	0,85	Korr. R ²	0,81	Korr. R ²	0,78	Korr. R ²	0,82	Korr. R ²	0,69	Korr. R ²	0,75

Engineering and science show small negative coefficients for teaching outputs, and score slightly better on research

Humanities and Social Sciences show better teaching outputs

The important role of the size of a faculty indicate relevant economies of scale

3. Statistical analysis – basic model

Students within the prescribed study duration	Universities			Universities of applied science		
	B	Beta	Sig.	B	Beta	Sig.
(Constant)	-160763,822		***	-42307,441		***
Number of students in department	n/a	n/a	n/a	n/a	n/a	n/a
HEI size	,088	,200	***	,076	,219	***
Number of professorships	32,080	,572	***	13,525	,548	***
Number of academic positions	,860	,147	***	1,738	,171	***
Proportion of BA & MA students	-708,214	-,086	***	-103,686	-,045	***
Expenditure for teaching and research	-,011	-,041	*	,031	,062	***
Third-party funding	-,011	-,043	*	,018	,015	
Engineering	-2283,980	-,272	***	-420,891	-,209	***
Natural science	-2615,206	-,343	***	-452,501	-,222	***
Trend over time	80,822	,057	***	21,289	,058	***
R ²	,857	,856		,874	,873	

Source: QualitAS-Dataset. Legend: (***) significant on 0.1% level, (**) significant on 1% level, (*) significant on 5% level.

The number/share of students within the prescribed study period is considered as efficiency indicator

For most variables, direction and strength is similar:

The student-teacher ratio important, followed by research staff

Engineering and science perform worse than humanities/socSci

Time trend is positive

... but in detail differences can be observed:

Expenses for T&R shows negative sign for univ', but positive for AUS

Third party funding correlates negatively with studying efficiency at univ.

3. Statistical analysis – basic model

Graduates	Universities			Universities of applied science		
	B	Beta	Sig.	B	Beta	Sig.
(Constant)	-50844,854		***	-9581,971		***
Number of students in department	,062	,587	***	,110	,678	***
HEI size	-,006	-,089	***	-,005	-,063	***
Number of professorships	3,017	,345	***	1,156	,217	***
Number of academic positions	,106	,116	***	,143	,065	***
Proportion of BA & MA students	92,740	,072	***	57,625	,117	***
Expenditure for teaching and research	,000	-,004		-,002	-,023	*
Third-party funding	-,003	-,079	***	,004	,015	
Engineering	7,239	,006		-45,956	-,105	***
Natural science	-93,482	-,079	***	-40,567	-,092	***
Trend over time	25,382	,115	***	4,793	,060	***
R ²	,891	,890		,849	,848	

Source: QualitAS-Dataset. Legend: ***) significant on 0.1% level, **) significant on 1% level, *) significant on 5% level.

The number of graduates is a core output indicator

For most variables, direction is similar, but B and Beta vary:

The student-teacher ratio remains important as does number of research staff

The positive correlation of the no of stud. in department indicates economies of scale

A higher share of BA/MA-students increases the graduates no.

Time trends are positive

Expenses for T&R shows negative relation at UAS

Third party funding correlates negatively with the number of graduates at universities

No statistical differences between engineering and Hum/SocSci at univ., but at AUS, for

3. Statistical analysis – basic model

Third-party funding	Universities			Universities of applied science		
	B	Beta	Sig.	B	Beta	Sig.
(Constant)	-532296,171		***	-83963,286		***
Number of students in department	-,389	-,145	***	,055	,093	*
HEI size	-,061	-,035	*	-,027	-,099	***
Number of professorships	-,370	-,002		2,468	,126	**
Number of academic positions	12,097	,521	***	1,729	,213	***
Proportion of BA & MA students	-1141,391	-,035	**	3,698	,002	
Expenditure for teaching and research	,505	,492	***	,118	,297	***
Third-party funding	n/a	n/a	n/a	n/a	n/a	n/a
Engineering	7656,987	,229	***	418,095	,261	***
Natural science	4558,548	,150	***	227,716	,141	***
Trend over time	264,051	,047	***	41,863	,143	***
R ²	,776	,775		,437	,435	

Source: QualitAS-Dataset. Legend: (***) significant on 0.1% level, (**) significant on 1% level, (*) significant on 5% level.

