

Measuring outsourcing of services

Cross-cutting topic

The 39th Voorburg Group Meeting
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Plan of presentation

- ❑ Introduction
- ❑ Data sources on outsourcing in the Statistics Poland
- ❑ Outsourcing of services in Poland
- ❑ Services outsourcing vs. productivity of enterprises in Poland
 - The Ist stage of procedure
 - The IInd stage of procedure
 - Conclusions
- ❑ Challenges for future

Introduction

- Objective – presenting the experiences of the Statistics Poland in measuring the services outsourcing&establishing the relationship between the services outsourcing and productivity of enterprises;
- Outstanding development if services sector as a result of growing demand for services;
- What motivates enterprises to outsource services instead of producing them in-house;
- Definition by Greaver (1999):

„Outsourcing involves the transfer of an organization's recurring internal tasks to external service providers, in accordance with the provisions of an agreement (contract), as well as the related personnel, machinery, equipment, facilities, technology, and other resources, along with the decision-making authority regarding their use.”

Data sources on services outsourcing

❑ *Annual business survey of enterprises:*

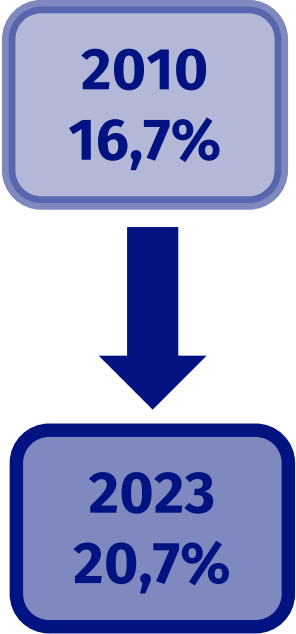
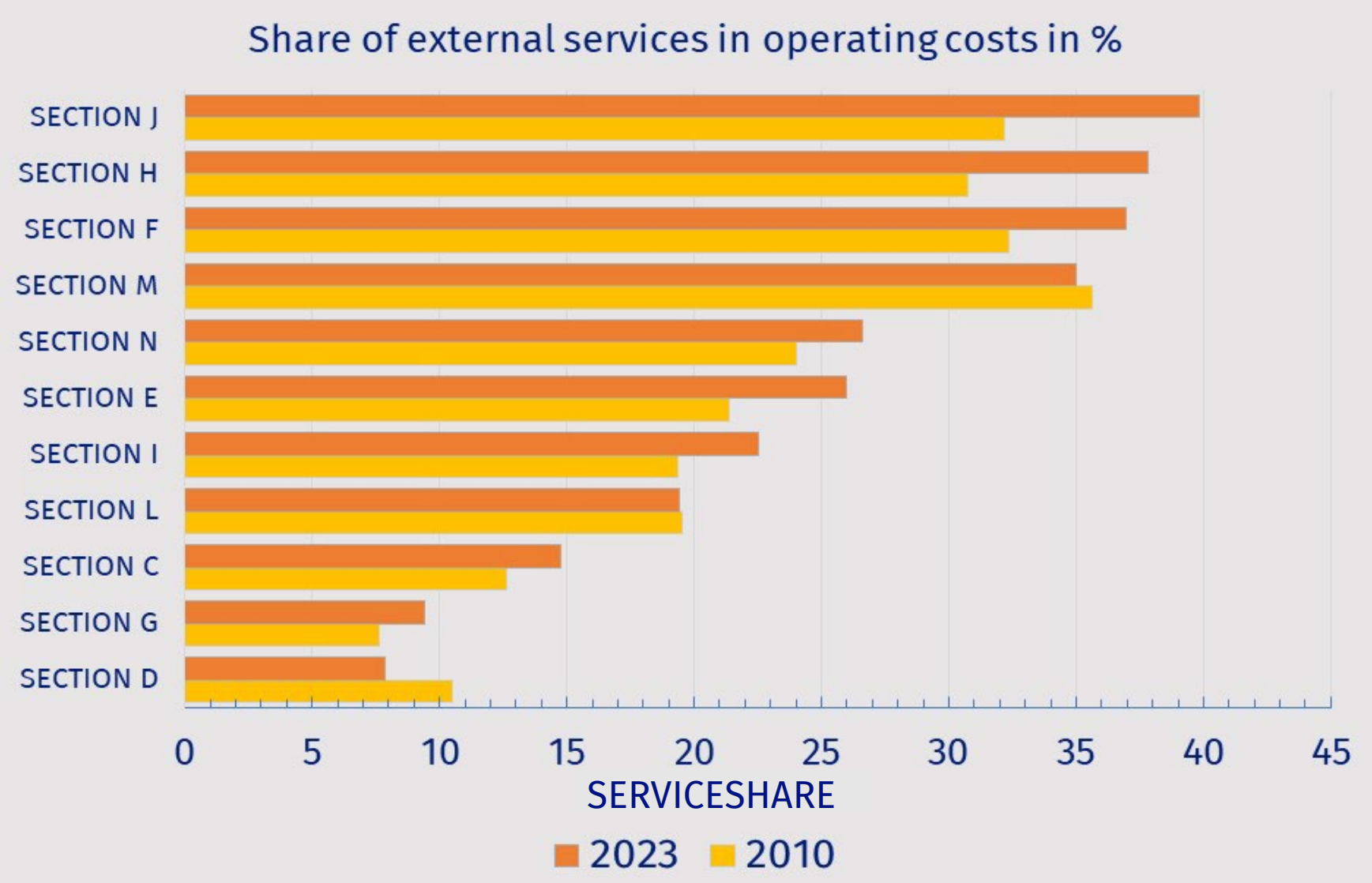
- data from the financial statements: profit and loss account as well as data from the balance sheet collected, including the value of services purchased from the third parties;
- information collected from all companies with the number of persons employed 10 and more and the approx. 3% sample of enterprises with the number of persons employed 9 and less running the business activities classified according to the NACE sections: A – N;

❑ *Demand for services survey:*

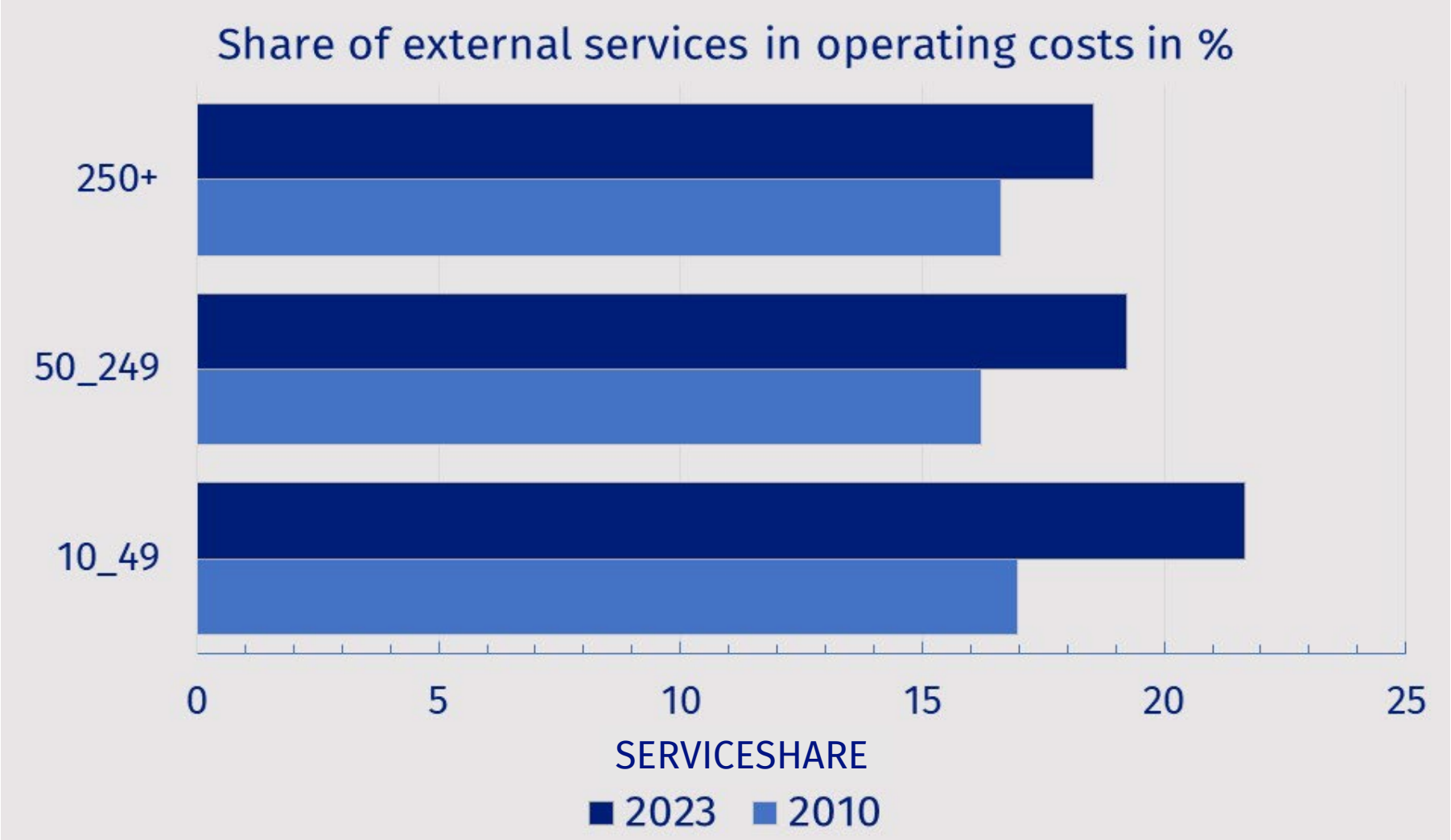
- ✓ information on: value of services purchased from the third parties by services category, direction of service purchases (domestic/foreign), barriers to purchase of services and enterprises plans in the scope of external service acquiring.
- ✓ conducted every 5 years;
- ✓ information collected from all companies with the number of persons employed 50 and more which carry out activities classified, according to NACE, to sections: C *Manufacturing*, F *Construction*, G *Wholesale and retail trade; repair of motor vehicle and motorcycles*, H *Transportation and storage*, I *Accommodation and food service activities*, J *Information and communication* (excluding division 59), K *Financial and insurance activities*, L *Real estate activities*, M *Professional, scientific and technical activities*, N *Administrative and support service activities*.



