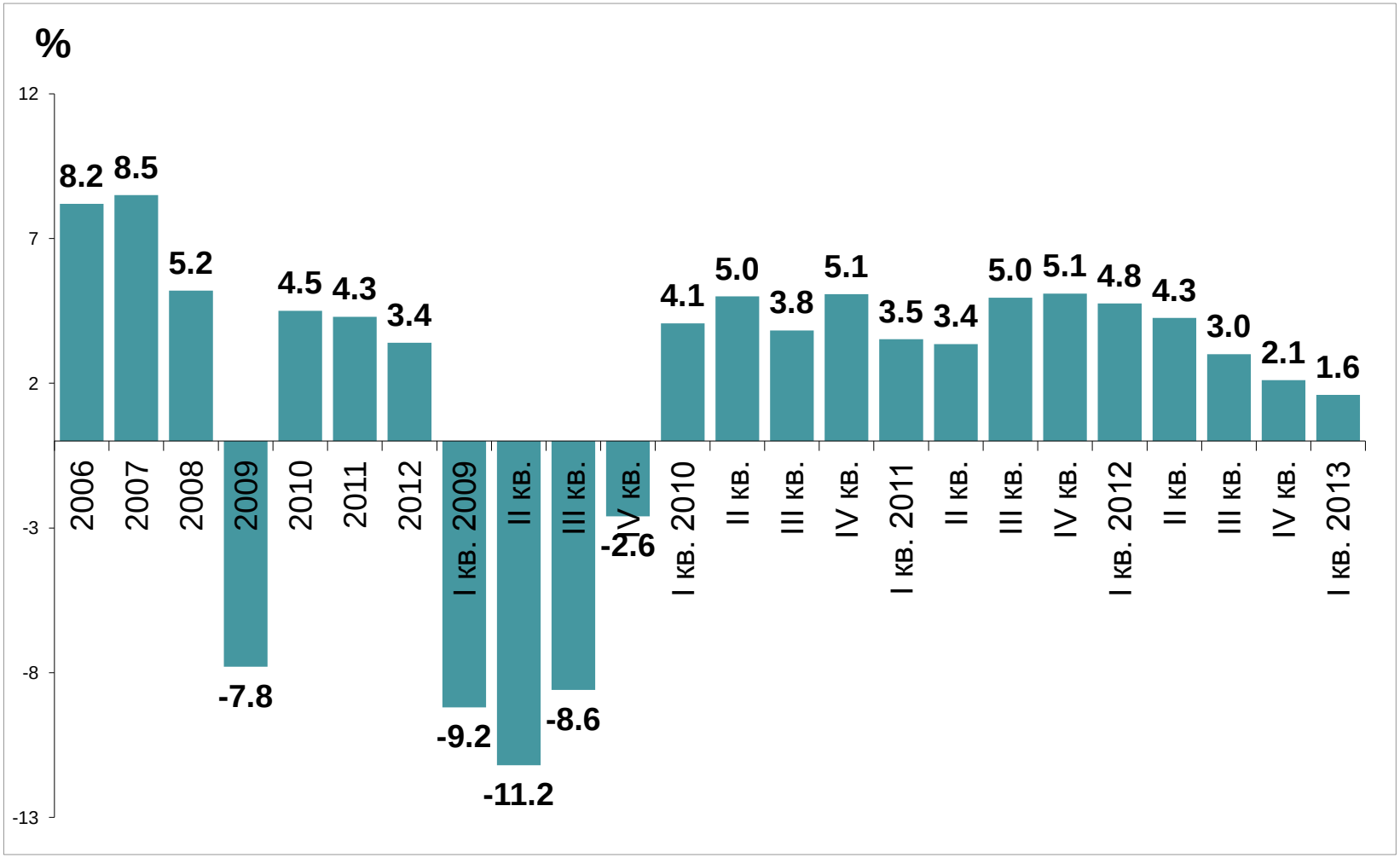
