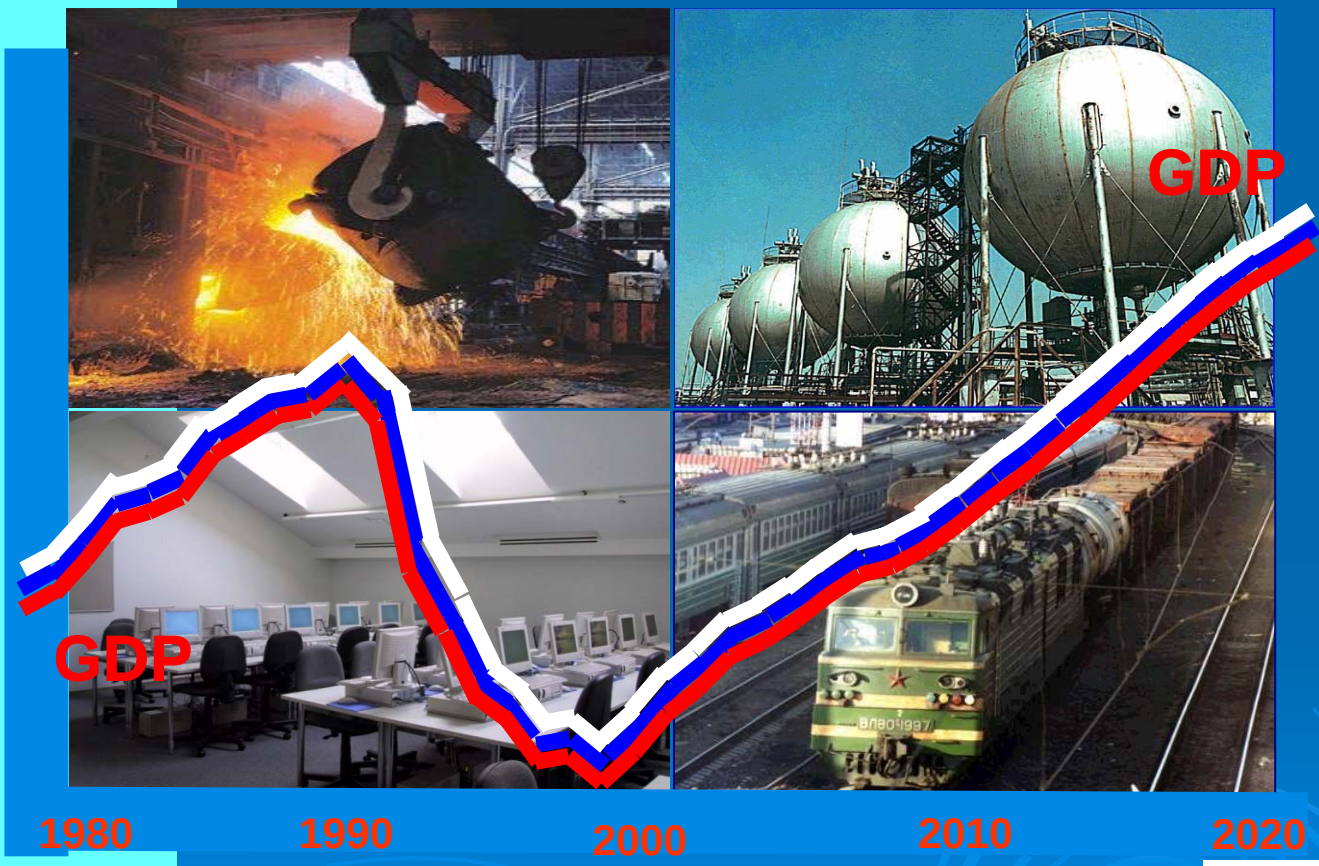
Multilevel model of regions of the Russian Federation by example of Far East Federal District



