

CEE trade in services: value added versus gross terms approaches

Aleksandra Kordalska
Gdansk University of Technology

Magdalena Olczyk
Gdansk University of Technology

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Map of presentation

- Importance of our research
- Literature review
- Data description
- Gross exports decomposition – methodology
- Empirical model
- Results
- Conclusions

Importance of the research

- **Services in developed countries:** 70 % global GDP, 55 % global employment (World Bank, 2016)

Services in international trade: tradability, GVCs, deregulations, liberalization

- **Services trade:** World service trade grew average 2 p.p. faster than merchandise trade during 2005-2015 (OECD 2016)
- **Services VA:** Services value added in CEE gross exports between 50-60% (OECD-WTO TiVA Database 2016)
- **Servicification:** 40% Services value added in CEE manufacturing export (OECD-WTO TiVA Database 2016)
- **Services in GVC's:** 70 % of world services trade are intermediate services, used in production organized in GVCs (OECD, 2012)

Literature review

- still scarce studies (Dao et al. 2015; Landesmann et al. 2015; Grunfeld, Moxnes 2013; Guardia et al. 2005; Kimura, Lee 2008; Walsh 2008; Wörz 2008)
- the gravity model mostly used (market size, distance, common language, GDP gap etc.)
- weakness in the existing analyses:
 - the use of service trade data in gross terms (except Landesmann et al. 2015 – high heterogeneous group of countries)
 - too few export determinants
 - analysis at country level, omitting the differentiation between service sectors

The aim

- assess the impact of selected determinants on both services exports in value added and in gross terms for selected (more homogeneous) CEE economics
- use of a new approach in decomposition of gross trade in order to identify domestic value added