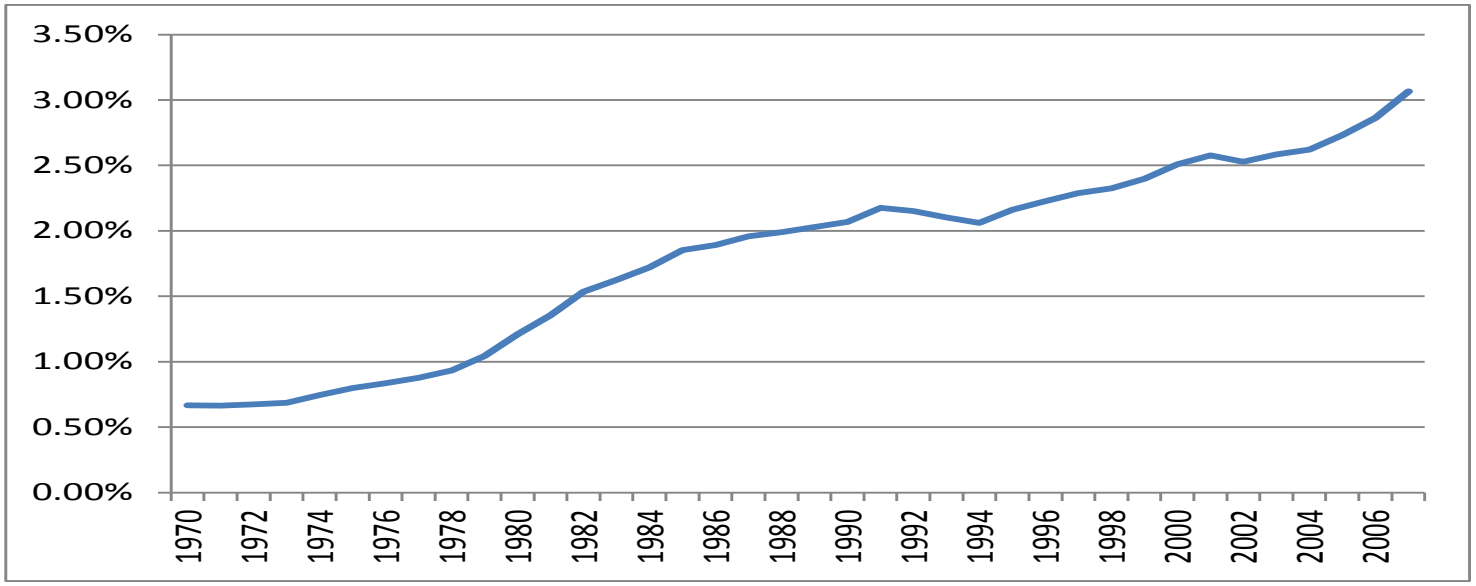
Structure changes and economic growth