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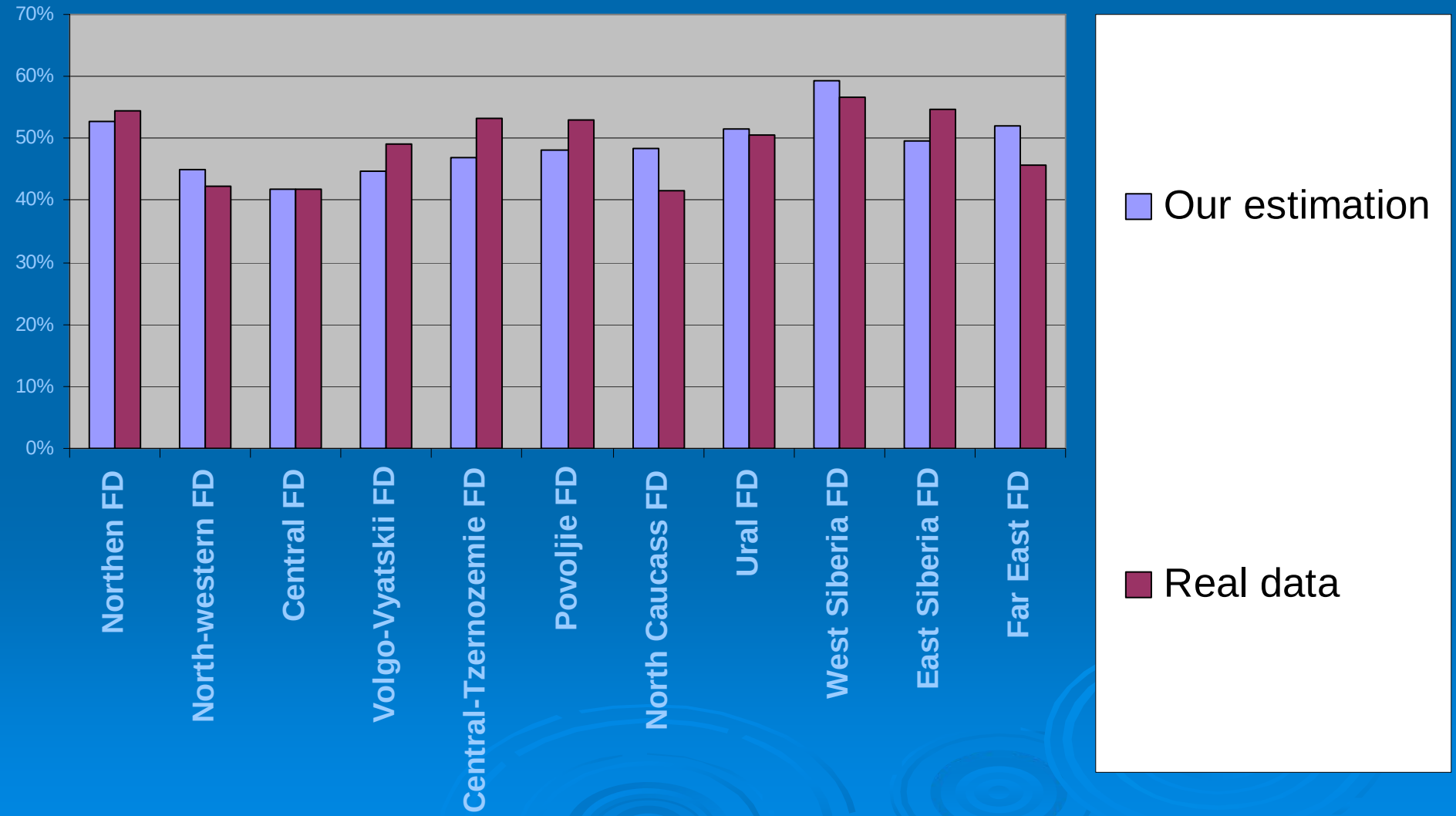
ИНП РАН

Growth of regional differentiation in Russian Federation by the example of regional domestic product per capita