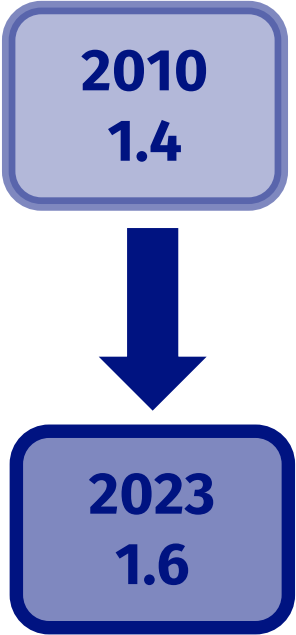
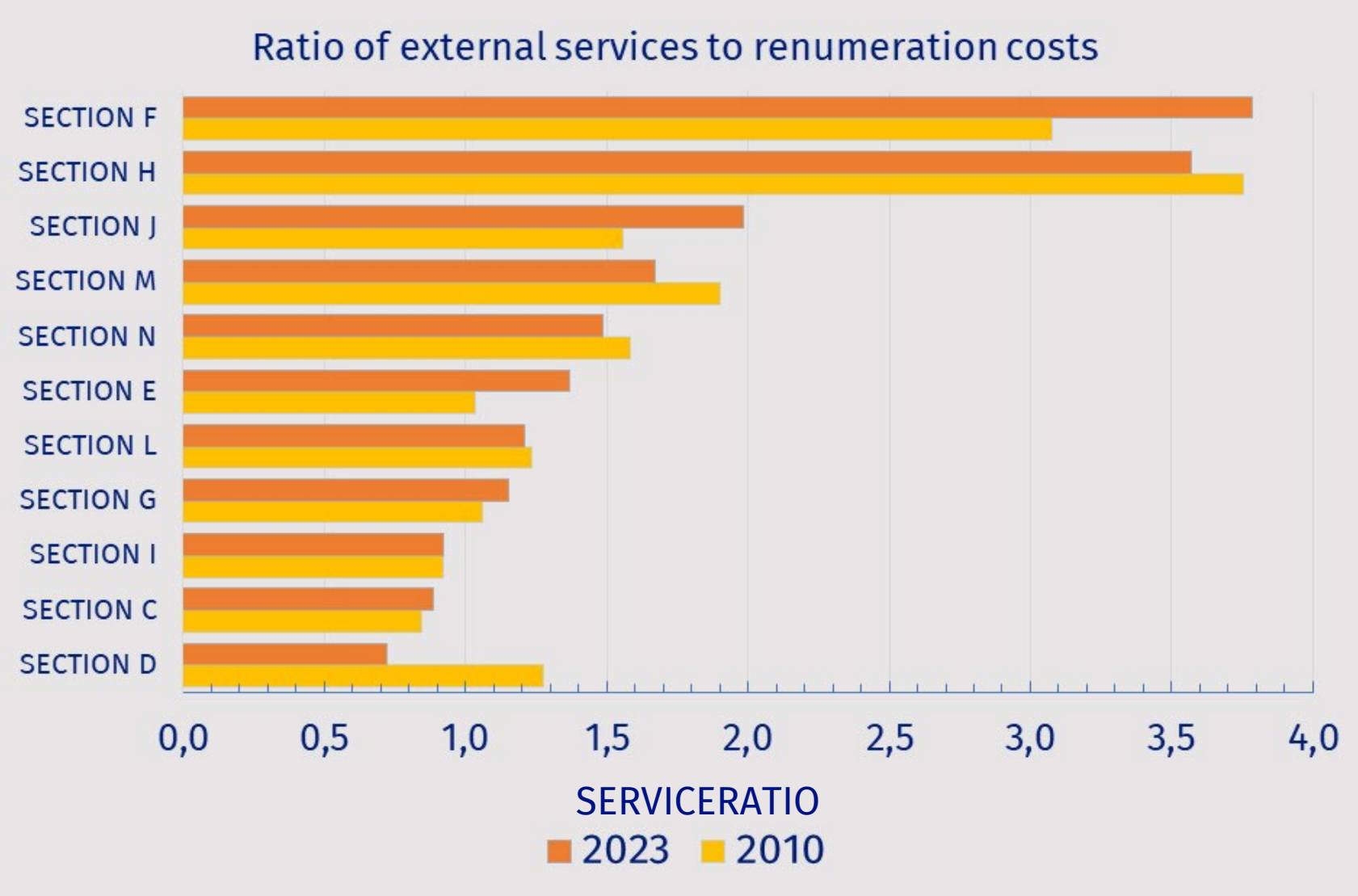
Outsourcing of services in Poland



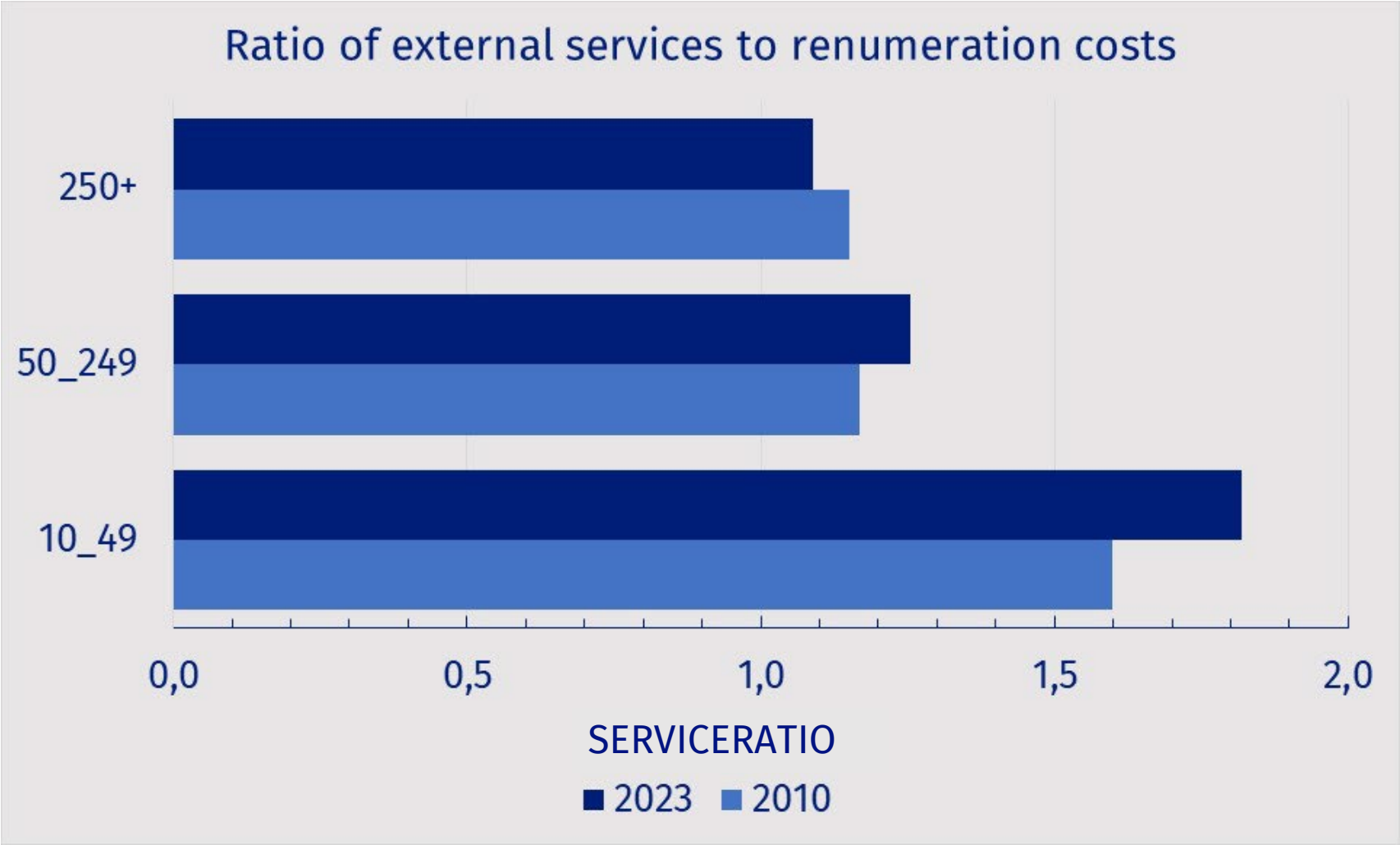
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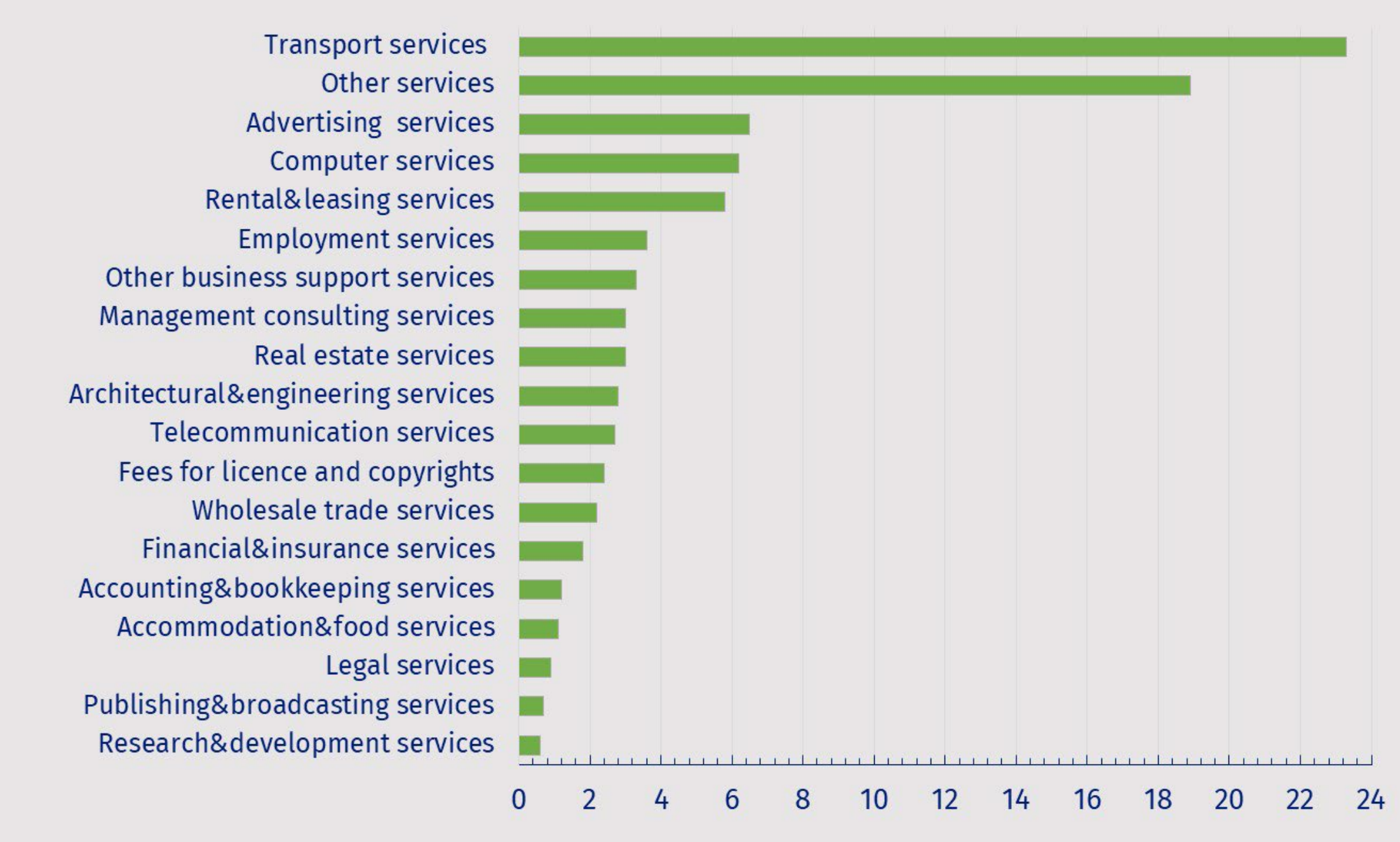
Outsourcing of services in Poland – ratio of external services to remuneration costs