RUSSIA - GDP q/q



R&D in US GDP



Y = *f* (Q,RD,Im)

Q - the efficiency of the use of primary resources
RD - expenditure in research and development
Im –import of goods

In countries with a high level of demand saturation economic dynamics depends on exports and population growth

$$Y = f(P, X)$$

But there is still the possibility of supporting economic growth with help of structural changes

$\sum \Delta y = 0$ => $\Delta y_i = - \Delta y_j$

y – final demand

$\sum \Delta x \neq 0$

т. к

$\Delta x_i = \Delta y_i * \mu_i$

$\Delta y_i \neq 0$ => $\mu_i = \Delta x \ / \ \Delta y_i$

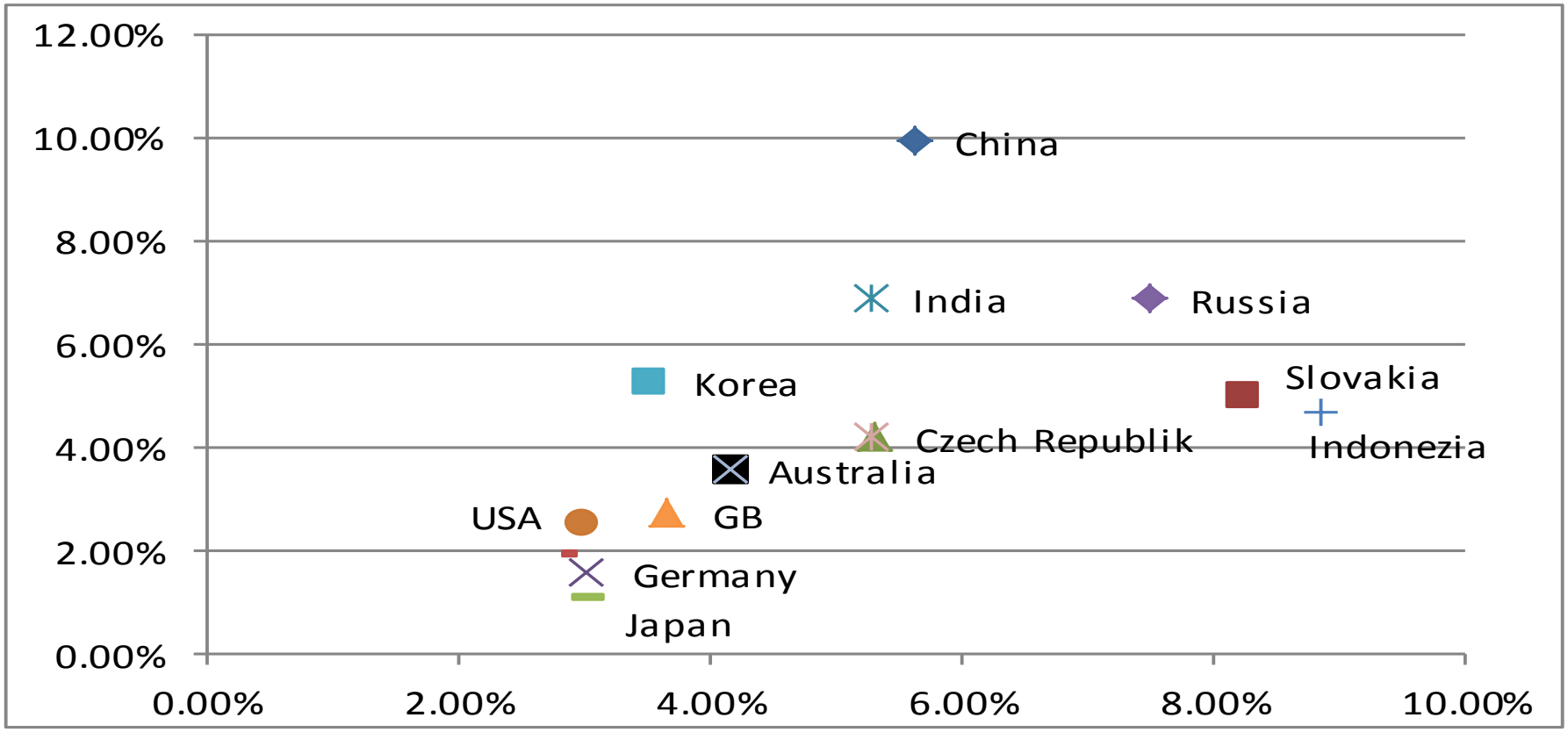
где:

y_i – final demand in sector i

x_i – output in sector i

μ_i – multiplicator in sector i

Change of output structure (X) and growth rate of GDP (Y) in 1995-2009 (current prices)