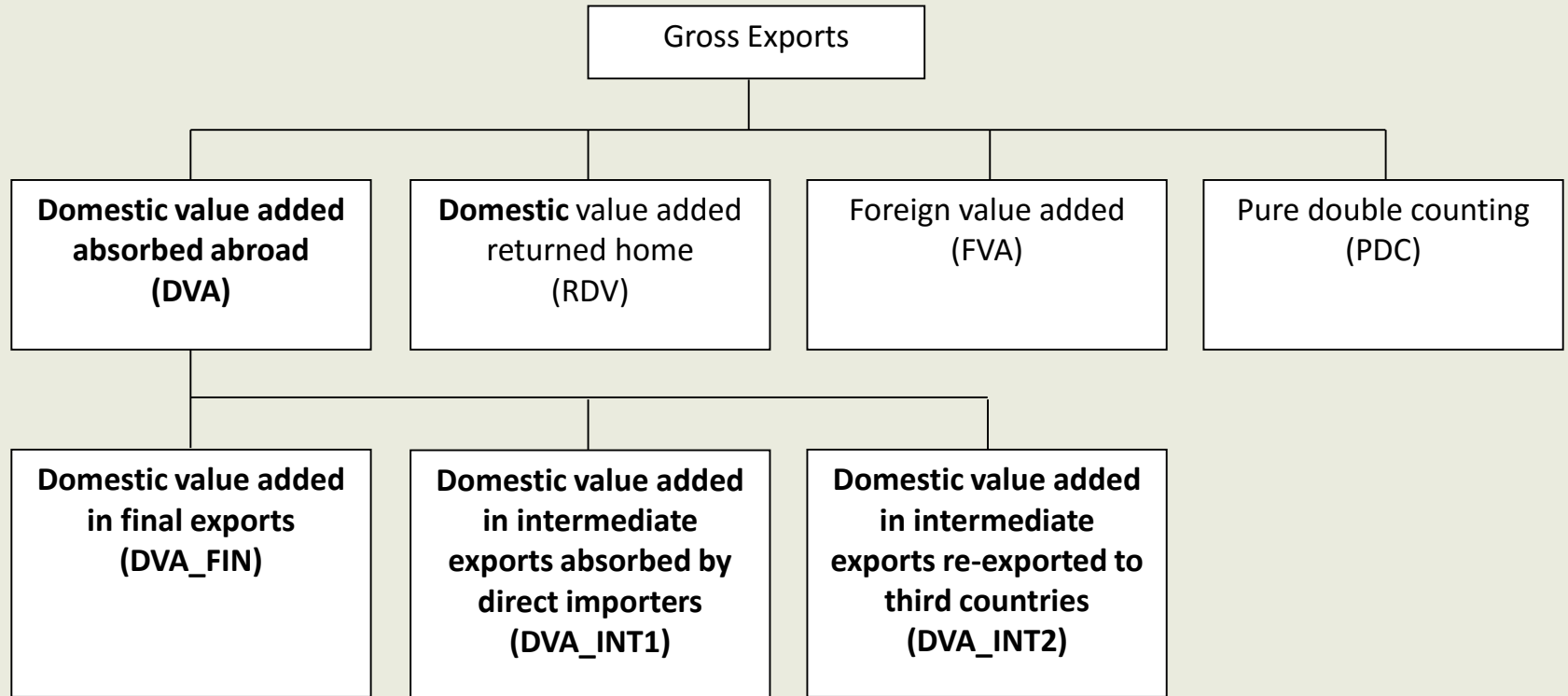
Exports determinants

- **Labour productivity** [New, New Trade Theory; Melitz's model (2003) Melitz & Ottawiano's model (2008)]; positive impact on exports (Bustos, 2011, Cieřlik et al., 2012)
- **Structure of employment** [Heckscher-Ohlin model; Leontief paradox]; positive influence of a higher share of both high- and medium-skilled labour on the exports growth (Landesmann et al. 2009)
- **Linkages of manufacturing with services** (Wolfmayrs 2012; Landesmann et al. 2015) positive impact on export

Data description and database

- Panel data
 - 7 CEE countries – the Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovakia
 - 7 (tradable) service sectors – transport (60, 61, 62, 63), post and telecommunication (64), financial intermediation (J), business services (71t74)
 - Period 1995 – 2011
- Database - WIOD
 - Inter-Country Input -Output Tables - gross exports decomposition (Wang et al, 2013) - identification of domestic value added in gross exports, service linkages to manufacturing exports
 - SocioEconomic Accounts – structure of employment, value added