Outsourcing of services in Poland



Outsourcing of services in Poland by services category in 2020 – structure in %



Types of services outsourcing

❑ Outsourcing of core activity services:

- transport and storage services - the biggest share of external services in Section H *Transporting and storage* (66,6%);
- computer services and telecommunication services - suitably 30,8% and 25,1% of external services in Section J *Information and communication*;
- advertising services - 23,5% of external services in Section M *Professional, scientific and technical activities*;

❑ Outsourcing of services supporting the core activity:

- architectural and engineering services - almost 9% of services purchased from the third companies in Section F *Construction*;
- advertising, market research and public opinion pooling services - almost 15% of external services in Section G *Wholesale and retail trade; repair of motor vehicles and motorcycles*;
- other business support services (i.e cleaning services, security and investigation services, tourist services) & advertising services - over 24% and 10% of external services in Section I *Accommodation and food service activities*;

❑ Outsourcing of services supporting the running business activity (i.e. computer and telecommunication services, accounting, book-keeping and auditing services, legal services);



Services outsourcing vs. productivity of enterprises in Poland

- ❑ Methodological work covered legal units with the number of persons being employed 10 and more which run activities classified according to the PKD/NACE from C to N;
- ❑ Period: 2010-2023;
- ❑ Two stages procedure:
 - 1st stage - TFP estimation – method developed by Akerberg, Cavesa i Frazer (2015) based on the translogarithmic production function
 - 2nd stage - estimating the correlation between outsourcing of services and TFP:
 - ✓ regression model using the order least square method (OLS);
 - ✓ panel data model with fixed effects (FE);
 - ✓ generalized additive model (GAM);

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① share of external services in operating costs (size of outsourcing)

② ratio of external services to remuneration costs (intensity of outsourcing)

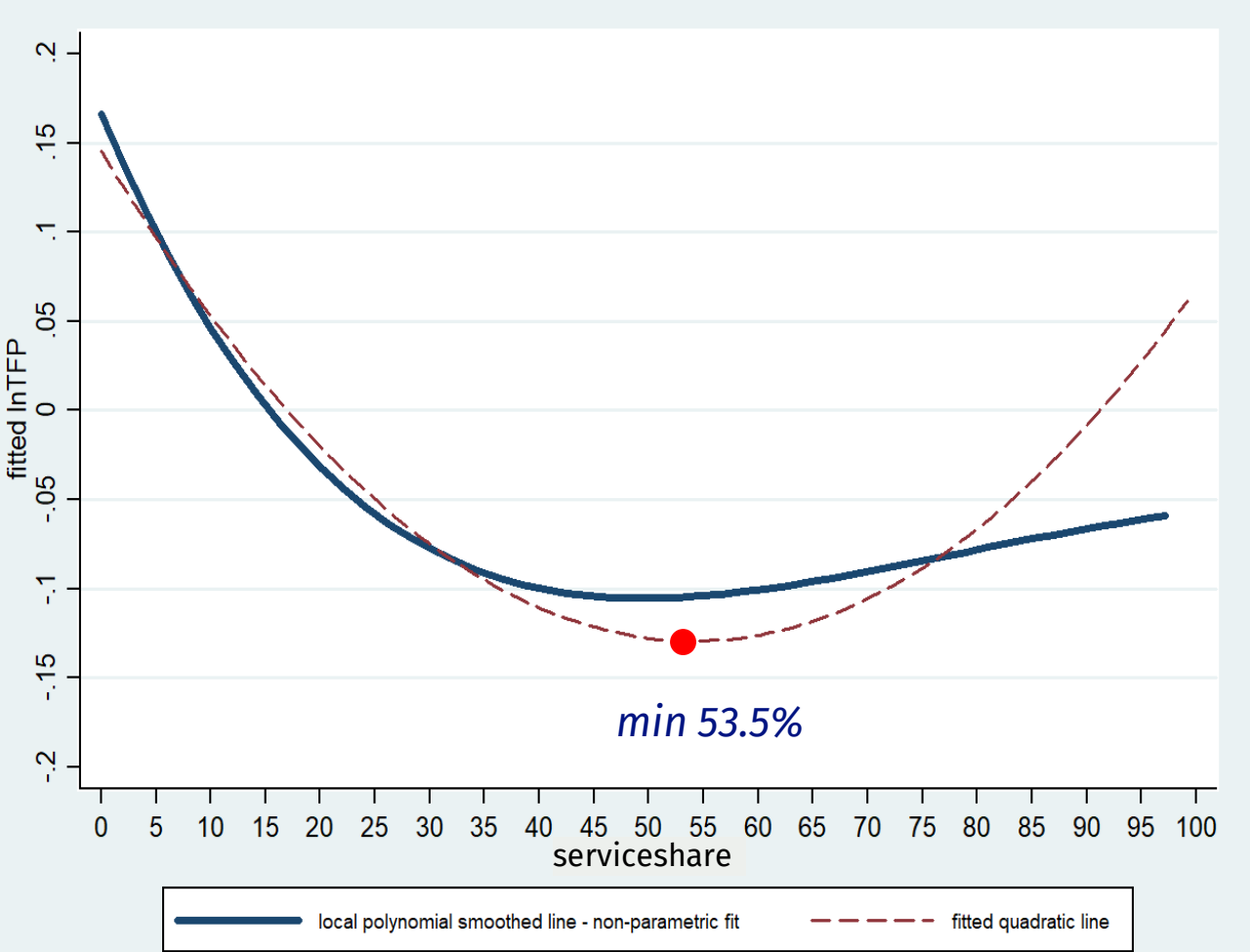
① Share of external services in operating costs vs. total factor productivity (TFP)

lnTFP	(1)	(2)	(3)	(4)
	OLS	FE	FE	GAM
	Intfp	Intfp	Intfp	Intfp
serviceshare	0,00195***	-0,00056***	-0,00581***	x
	(0,00007)	(0,0001)	(0,00023)	x
serviceshare2	x	x	0,00007***	x
	x	x	(2.92e-06)	x
...				