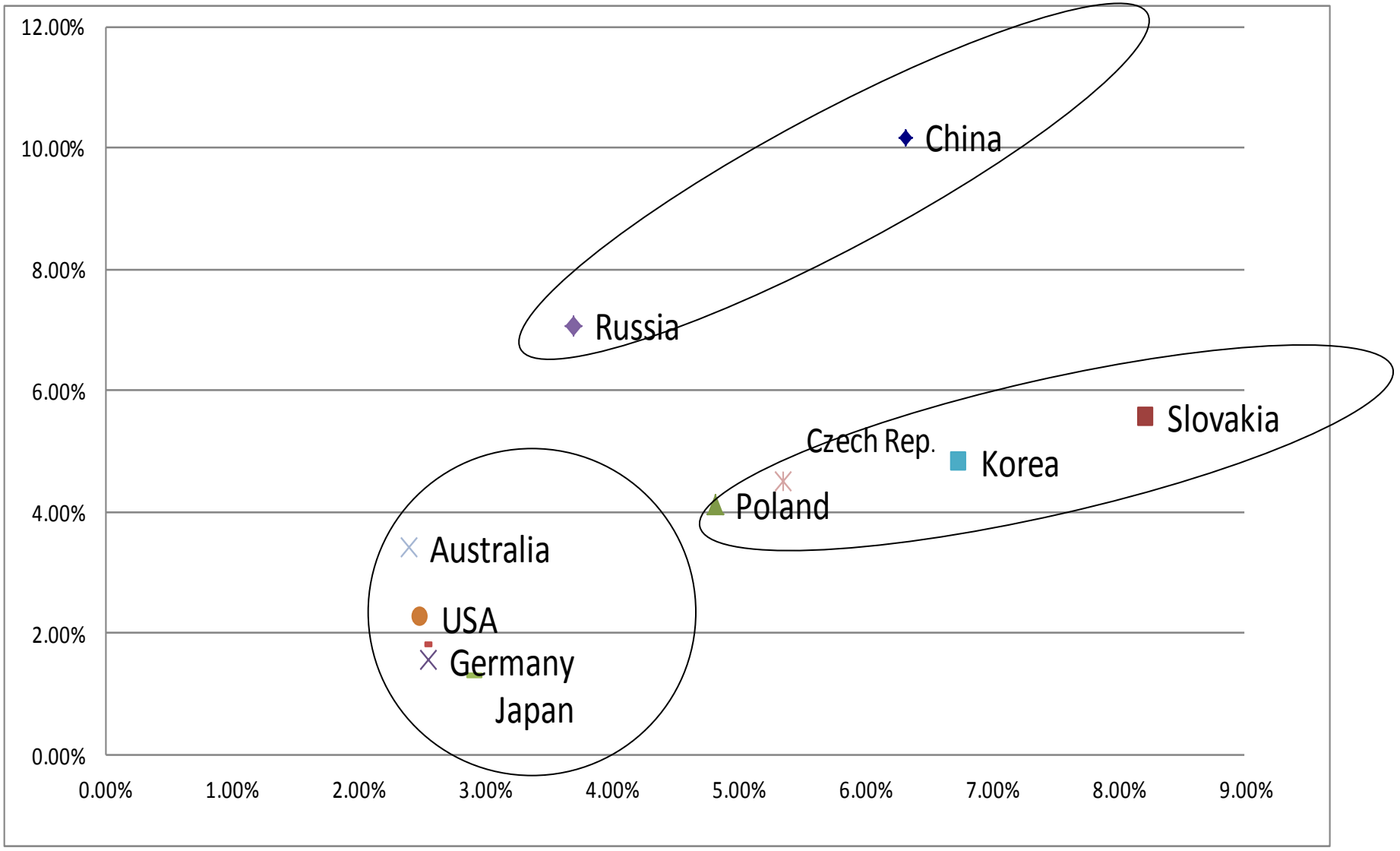
$\Delta X_t = \Sigma |a_{it} - a_{it-1}|$

где:

ΔX – change in structure of total output in year t;

a_{it} – share of sector i in structure of output

Change of output structure (X) and growth rate of GDP (Y) in 1995-2009 (constant prices)