Gross exports decomposition

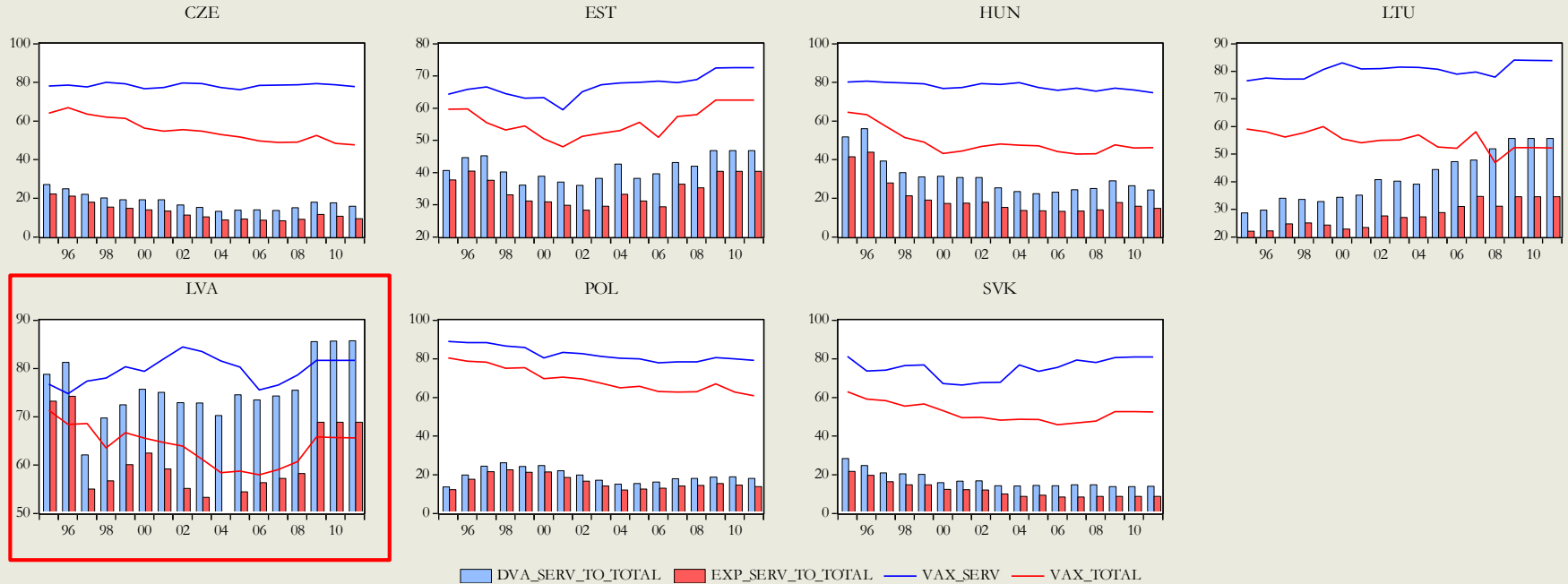


Source: own elaboration based on Wang et al., (2013)

Gross exports decomposition – Wang et al. 2013

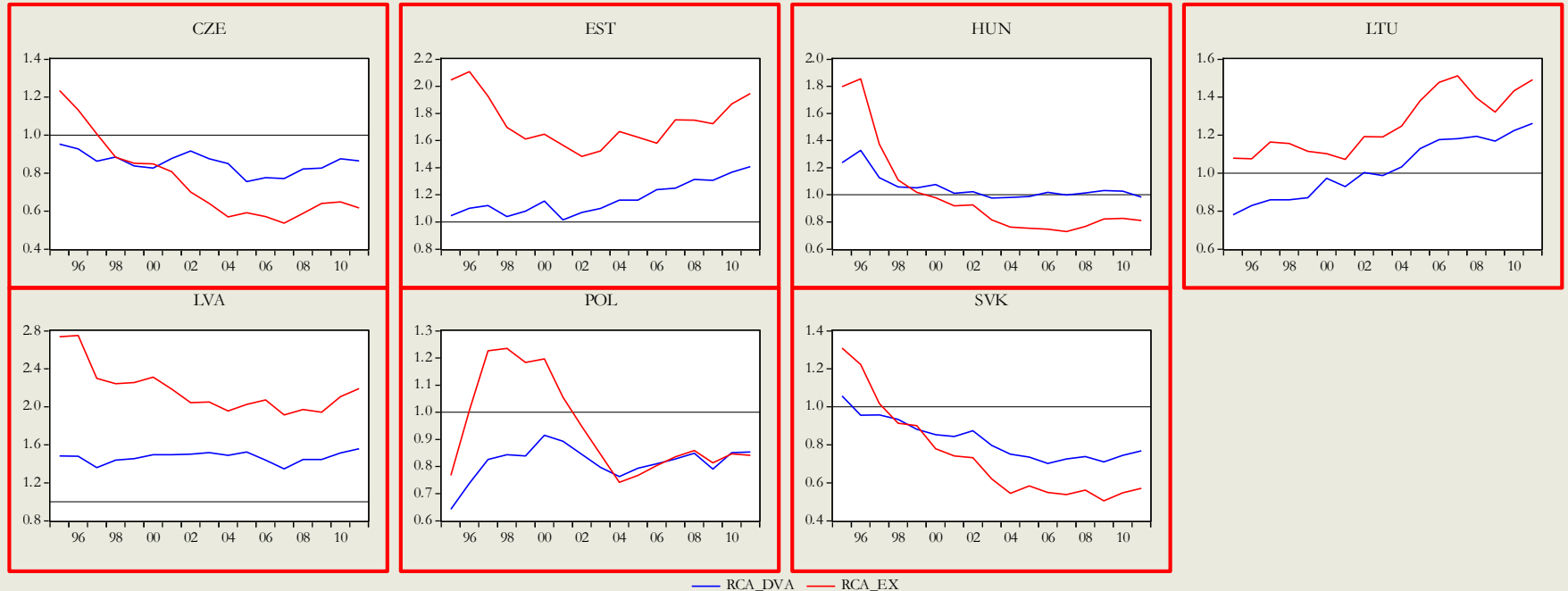
$$\begin{aligned}
 E^{s*} = & \underbrace{(V^s B^{ss})^T \# \sum_{r \neq s}^G Y^{sr}}_{DVA_FIN} + \underbrace{(V^s L^{ss})^T \# (\sum_{r \neq s}^G A^{sr} B^{rr} Y^{rr})}_{DVA_INT1} + \underbrace{(V^s L^{ss})^T \# (\sum_{r \neq s}^G A^{sr} \sum_{t \neq s, r}^G B^{rt} Y^{tt})}_{DVA_INTrex1} \\
 & + \underbrace{(V^s L^{ss})^T \# (\sum_{r \neq s}^G A^{sr} B^{rr} \sum_{t \neq s, r}^G Y^{rt})}_{DVA_INTrexF} + \underbrace{(V^s L^{ss})^T \# (\sum_{r \neq s}^G A^{sr} \sum_{t \neq s}^G \sum_{ru \neq s, t}^G B^{rt} Y^{tu})}_{DVA_INTrex2} \\