Constans	5,14071***	5,25957***	5,29853***	
	(0,003)	(0,00597)	0,00616	
No of observations	638 826	638 826	638 826	524 776
No of groups		95 128	95 128	
R²	23.34			
R² within		0.0152	0.0164	0.0144
R² between		0.1548	0.1440	
R² overall		0.1754	0.1620	
Standard error in brackets *** p<0.01, ** p<0.05, * p<0.1				

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① Share of external services in operating costs vs. total factor productivity (TFP) by size classes

Specification	FE model (5)			FE model (6)		
	Entities with the no of persons employed:			Entities with the no of persons employed:		
	from 10 to 49 persons	from 50 to 249 persons	250 persons and more	from 10 to 49 persons	from 50 to 249 persons	250 persons and more
	lnthp	lnthp	lnthp	lnthp	lnthp	lnthp
serviceshare	-0.00109***	0.00045**	-0.00021	-0.00754***	-0.00415***	0.00073
	(0.00012)	(0.00019)	(0.0004)	(0.0003)	(0.00042)	(0.00084)
serviceshare2	x	x	x	0.00009***	0.00007***	-0.00002
	x	x	x	(0.0000)	(0.00001)	(0.00001)
...						

Constans	5.15394***	5.44769***	6.09445***	5.20366***	5.47943***	6.08862***
	(0.00791)	(0.0103)	(0.02172)	(0.00818)	(0.01062)	(0.02218)
No of observations	406 618	186 910	45 298	406 618	186 910	45 298
No of groups	77 189	28 910	6 071	77 189	28 910	6 071
R² within	0.0092	0.0056	0.0043	0.0109	0.0065	0.0043
R² between	0.0524	0.0333	0.0225	0.0442	0.0292	0.0240
R² overall	0.0644	0.0309	0.0212	0.0520	0.0256	0.0228

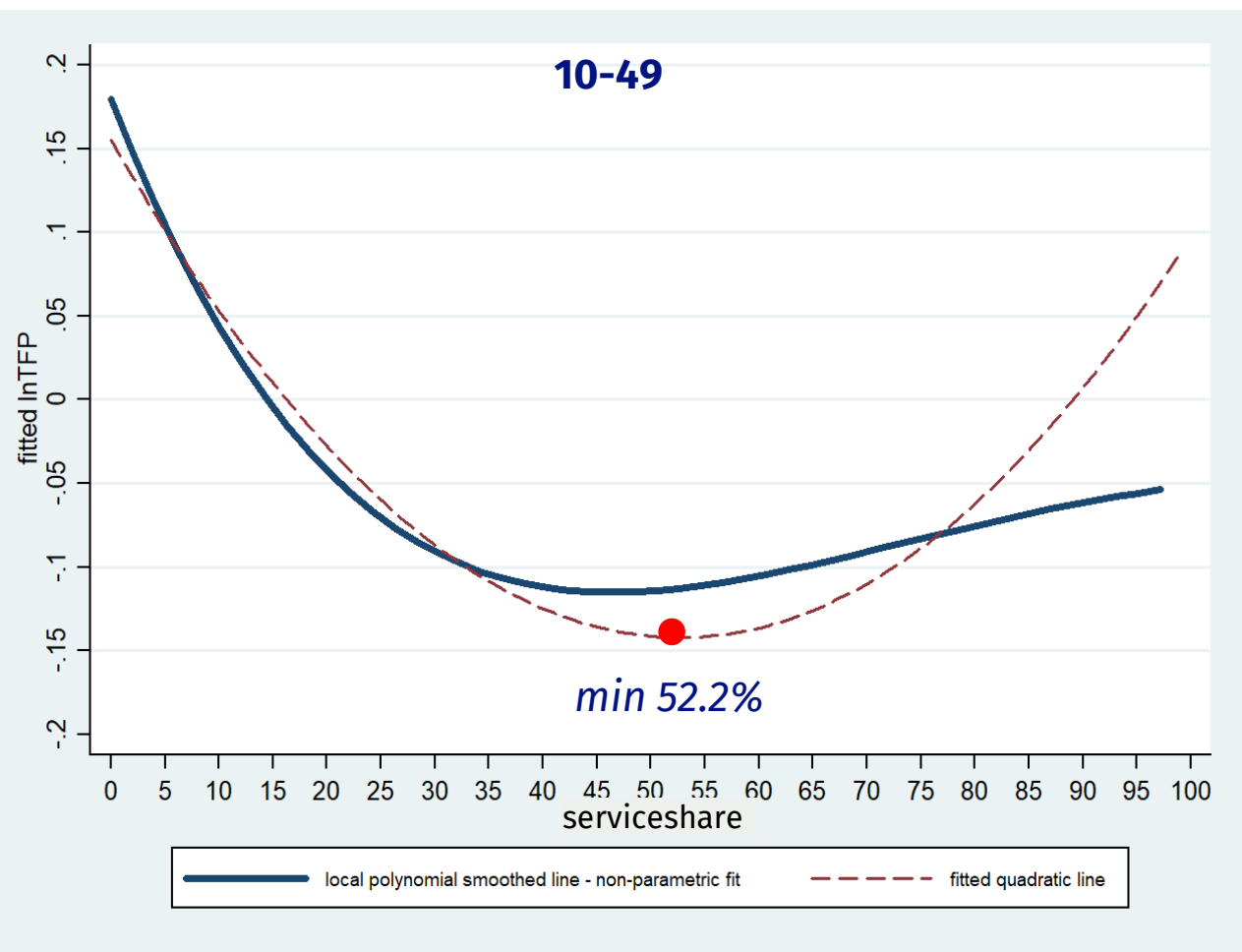
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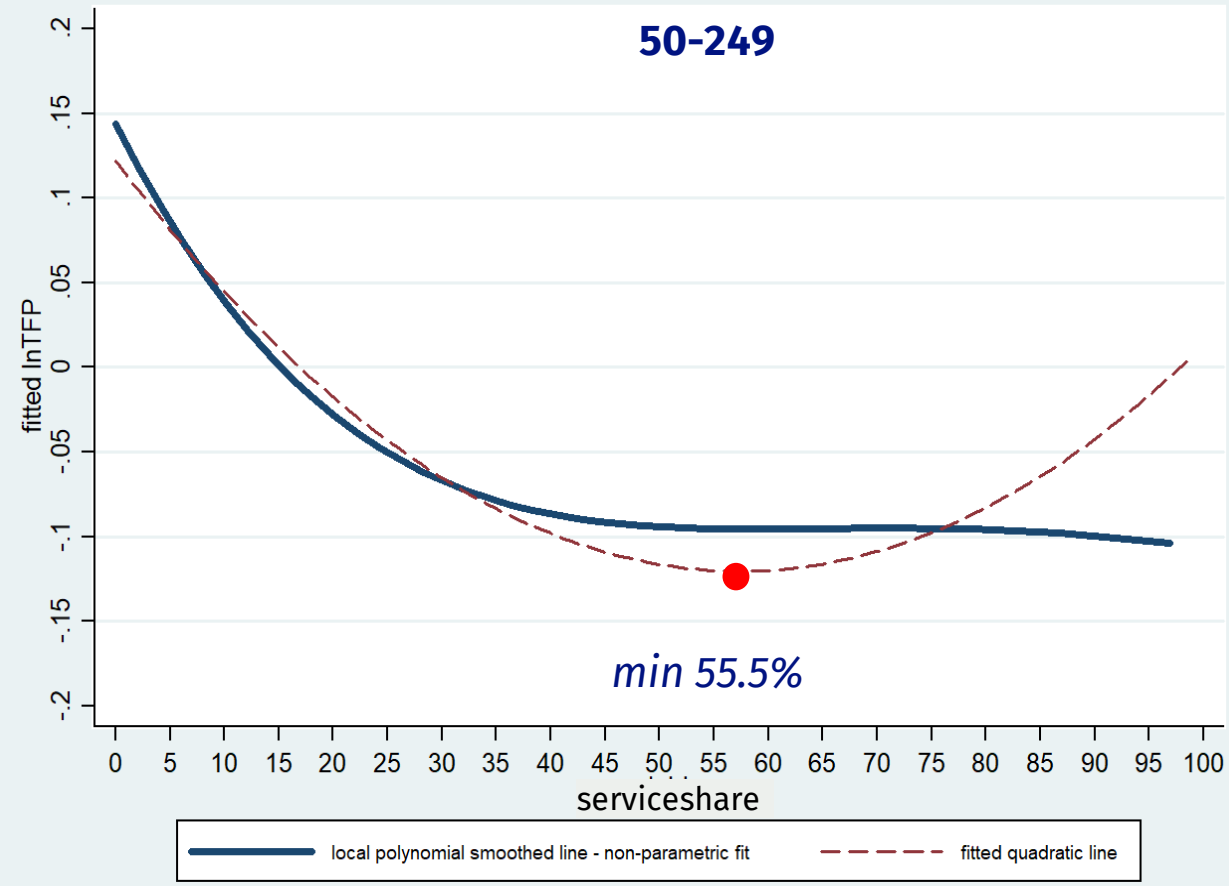
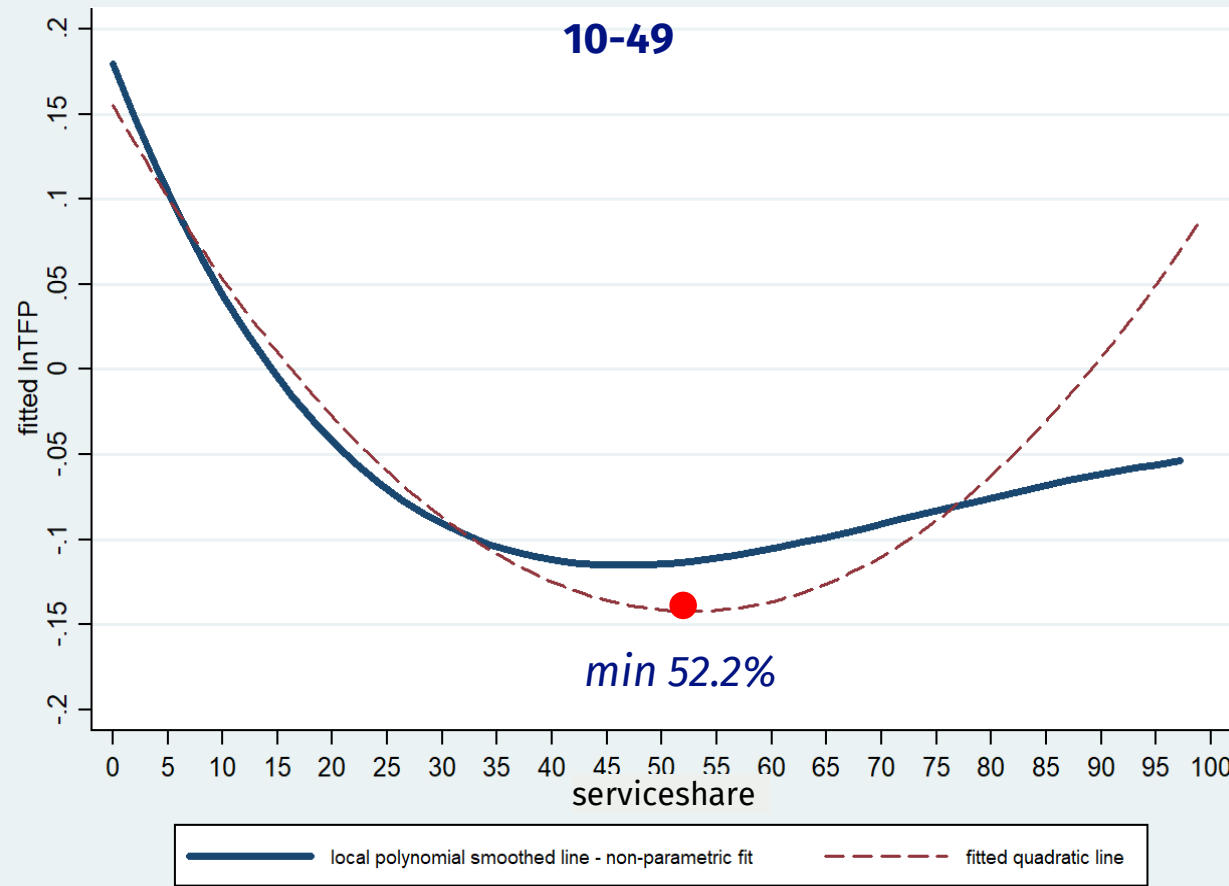
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	Entities with the no of persons employed:			Entities with the no of persons employed:			
	from 10 to 49 persons	from 50 to 249 persons	250 persons and more	from 10 to 49 persons	from 50 to 249 persons	250 persons and more	
	ln tfp	ln tfp					
serviceshare	-0.00109***	0.00045**		Specification	Model GAM (7)		
	(0.00012)	(0.00019)			Entities with the no of persons employed:		
serviceshare2	X	X			from 10 to 49 persons	from 50 to 249 persons	250 persons and more
	X	X			ln tfp	ln tfp	ln tfp
...				renumshare	-0,01071***	-0,00609***	-0,00242***
			(0,00017)	(0,00022)	(0,00046)
Constans	5.15394***	5.44769***		exportshare	0,00053***	0,00059***	0,00031**
	(0.00791)	(0.0103)			(0,00006)	(0,00007)	(0,00014)
No of observations				...			
				