Third party funding (TPF) is considered an indicator concerning the quality of research

For some variables, direction is the same:

Engineering and sciences have higher revenues

TPF is positively correlated with number of research staff

Expenses for T&R correlated positively with TPF

The size of the university has a negative correlation

Trend over time is positive

However, the size of the coefficient is different

Some variables work in different directions:

Number of students in department: Univ (-), UAS (+)

Number of professors: Univ (-), UAS (+)

Proportion of BA/MA-students

Almost all models have a high to very high r^2 ! In most cases they explain more than 80%, sometimes even more than 90% of the variance

=> The room for a PBF to be effective is rather limited

Student-teacher ratios and number of research staff show positive correlations with teaching indicators

The size of a department has a positive impact => economies of scale

Indications of a trade-off between teaching and research outputs, but also the „production factors“ vary

However, universities and UAS have different production functions, even if the direction is the same

This clearly suggests to have different PBF-models

3. Statistical analysis – Introduction of PBF-model

University	1st grade students			Students in Standard study time"			Graduates			Foreign students		
	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.
Application of PBF	,846	,000		79,107	,010		-2,306	-,002		65,595	,059	***
R ²		,936			,856			,890				

The introduction of a PBF-model has only limited effects on the teaching indicators of Univ./AUS,

...

UAS	1st grade students			Students in standard study time			Graduates			Foreign students		
	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.
Application of PBF	-4,841	-,009		11,407	,005		-10,432	-,023	*	18,474	,059	***
R ²		,920			,873			,849			,733	

... but stronger effects on research indicators, ...

... though always with a negative sign

University	PhD's			Third Party Funding			Habitations			Female Professors		
	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.
Application of PBF	-1,595	-,009		-1072,946	-,033	*	-,279	-,018		-1,806	-,060	***
R ²	,779	,778		,777	,776		,693	,691		,833	,832	

UAS	Third Party Funding			Female Professors		
	B	Beta	Sig.	B	Beta	Sig.
Application of PBF	-60,035	-,036	*	-1,456	-,091	***
R ²		,436			,632	

R² does not increase

3. Statistical analysis – Introduction of PBF-model

University	1st grade students			Students in Standard study time "			Graduates			Foreign students		
	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.
PBF in relation to total grant	-182,398	-,049	***	-1622,018	-,032	*	-169,867	-,070	***	542,114	,079	***
Maximum redistribution after cut-backs	-32,083	-,017	*	164,747	,021		-32,884	-,026	*	-44,581	-,042	**
R²		,940			,852			,899			,822	
UAS	1st grade students			Students in Standard study time "			Graduates			Foreign students		
	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.
PBF in relation to total grant	-43,743	-,026	**	251,395	,021		4,298	,003		144,715	,079	***
Maximum redistribution after cut-backs	-9,795	-,019	*	-80,062	-,040	***	-2,457	-,006		-6,337	-,021	
R²		,929			,880			,852			,770	

The budget relevance, i.e. the share of PBF in relation to total budget matters...

... almost all teaching indicators show statistically significant changes,

The sign is more often negative at universities, but positive at UAS

	PhD's			Third Party Funding			Habitations			Female Professors		
	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.
PBF in relation to total grant	-11,250	-,035	*	-325,914	-,005		,539	,020		8,867	,158	***
Maximum redistribution after cut-backs	1,953	,012		-1233,593	-,039	*	-,837	-,059	***	-,448	-,015	
R²		,803			,773			,702			,842	

The impact on research indicators is less pronounced, ...