 & + (V^s L^{ss})^T \# (\sum_{r \neq s}^G A^{sr} B^{rr} Y^{rs}) + (V^s L^{ss})^T \# (\sum_{r \neq s}^G A^{sr} \sum_{t \neq s, r}^G B^{rt} Y^{ts}) \\
 & + (V^s L^{ss})^T \# (\sum_{r \neq s}^G A^{sr} B^{rs} Y^{ss}) + (V^s L^{ss})^T \# (\sum_{r \neq s}^G A^{sr} \sum_{t \neq s}^G B^{rs} Y^{st}) \\
 & + (V^s B^{ss} - V^s L^{ss})^T \# (\sum_{r \neq s}^G A^{sr} X^r) + (\sum_{r \neq s}^G V^r B^{rs})^T \# Y^{sr} + (\sum_{t \neq s, r}^G V^t B^{ts})^T \# Y^{sr} \\
 & + (\sum_{r \neq s}^G V^r B^{rs})^T \# (A^{sr} L^{rr} Y^{rr}) + (\sum_{t \neq s, r}^G V^t B^{ts})^T \# (A^{sr} L^{rr} Y^{rr}) \\
 & + \sum_{r \neq s}^G (V^r B^{rs})^T \# (A^{sr} L^{rr} E^{r*}) + \sum_{t \neq s, r}^G (V^t B^{ts})^T \# (A^{sr} L^{rr} E^{r*})
 \end{aligned}$$