No of groups	406 618	186 910		No of observations	319 713	163 828	41 256
R ² within	0.0092	0.0056		R ²	0.018	0.009	0.004
R ² between	0.0524	0.0333		Standard error in brackets *** p<0.01, ** p<0.05, * p<0.1			
R ² overall	0.0644	0.0309					
Standard error in brackets *** p<0.01, ** p<0.05, * p<0.1							

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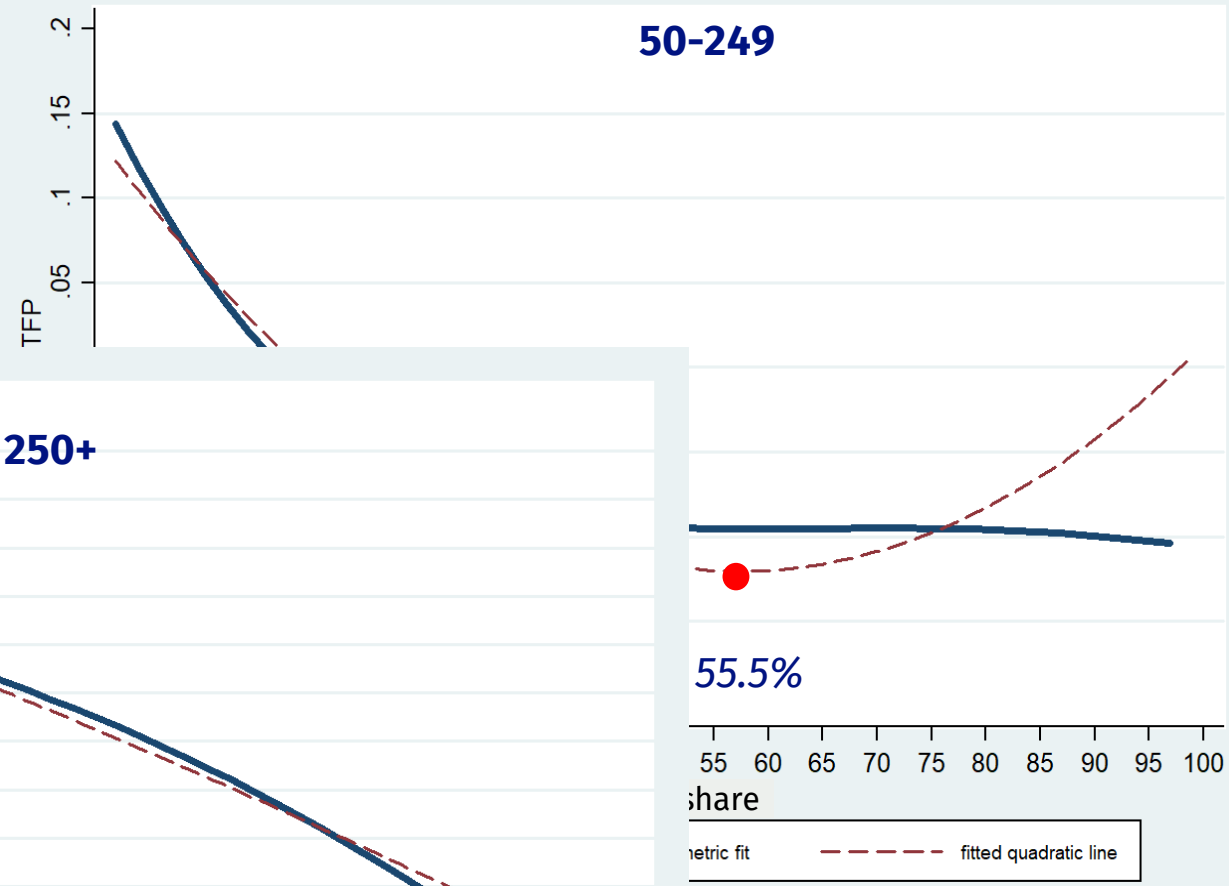
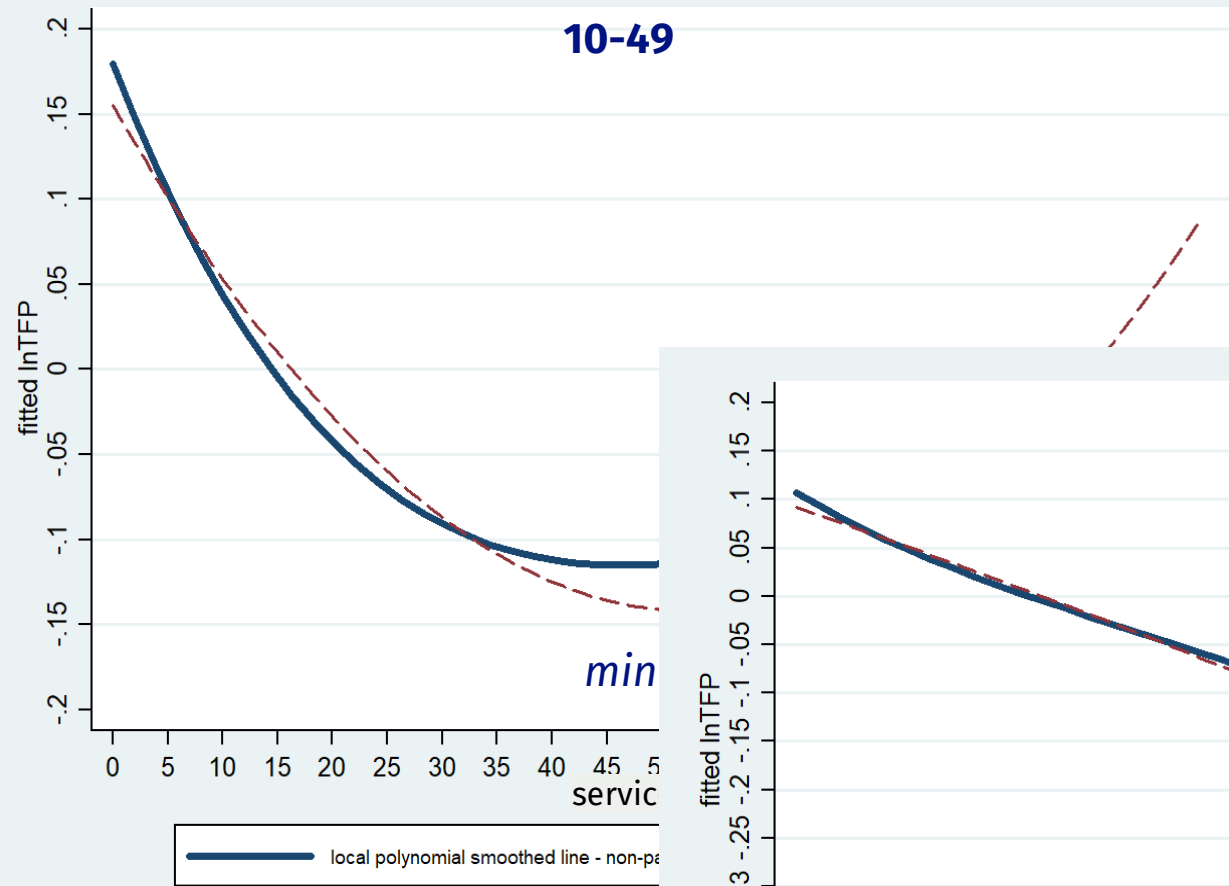
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② Ratio of external services to remuneration costs vs. total factor productivity (TFP)