... and not significant for TPF

Looking at the redistribution effect after cutbacks, a similar picture arises

R² increases marginally in most cases

	Third Party Funding			Female Professors		
	B	Beta	Sig.	B	Beta	Sig.
PBF in relation to total grant	116,355	,022		9,766	,203	***
Maximum redistribution after cut-backs	87,402	,055	**	-,257	-,017	
R²	,485	,482		,675	,673	

3. Statistical analysis – specification of the PBF-model

	1st grade students			Students in Standard study			Graduates			Foreign students		
	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.
Share of Indicator 1st grade students in relation to total PBF	1389,008	,045		16085,726	,129	*	-2028,286	-,101	*	-4099,227	-,242	***
Share Indicator on Graduates in relation to total PBF	-2905,540	-,423	**	-16323,446	-,582	*	1357,297	,302		5902,575	1,551	***
Share Indicator on Students in standard study time in relation to	-3838,135	-,372	**	-20213,008	-,480	*	2318,388	,344	*	8949,150	1,564	***
Share on foreign students indicator on total PBF	-2609,753	-,146	**	-15397,586	-,211	*	872,073	,074		5149,828	,519	***
Share of PhD-indicator on total PBF	1319,982	,087	**	3746,901	,061		-1036,368	-,105	**	-1500,895	-,179	***
Share of indicator on Third Party Funding on total PBF	575,739	,064	*	4257,982	,116	*	-487,983	-,083	*	-360,110	-,072	
Share of habilitations indicator on total PBF	3511,707	,102	***	12084,090	,086	*	-1979,809	-,088	*	-2401,986	-,126	**
Share of indicator on female Professors on total PBF	639,539	,047	*	417,823	,007		103,016	,011		1447,674	,190	***
Total number of indicators of PBF-model	-66,018	-,206	*	-465,876	-,355	*	56,011	,267	*	211,208	1,185	***
Lump-sum budget	-17,398	-,008		29,239	,003		-51,204	-,035		-27,740	-,023	
Tuition fees	-20,022	-,009		-184,271	-,019		80,669	,053	***	-53,462	-,042	*
Mandatory intra-university target agreements	-293,069	-,147	***	-428,380	-,053		19,890	,015		195,614	,177	***
Mandatory intra-university PBF	112,124	,059		607,908	,078		-156,124	-,125	*	-649,256	-,611	***
R²		,947			,853			,907			,830	

Looking at design characteristics, many statistically significant effects can be observed, but rarely in the expected direction, ...

... quite often, an increase in the relevance of a specific variable correlates negatively with the corresponding indicator

The impact on research indicators is less pronounced

... and not significant for TPF

Looking at the redistribution effect after cutbacks, a similar picture arises

R² increases marginally in most cases

3. Statistical analysis – specification of the PBF-model

	1st grade students			Students in Standard study time "			Graduates			Foreign students		
	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.
Share Indicator 1st grade students in relation to total	-142,862	-,020		-452,100	-,017		-115,242	-,019		-282,160	-,072	***
Share Indicator on Graduates in relation to total PBF	-55,253	-,046		-167,930	-,037		209,044	,206	**	48,357	,073	
Share Indicator on Students in standard study time in relation to total PBF	-178,566	-,067		-486,917	-,048		115,768	,052		286,971	,197	*
Share on foreign students indicator on total PBF	-129,832	-,038		-682,295	-,053	*	253,164	,089	**	-30,762	-,017	
Share of indicator on Third Party Funding on total PBF	-150,809	-,043		-462,443	-,035		235,281	,080	*	3,733	,002	
Share of indicator on female Professors on total PBF	-72,583	-,035		-98,505	-,012		-136,080	-,077	*	130,785	,114	**
Total number of indicators of PBF-model	-,325	-,003		-14,163	-,037		27,311	,327	***	5,177	,095	
Lump-sum budget	-7,654	-,013		66,726	,031		-47,509	-,099	***	12,824	,041	
Tuition fees	16,090	,024	*	-88,394	-,035	**	17,963	,032	*	-15,859	-,044	*
Mandatory intra-university target agreements	-6,304	-,012		48,973	,024		39,439	,088	***	-64,804	-,223	***
Mandatory intra-university PBF	15,196	,029		108,522	,054		-33,750	-,076	*	-59,006	-,205	***
R ²		,929			,816			,890			,787	