Domestic value added in service sector



Source: own elaboration based on WIOD

Revealed Comparative Advantage Ratio domestic value added vs. gross exports



Source: own elaboration based on WIOD

Empirical model

$$\begin{aligned} EXPIND_{ijt} = & \beta_0 + \beta_1 HS_{ijt} + \beta_2 MS_{ijt} + \beta_3 \ln LPRO_{ijt} \\ & + \beta_4 SMLink_{ijt} + \mu_i + \nu_j + \varepsilon_{ijt} \end{aligned}$$

- *EXPIND* – exports indicator – log of gross exports (1,2), log of domestic value added exports (3,4), RCA-EXP (5,6), RCA-DVA (7,8)
- *HS*, *MS* – structure of employment – hours worked by high-skilled and medium skilled employees in total hours worked
- *LPro* – labour productivity
- *SMLink* – service sector to manufacturing sector linkages (total vs. domestic and foreign)
- *i* – country, *j* – sector, *t* - time

Service sector to manufacturing sector linkages

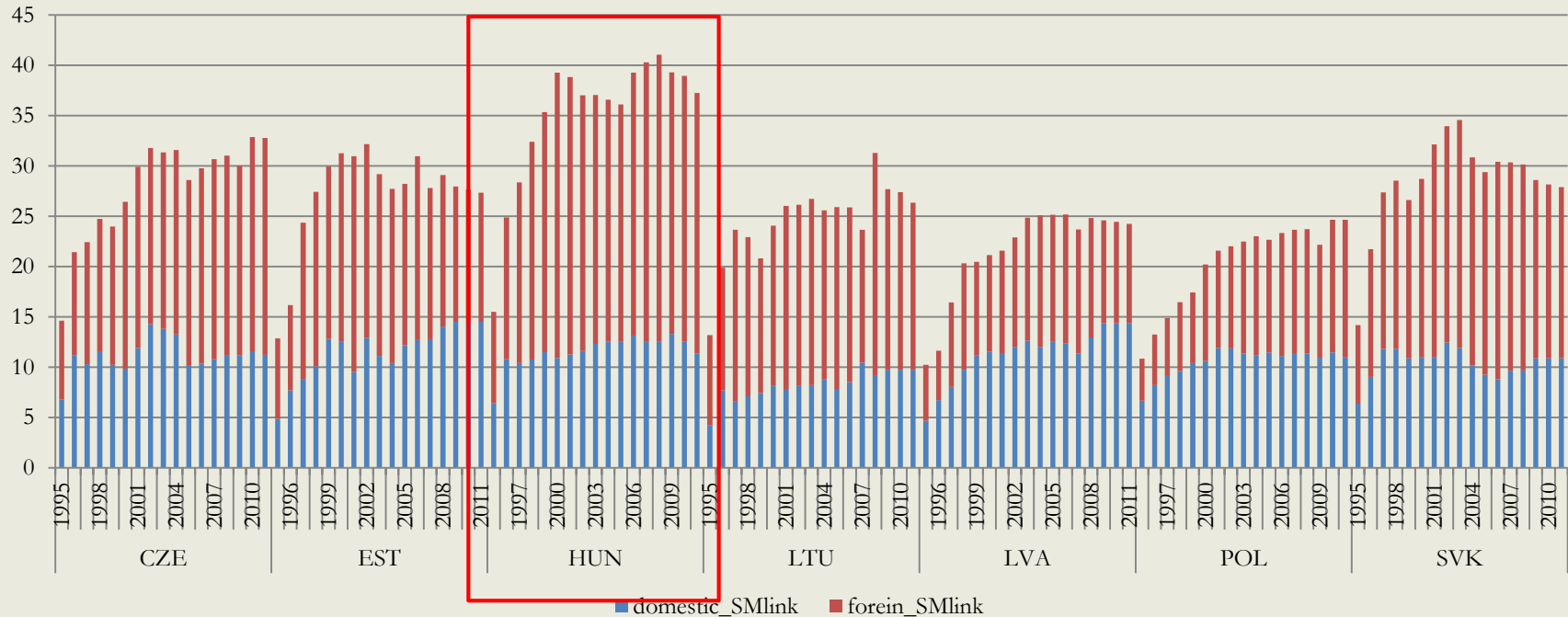
$$total_Smlink = V_{totalSERV} (I - A)^{-1} TEXP_{manuf}$$