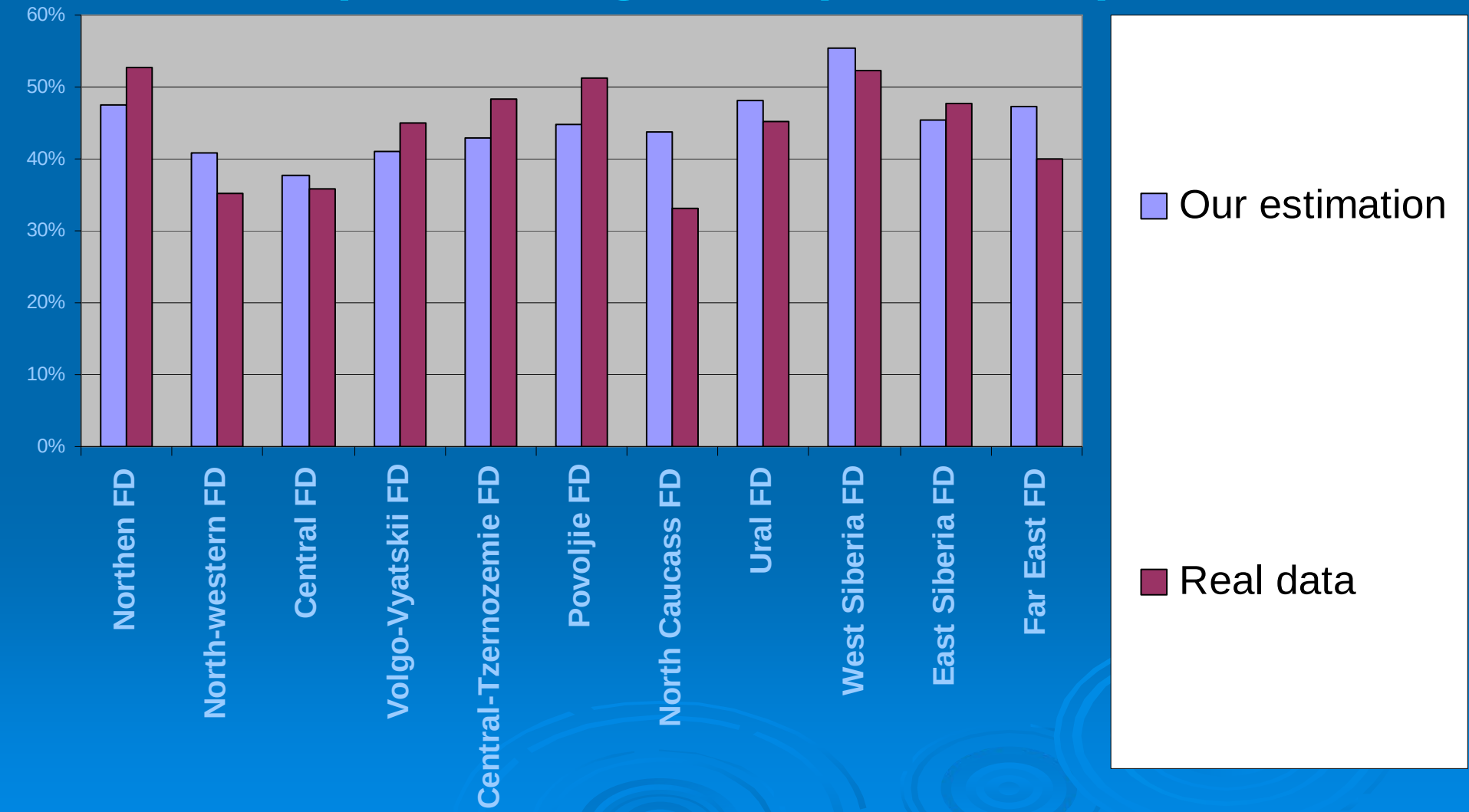
Interindustry approach

Application of the interindustry approach to the analysis of regional development means not only the research of sector structure of regional production or I/O interactions inside a region, but also the analysis of influence of sector structure of the national economy on dynamics and structure of regional economy. Even the simple projection of sectors shifts in the Russian economy on industry of regions, allows to explain the most part of dynamics of the industrial production of the economic regions of Russia. Enrichment of this approach by regional interindustry interactions can provide high enough degree of quality of the description of structural shifts in regions and a substantial explanation of features of regional explanation dynamics.