	(1)	(2)	(3)	(4)
lnTFP	OLS	FE	FE	GAM
	lntfp	lntfp	lntfp	lntfp
serviceratio	0.02166***	0.01412***	0.01926***	x
	(0.00027)	(0.00033)	(0.00044)	x
serviceratio2	x	x	- 0.00005***	x
	x	x	(0)	x
...				

Constans	5.11983***	5.19673***	5.18115***	
	(0.00279)	(0.00544)	(0.00551)	
No of observations	638 806	638 806	638 806	524 771
No of groups		95 118	95 118	
R²	24.04			
R² within		0.0185	0.0191	0.0126
R² between		0.1511	0.0909	
R² overall		0.1876	0.1721	
Standard error in brackets *** p<0.01, ** p<0.05, * p<0.1				

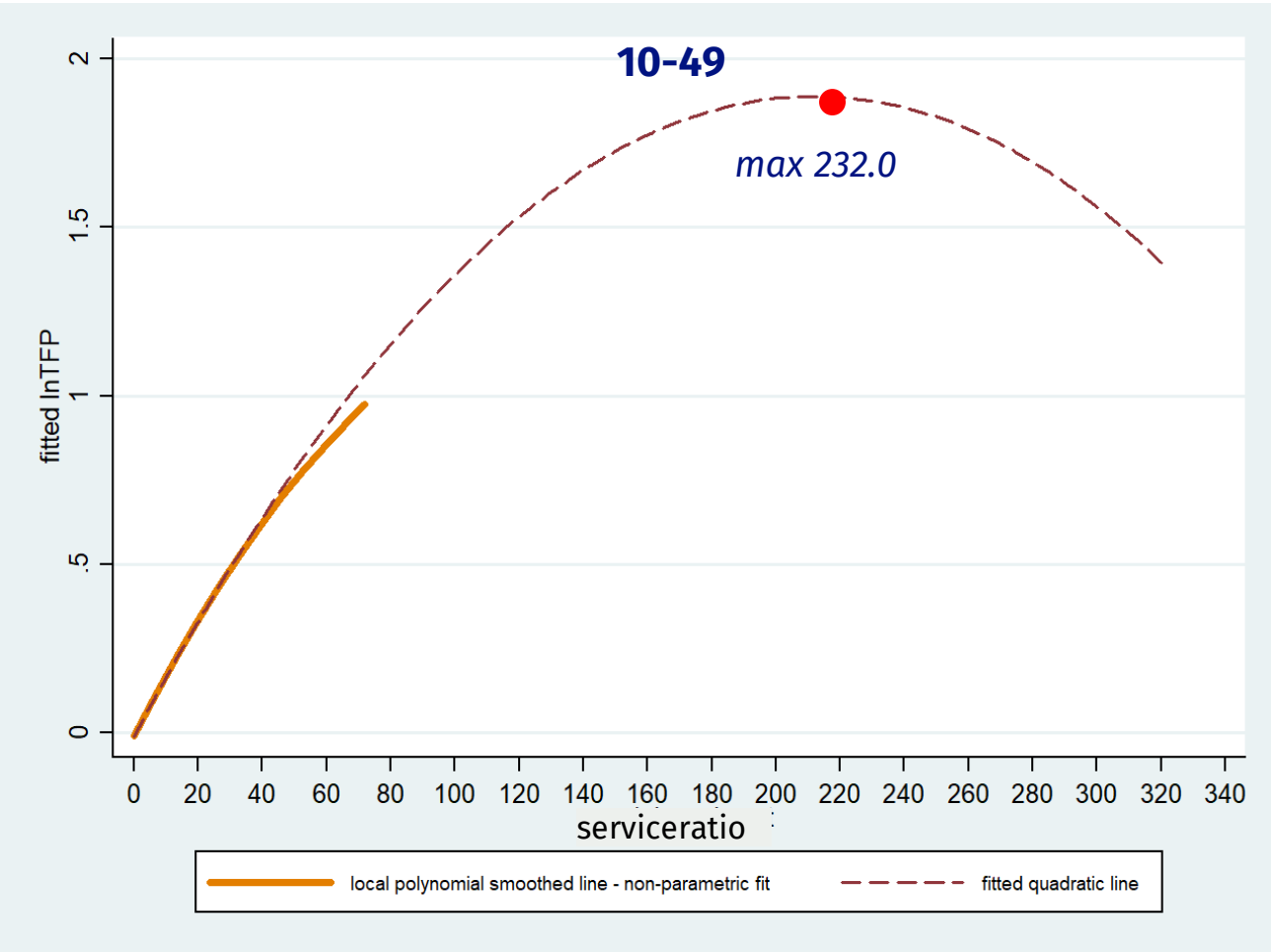
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Specification	FE model (5)			FE model (6)			
	Entities with the no of persons employed:			Entities with the no of persons employed:			
	from 10 to 49 persons	from 50 to 249 persons	250 persons and more	from 10 to 49 persons	from 50 to 249 persons	250 persons and more	
	ln t f p	ln t f p	ln t f p	Model GAM (7)			
serviceratio	0,01304*** (0,00039)	0,0101*** (0,00083)	0,0111*** (0,00047)	Specification	Entities with the no of persons employed:		
					from 10 to 49 persons	from 50 to 249 persons	250 persons and more
serviceratio2				renumshare	ln t f p	ln t f p	ln t f p
					-0,00848*** (0,00017)	-0,00465*** (0,00023)	-0,00115** (0,00047)
...				exportshare	0,00053*** (0,00006)	0,00075*** (0,00007)	0,00068*** (0,00014)
					
Constans	5,0793*** (0,00729)	5,43166*** (0,00922)	6,0599*** (0,0101)	...			
				
No of observations				No of observations			
	406 599	186 909	45 298		319 709	163 810	41 252
No of groups	77 179	28 910	6 071	R²	0.016	0.006	0.001
R² within	0.0123	0.0065	0.0049	Standard error in brackets *** p<0.01, ** p<0.05, * p<0.1			
R² between	0.0663	0.0428	0.0236	0.0371	0.0432	0.0236	
R² overall	0.0847	0.0379	0.0228	0.0738	0.0383	0.0226	