$$domestic_Smlink = V_{domSERV} (I - A)^{-1} TEXP_{manuf}$$

$$foreign_Smlink = V_{forSERV} (I - A)^{-1} TEXP_{manuf}$$

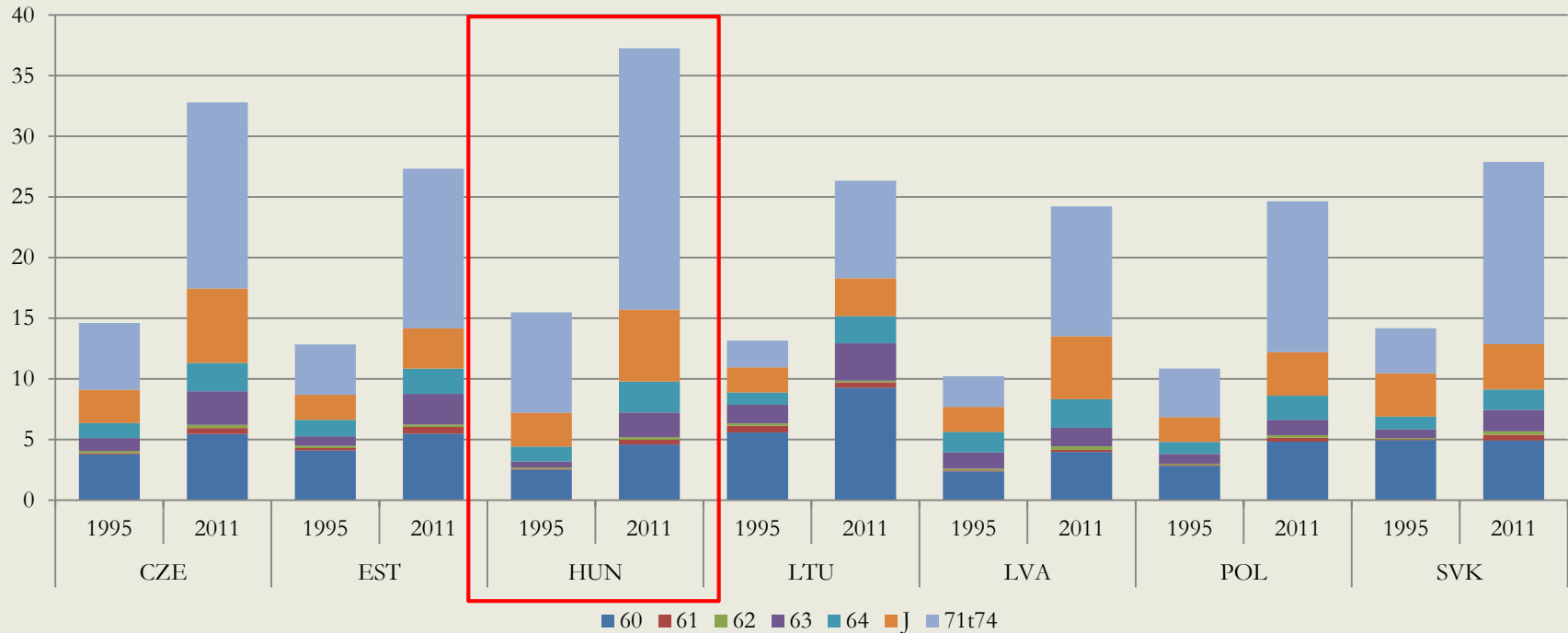
- V - matrix of the share of the value added in total output for the particular tradable service sector and zero otherwise,
- $(I-A)^{-1}$ - inverse global Leontief matrix
- $TEXP_{manuf}$ - matrix of gross exports of the manufacturing sector in the CEE countries and zero otherwise

Services linkages to manufacturing exports domestic vs. foreign



Source: own elaboration based on WIOD

Structure of total service linkages to manufacturing exports – importance of business services



Source: own elaboration based on WIOD

	Gross exports		Domestic value added	
	1	2	3	4
<i>HS</i>	0.052** [0.021]	0.048** [0.021]	0.048** [0.021]	0.044** [0.021]
<i>MS</i>	0.053** [0.021]	0.048** [0.021]	0.051** [0.021]	0.046** [0.022]
<i>lnLPRO</i>	0.642*** [0.076]	0.640*** [0.077]	0.671*** [0.076]	0.669*** [0.078]
<i>total_Smlink</i>	-0.028 [0.037]		-0.050 [0.037]	
<i>total_Smlink_J</i>	-0.010 [0.076]		0.015 [0.075]	
<i>total_Smlink_71t74</i>	0.099** [0.040]		0.121*** [0.039]	
<i>domestic_Smlink</i>		-0.193*** [0.056]		-0.194*** [0.054]
<i>domestic_Smlink_J</i>		0.200* [0.110]		0.217** [0.108]
<i>domestic_Smlink_71t74</i>		0.307*** [0.068]		0.314*** [0.066]
<i>foreign_Smlink</i>		0.086 [0.053]		0.050 [0.052]
<i>foreign_Smlink_J</i>		-0.153 [0.110]		-0.125 [0.109]
<i>foreign_Smlink_71t74</i>		-0.037 [0.055]		-0.004 [0.055]
R2	0.7384	0.7427	0.7517	0.7551
N	733	733	733	733