Share of VA in structure of output, %

	1995		2000		2007		2009	
	USA	Russia	USA	Russia	USA	Russia	USA	Russia
Mining	57.6	48.7	54.1	53.8	54.0	52.5	68.9	51.2
Food and tobacco	25.9	25.3	29.3	27.3	24.7	27.3	26.7	26.8
Wood and Products of Wood and Cork	30.5	38.7	29.4	42.8	27.0	38.7	25.9	35.3
Metallurgy	37.7	35.7	39.6	30.1	32.1	32.6	33.6	28.4
Machinery and Equipment	36.9	40.7	36.7	35.6	35.7	31.2	42.0	31.9
Electrical and Optical Equipment	33.6	42.2	35.2	40.1	47.1	32.0	56.5	34.2
Transport Equipment	27.6	31.7	29.3	38.2	25.3	21.7	27.5	23.0
Constructing	45.0	52.0	48.3	50.0	49.6	41.5	49.5	41.2
Air transport	42.5	63.3	42.1	59.2	39.8	30.8	46.1	21.7
Communications	67.6	69.2	57.0	59.2	60.3	61.0	59.6	59.5

Share of profirs in structure of output, %

	1995		2000		2007		2009	
	USA	Russia	USA	Russia	USA	Russia	USA	Russia
Mining	46.1	5.86	54.7	9.4	62.6	32.0	58.9	30.0
Food and tobacco	44.6	8.09	46.3	12.7	40.5	17.4	42.4	20.9
Wood and Products of Wood and Cork	31.6	6.39	20.3	9.5	13.9	24.8	24.9	23.0
Metallurgy	30	8.34	22.4	13.5	40.2	25.9	32.7	16.0
Machinery and Equipment	27.3	6.44	25.7	7.2	31.3	8.8	33.7	8.1
Electrical and Optical Equipment	41.8	7.44	30.6	7.0	32.9	10.2	34.6	8.6
Transport Equipment	24	6.21	30.3	6.4	27.8	3.5	25.5	1.7
Constructing	33.5	17.07	33.2	25.1	31.2	21.6	29.9	22.8
Air transport	25.6	9.02	11	12.6	16	14.9	24.4	12.9
Communications	53.7	23.70	46.7	36.9	55.8	41.1	61.3	42.7

STRUCTURE OF GROSS OUTPUT

	2010	2015	2020	2025	2030
AGRICULTURE	4.2	4.0	3.2	2.7	2.3
OIL, GAS AND MINING	7.7	6.4	5.0	4.2	3.5
HI-TECH INDUSTRY	1.2	1.4	1.8	3.2	4.5
MID-TECH INDUSTRY (HIGH LEVEL)	7.3	8.6	10.4	10.7	12.0
MID-TECH INDUSTRY (LOW LEVEL)	10.3	9.1	7.9	7.2	6.8
LOW-TECH INDUSTRY	9.4	9.2	8.7	8.5	8.5
POWER	4.8	4.7	4.6	4.4	4.2
COSTRUCTION	6.7	7.7	9.1	9.0	8.7
TRADE	15.7	15.7	15.5	15.4	15.6
HOTELS AND RESTAURANTS	1.0	1.2	1.4	1.6	1.7
TRANSPORT	7.6	7.1	6.5	6.0	5.6
COMMUNICATIONS	1.1	1.4	1.4	1.5	1.5
FINANCE AND INSURANCE	2.8	2.8	3.3	4.1	4.2
REAL ESTATE	6.6	7.4	8.4	8.8	9.0
RESEARCH AND DEVELOPMENT	1.3	1.5	1.7	1.8	2.0
OTHER BUSINESS SERVISES	0.2	0.2	0.2	0.2	0.2
GOVERNMENT SERVICES	5.4	5.3	5.0	4.9	5.0
EDUCATIONS	2.0	1.9	1.7	1.7	1.6
HEALTH	2.9	2.8	2.7	2.6	2.6
OTHER SOCIAL SERVICES	1.8	1.8	1.6	1.6	1.5
TOTAL OUTPUT	100.0	100.0	100.0	100.0	100.0