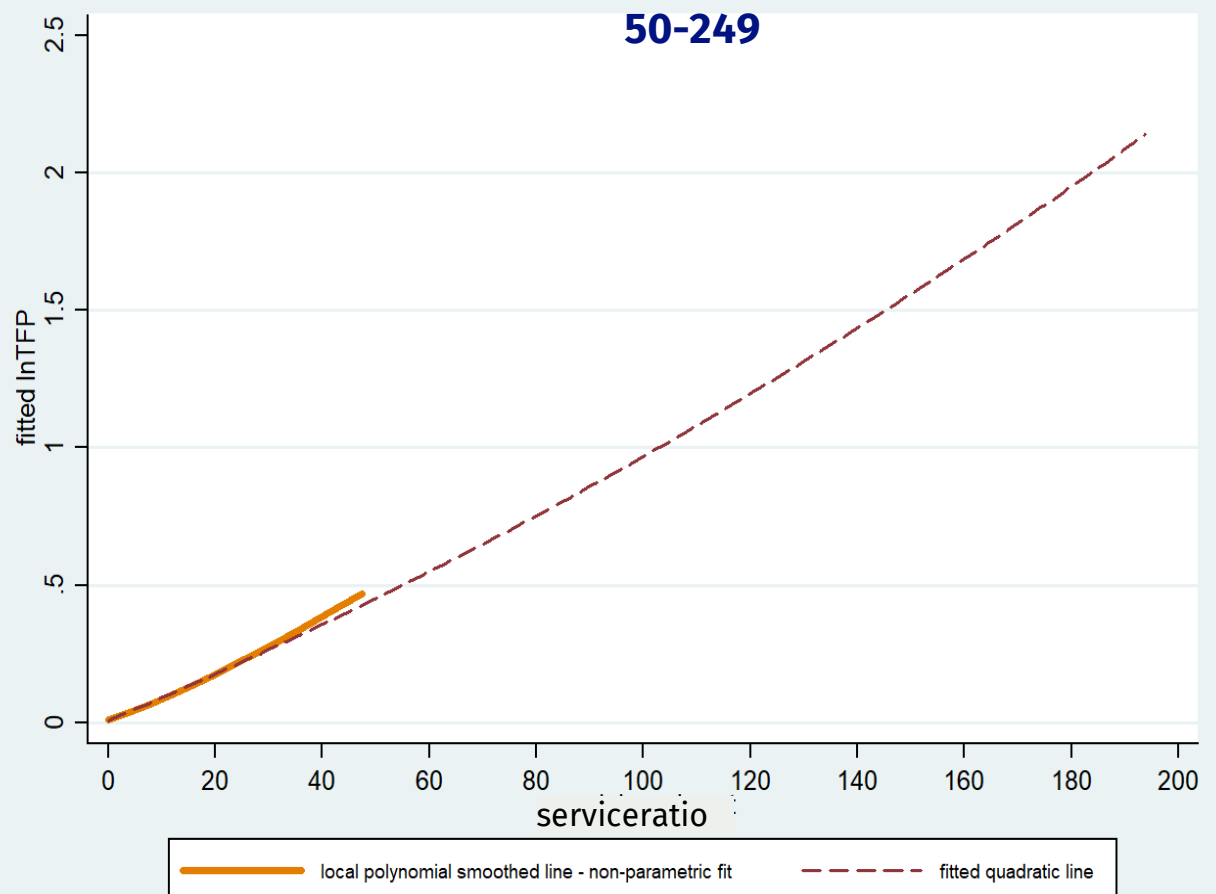
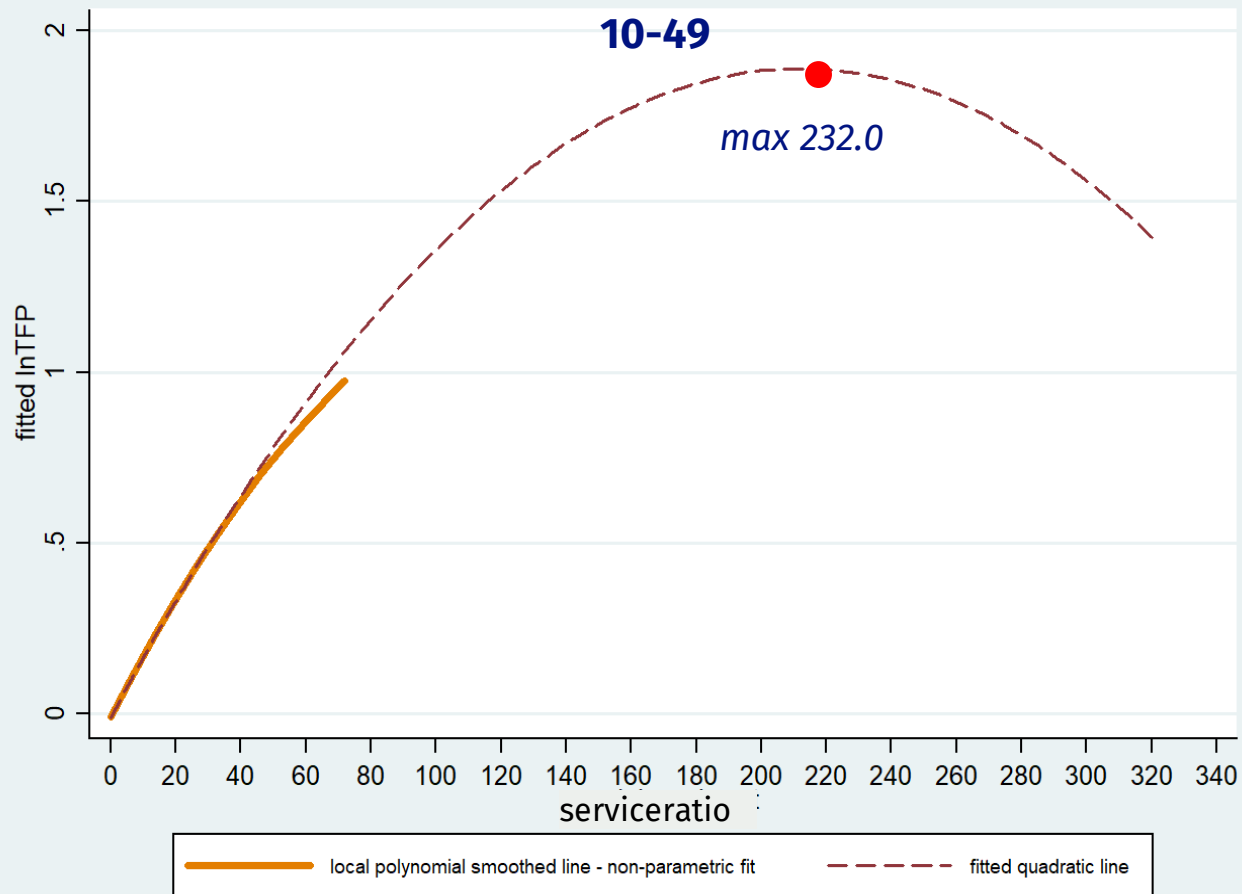
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Standard error in brackets *** p≤0.01 ** p≤0.05 * p≤0.1