	RCA_TEXP		RCA_DVA	
	5	6	7	8
<i>HS</i>	0.080***	0.071***	0.046***	0.034***
	[0.017]	[0.018]	[0.009]	[0.010]
<i>MS</i>	0.065***	0.058***	0.043***	0.033***
	[0.017]	[0.018]	[0.009]	[0.010]
<i>lnLPRO</i>	-0.059	-0.058	-0.074***	-0.075***
	[0.041]	[0.040]	[0.028]	[0.026]
<i>total_Smlink</i>	-0.043		-0.246***	
	[0.074]		[0.059]	
<i>total_Smlink_J</i>	0.136*		0.227***	
	[0.082]		[0.060]	
<i>total_Smlink_71t74</i>	0.068		0.226***	
	[0.074]		[0.058]	
<i>domestic_Smlink</i>		-0.445***		-0.771***
		[0.125]		[0.134]
<i>domestic_Smlink_J</i>		0.356***		0.566***
		[0.135]		[0.140]
<i>domestic_Smlink_71t74</i>		0.371***		0.674***
		[0.129]		[0.135]
<i>foreign_Smlink</i>		0.240**		0.122*
		[0.122]		[0.074]
<i>foreign_Smlink_J</i>		-0.002		0.011
		[0.133]		[0.080]
<i>foreign_Smlink_71t74</i>		-0.157		-0.095
		[0.123]		[0.075]
R2	0.4840	0.4694	0.5438	0.5413
N	733	733	733	733

	Gross exports				Domestic value added			
	Baltic Countries		Visegrad Group		Baltic Countries		Visegrad Group	
<i>HS</i>	0.057***	0.057***	0.083***	0.067**	0.056***	0.056***	0.077***	0.063**
	[0.014]	[0.013]	[0.026]	[0.026]	[0.013]	[0.013]	[0.027]	[0.027]
<i>MS</i>	0.040***	0.041***	0.058**	0.043*	0.040***	0.040***	0.059***	0.045*
	[0.014]	[0.014]	[0.023]	[0.023]	[0.014]	[0.013]	[0.023]	[0.024]
<i>lnLPRO</i>	0.997***	1.001***	0.277**	0.256**	1.017***	1.021***	0.321***	0.303***
	[0.037]	[0.037]	[0.111]	[0.111]	[0.036]	[0.035]	[0.116]	[0.116]
<i>total_Smlink</i>	-0.093**		-0.013		-0.094**		-0.060	
	[0.039]		[0.051]		[0.037]		[0.050]	
<i>total_Smlink_J</i>	0.028		-0.166		0.031		-0.115	
	[0.069]		[0.119]		[0.068]		[0.117]	
<i>total_Smlink_71t74</i>	0.079*		0.098*		0.082*		0.145***	
	[0.045]		[0.056]		[0.043]		[0.054]	
<i>domestic_Smlink</i>		-0.294***		-0.372***		-0.274***		-0.381***
		[0.054]		[0.094]		[0.050]		[0.091]
<i>domestic_Smlink_J</i>		0.199*		0.172		0.181		0.196
		[0.116]		[0.177]		[0.112]		[0.173]
<i>domestic_Smlink_71t74</i>		0.310***		0.465***		0.302***		0.473***
		[0.062]		[0.120]		[0.059]		[0.118]
<i>foreign_Smlink</i>		0.028		0.311***		0.015		0.231***
		[0.040]		[0.093]		[0.039]		[0.088]
<i>foreign_Smlink_J</i>		-0.068		-0.454***		-0.051		-0.380**
		[0.117]		[0.161]		[0.118]		[0.158]
<i>foreign_Smlink_71t74</i>		-0.074		-0.224**		-0.067		-0.143
		[0.051]		[0.096]		[0.051]		[0.091]
R2	0.7069	0.7426	0.7902	0.7999	0.7174	0.7501	0.8010	0.8091
N	215.000	215.000	110.000	110.000	215.000	215.000	110.000	110.000

Results

- Similar impact of the main determinants on services exports estimated in two way
- Labour productivity and high & medium skilled employees – main determinants of services export
- Weak linkages between services and manufacturing sector
- Only strong linkages between domestic financial and business services and manufacturing sector
- Important discrepancies between Baltic and V4 countries – mainly in labour productivity and foreign services content to manufacturing exports

Conclusions

- The services-led export growth in CEE economies - largest opportunity to deeper, generating more value added participation in global GVCs.
- Policy recommendations
 - open up services sector to foreign participations
 - improve the quality and range of services
 - build up skills to move into more sophisticated services, generating often higher value added.
- Further analyses:
 - disaggregation the business services sector into more specific groups e.g. for knowledge intensive business services and other business services and analyze more deeply the business services linkages to manufacturing sector
 - new determinants – e.g. restrictiveness of services

Thank you for your attention