At AUS significant correlations can be identified for graduates, And here, a stronger relevance of the variable correlates positively with the indicator

3. Statistical analysis – specification of the PBF-model

	1st grade students			Students in Standard study			Graduates			Foreign students		
	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.	B	Beta	Sig.
Share of Indicator 1st grade students in relation to total PBF	1389,008	,045		16085,726	,129	*	-2028,286	-,101	*	-4099,227	-,242	***
Share Indicator on Graduates in relation to total PBF	-2905,540	-,423	**	-16323,446	-,582	*	1357,297	,302		5902,575	1,551	***
Share Indicator on Students in standard study time in relation to	-3838,135	-,372	**	-20213,008	-,480	*	2318,388	,344	*	8949,150	1,564	***
Share on foreign students indicator on total PBF	-2609,753	-,146	**	-15397,586	-,211	*	872,073	,074		5149,828	,519	***
Share of PhD-indicator on total PBF	1319,982	,087	**	3746,901	,061		-1036,368	-,105	**	-1500,895	-,179	***
Share of indicator on Third Party Funding on total PBF	575,739	,064	*	4257,982	,116	*	-487,983	-,083	*	-360,110	-,072	
Share of habilitations indicator on total PBF	3511,707	,102	***	12084,090	,086	*	-1979,809	-,088	*	-2401,986	-,126	**
Share of indicator on female Professors on total PBF	639,539	,047	*	417,823	,007		103,016	,011		1447,674	,190	***
Total number of indicators of PBF-model	-66,018	-,206	*	-465,876	-,355	*	56,011	,267	*	211,208	1,185	***
Lump-sum budget	-17,398	-,008		29,239	,003		-51,204	-,035		-27,740	-,023	
Tuition fees	-20,022	-,009		-184,271	-,019		80,669	,053	***	-53,462	-,042	*
Mandatory intra-university target agreements	-293,069	-,147	***	-428,380	-,053		19,890	,015		195,614	,177	***
Mandatory intra-university PBF	112,124	,059		607,908	,078		-156,124	-,125	*	-649,256	-,611	***
R ²		,947			,853			,907			,830	

Looking at other instruments, Tuition fees resulted in higher graduate numbers at universities, Mandatory intra-university target agreements as well as PBF show some significant correlations, but rarely in the expected direction

R² increases marginally in most cases

3. Statistical analysis – specification of the PBF-model

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Mandatory intra-university PBF	15,196	,029		108,522	,054		-33,750	-,076	*	-59,006	-,205	***
R ²		,929			,816			,890			,787	

At UAS, the introduction of tuition fees show significant correlations with all teaching indicators, though twice positively and twice negatively correlated. Mandatory intra-university instruments correlate with graduate and foreign student numbers, but commonly negatively.

Universities and Universities of Applied Science show different „production functions“ ,

⇒ They should be treated differently

⇒ It appears that UAS respond more pronounced to PBF-systems, but – alike universities – often not in the expected direction

The mere introduction of a PBF-model seems to have hardly any impact (at least during our time period)

Even the budget relevance of a PBF-model shows only limited results

Even though design characteristics reveal a number of significant correlations, they rarely show the expected sign

Are universities too complex to respond „rationally“ to such complex instruments?

Or was our basic model already too good and explained too much of the variance across universities?

Performance-based funding in German HE

AEDE annual conference
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