I-O TABLES FOR RUSSIA, UKRAINE, KAZAKHSTAN and BELORUSSIA

x_{irjr}	x_{irjb}	x_{irju}	x_{irjk}	x_{irjw}	y_{rr}	y_{rb}	y_{ru}	y_{rk}	y_{rw}	X_r
x_{ibjr}	x_{ibjb}	x_{ibju}	x_{ibjk}	x_{ibjw}	y_{br}	y_{bb}	y_{bu}	y_{bk}	y_{bw}	X_b
x_{iujr}	x_{iujb}	x_{iuju}	x_{iujk}	x_{iujw}	y_{ur}	y_{ub}	y_{uu}	y_{uk}	y_{uw}	X_u
x_{ikjr}	x_{ikjb}	x_{ikju}	x_{ikjk}	x_{ikjw}	y_{rr}	y_{rb}	y_{ru}	y_{rk}	y_{rw}	X_k
x_{iwjr}	x_{iwjb}	x_{iwju}	x_{iwjk}							
VA_r	VA_r	VA_r	VA_r							
X_r	X_b	X_u	X_k							

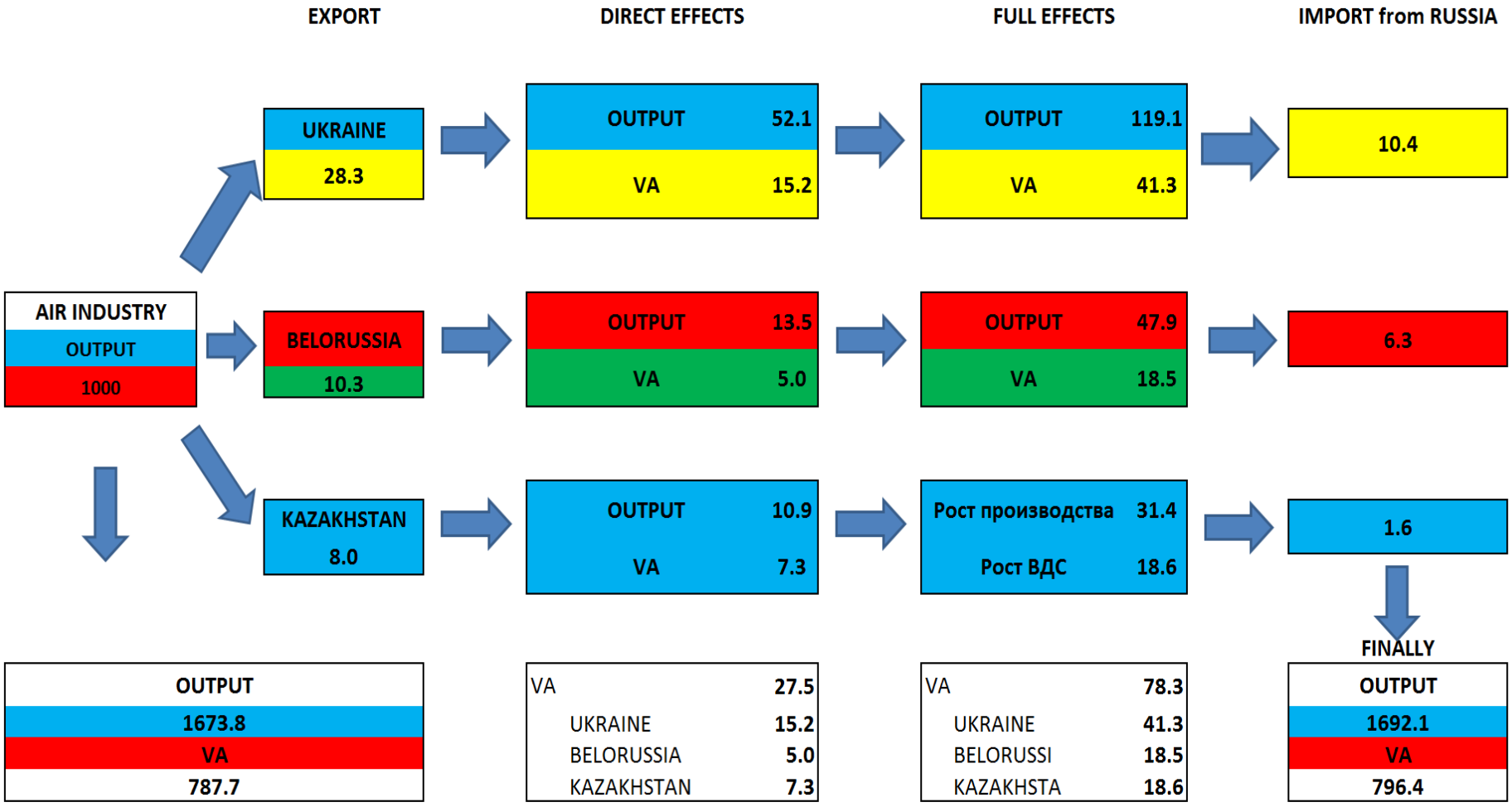
$$x_{ir} = \sum_{jr=1}^{n} x_{irjr} + \sum_{jb=1}^{n} x_{irjb} + \sum_{ju=1}^{n} x_{irju} + \sum_{jk=1}^{n} x_{irjk} + \sum_{jw=1}^{n} x_{irjw} + y_{irr} + y_{irb} + y_{iru} + y_{irk} + y_{irw}$$