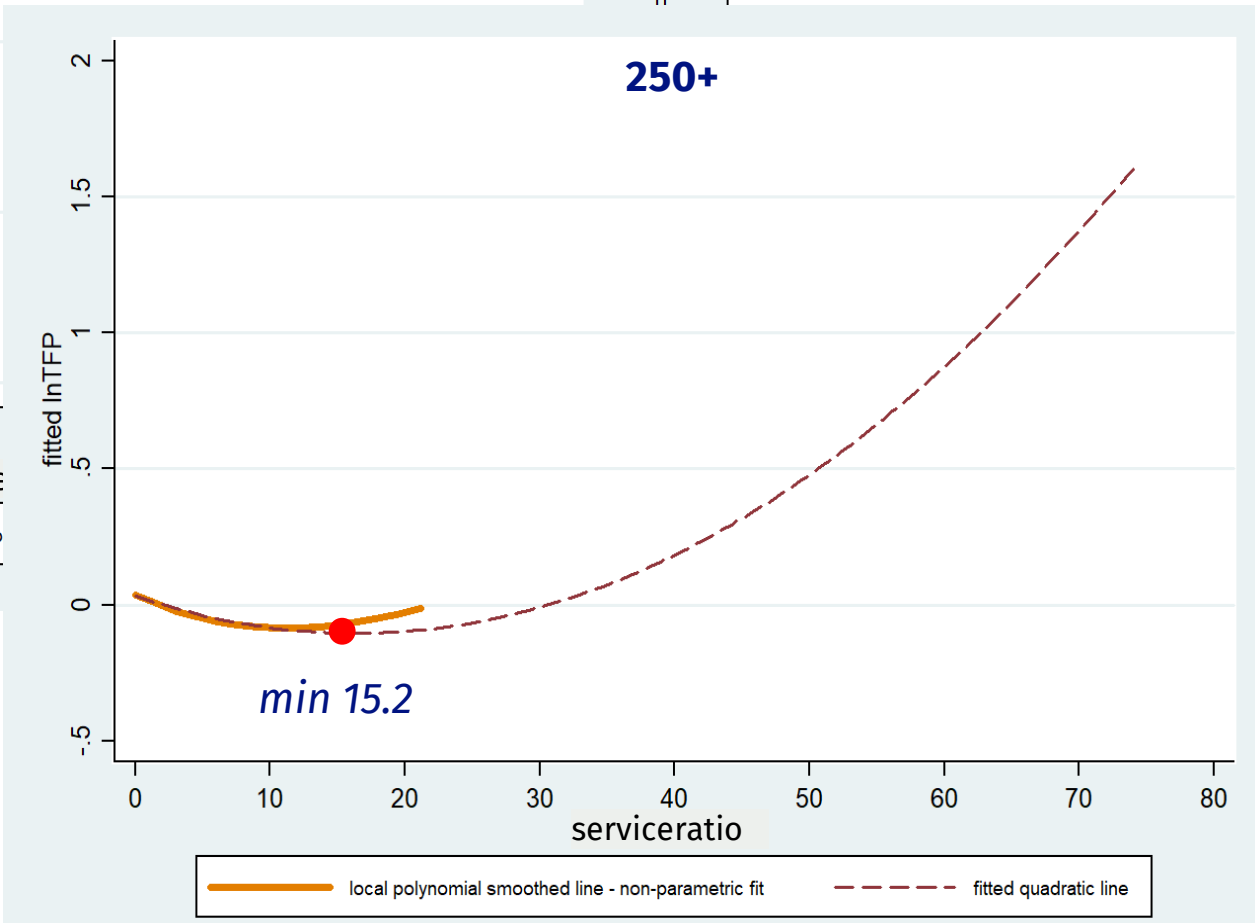
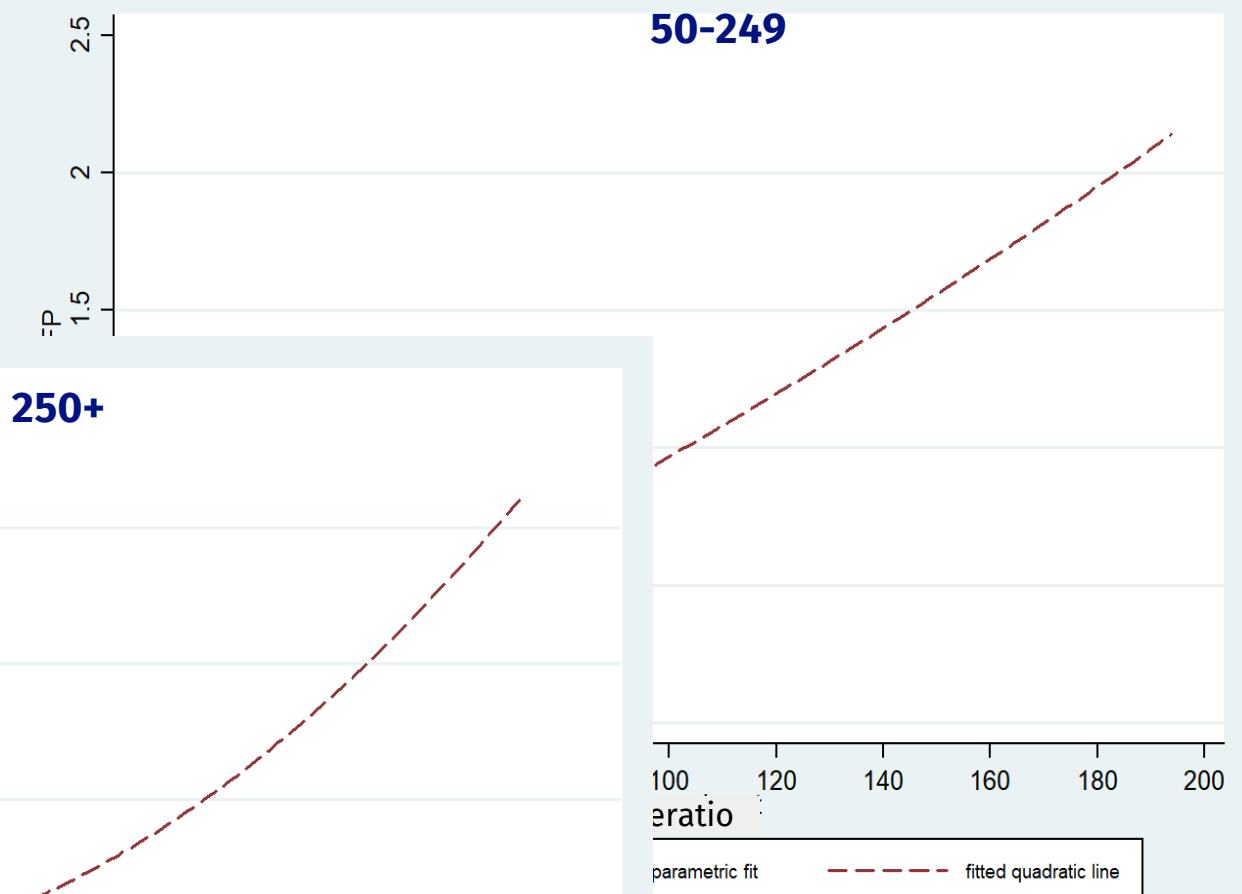
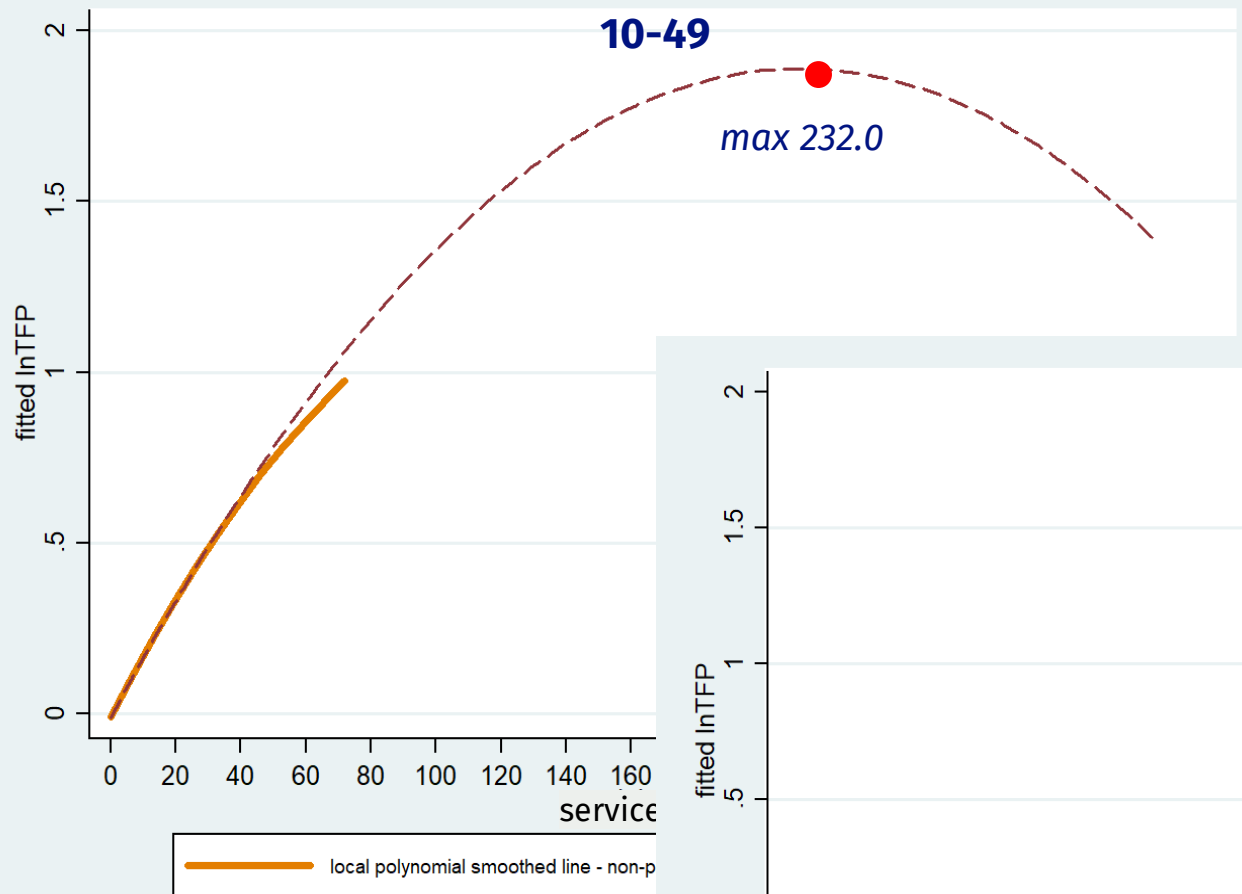
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Conclusions:

- 1) The relation between the outsourcing of services and the productivity of enterprises is differentiated and depends on the variable reflecting the phenomenon&the size class.
- 2) There is negative correlation between share of external services in the operating costs and TFP, however, without a linear form. According to the graph of fitted quadratic function (GAM model) the TFP decreases together with the increase in the share of outsourced services and gets its minimum at the level of outsourced services - 53,5%. The curve of the local polynomial smoothed function shows that dynamic of changes is differentiated depending on the share of outsourced services in the operating costs.
- 3) The increase in the ratio of external services to remuneration costs is related with the increase in the TFP. The curve of fitted quadratic function shows that the TFP rises until the ratio reaches the value approx. 256. (above max – only 4 records).
- 4) For enterprises with no of persons employed 10-49 findings are similar to those obtained for total panel. Regarding the fitted quadratic function the minimum of TFP is reached for the share of external services in operating costs at the level of 52.2% (positive correlation concerns only approx. 8% of records). At the same time, the TFP takes maximum when the ratio of external services to remuneration costs gets value of approx. 232.

Conclusions:

- 5) For enterprises with the no of persons employed 50-249 very slight positive correlation between the share of external services in operating costs and the TFP is recorded (without a linear form). The graph of fitted quadratic function shows that together with the increase in the share the TFP decreases and it reaches its minimum when the share evolves around 55%. Simultaneously, the relation between the ratio of external service to the remuneration costs and TFP is positive in the entire domain of function.
- 6) For enterprises with the no of persons employed 250+ the correlation between the share of external services in operating costs is non-linear. Based on the GAM model estimates it is concluded that together with the rise in the share of external services the TFP drops in the entire domain of function. The ratio of external services to remuneration costs it is positively related with the TFP. However, according to the curve of fitted quadratic function as well as local polynomial smoothed function when the ratio of external services to remuneration costs is 15.2 or less the TFP slightly decreases and after exceeding that minimum the TFP goes up.
- 7) The rise in the purchase of services is not enough in order to boost the productivity of enterprise. It has to be related with the simultaneous resigning from producing services inside the company.

Challenges for future:

- Searching for further variables that could provide a proxy for services outsourcing (including the necessary data sources);
- Establishing the relations between the outsourcing of services and TFP regarding the type of business activities (at the NACE section level);
- Establishing the relations between the outsourcing of services and TFP regarding the category of outsourced services;
- Widening the analyses for the population of micro-enterprises with the number of persons employed 9 and less;

Thank you for your attention

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