- RUSSIA
- BELORUSSIA
- UKRAINE
- KAZAKHSTAN
- REST OF THE WORLD

Доля стран постсоветского пространства в затратах некоторых российских отраслей

	ELECTRO EQUIPMENT	TRANSPORT QQUIPMENT	SHIP BUILDING	AIR and SPACE INDUSTRY
UKRAINE				
METALLURGY	0.8%	0.6%	0.6%	0.6%
CHEMICAL PRODUCTS	0.6%	0.5%	0.5%	0.5%
MASHINERY	0.4%	0.3%	1.5%	1.4%
TOTAL	**1.9%**	**1.6%**	**2.9%**	**2.7%**
KAZAKHSTAN				
METALLURGY	0.8%	0.2%	0.4%	0.3%
CHEMICAL PRODUCTS	0.2%	0.2%	0.2%	0.2%
MASHINERY	0.0%	0.0%	0.1%	0.1%
TOTAL	**1.1%**	**0.5%**	**0.8%**	**0.7%**
BELORUSSIA				
CHEMICAL PRODUCTS	0.6%	0.5%	0.3%	0.3%
MASHINERY	0.6%	0.6%	0.8%	0.8%
Всего	**1.3%**	**1.1%**	**1.3%**	**1.2%**

AIR INDUSTRY
EFFECTS FROM OUTPUT GROWTH IN RUSSIA



MASHINERY

Status quo scenario

	2011	2015	2020	2025	2030
RUSSIA MASHINERY OUTPUT, mln. Usd 2011	150999	207090	278965	367714	480588
ADDITONAL OUTPUT IN UKRAINE, mln. Usd 2011	15630	21436	28876	38062	49745
ADDITIONAL VA in UKRAIN, mln. Usd 2011	5323	7300	9834	12962	16941
SHARE OF MASHINERY SECTOR IN UKRAINAN GDP ,%	5.8%	5.9%	6.7%	8.0%	9.2%
SHARE OF UKRAINEN GDP PROVIDED BY RELATIONS WITH RUSSIAN MASHINERY%	2.5%	2.5%	3.2%	4.4%	4.8%