Comparision between estimated and real data about regional domestic product's growth (1995/1990)



Comparision between estimated and real data about regional domestic product's growth (1997/1990)



Interindustry model of the region

- Describes industrial structure of region, basing on regional I/O tables in current and constant prices.
- Operates with data, measured in cost units.
- Works in the connection with the national model.
- For convenience of linkage with with the national interindustry model uses the same sectors specification.
- Is time and labour-consuming.

Regional authorities and statistical bureaus

- Often work with data measured in natural units.
- Require a model simple enough to be operated by the local staff.
- Prefer to work with the regional product range as model's specifications. It increases complexity of the description of inter-regional interactions.

Interindustry or econometric model of the region

- Interindustry model of the region
  - Provides detailed forecast and is able to take up more diverse scenarios.
  - Labour- and time-consuming. Needs preliminary processing of regional statistics and making data in cost units. Incase of high specialization of the regional economy may be excessive.
- Econometric modal of the region
  - Operates also with data in natural units and regional product range. It is more easy to develop.
  - Doesn’t include whole industrial structure of the region. Provides less detailed forecast then interindustry model.

I/O table of the republic Sakha (Yakutia)

	Elect	Oil e	Oil r	Gaz i	Coal	Other	Ferro	Non-F	Chemi	Mashi	Wood	Const	Light	Food	Other	Const	Agri c	Transpo	Transpo	Trade	Other	Health c	Housing	Manage	Science
Electric	74.1	0.1	0.4	1.2	307.0	0.0	0.0	1983.4	0.0	57.1	38.6	106.7	3.7	24.8	12.8	259.9	88.2	293.5	119.2	711.1	0.0	561.2	153.6	35.2	112.0
Oil extra	0.0	0.1	9.0	2.9	0.5	0.0	0.0	0.4	0.0	0.0	0.0	0.2	0.0	0.0	0.0	16.8	0.0	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oil refini	680.2	0.0	0.5	1.3	28.4	0.0	0.0	593.3	0.0	10.3	21.5	49.4	0.2	40.1	1.1	243.1	98.5	589.0	286.1	65.3	0.0	12.4	3.7	67.5	8.8
Gaz indu	86.3	0.0	0.1	9.2	4.2	0.0	0.0	227.1	0.0	6.3	3.2	38.0	0.1	11.1	0.3	9.9	8.3	122.4	3.8	9.3	0.0	123.0	33.4	8.9	30.8
Coal indu	2370.4	0.0	0.0	0.0	1087.4	0.0	0.0	114.2	0.0	4.4	12.2	22.8	0.2	5.8	1.2	12.9	20.8	11.8	7.1	46.1	0.0	144.9	43.4	8.8	4.4
Other fu	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.9	0.1	0.3	0.0	0.0	3.5	0.3	0.3	0.5
Ferrous	30.8	0.0	0.1	0.2	77.6	0.0	0.0	435.7	0.0	195.5	17.3	192.2	0.3	12.7	2.3	1076.2	8.6	28.5	12.7	5.4	0.0	21.4	15.3	2.8	214.3
Non-Fer	24.0	0.0	0.0	0.0	1.0	0.0	0.0	496.7	0.0	78.6	0.5	1.6	0.0	1.4	0.8	20.9	0.3	3.9	1.6	1.3	0.0	13.5	0.8	0.3	227.6
Chemica	13.4	0.0	0.0	0.1	70.9	0.0	0.0	346.8	0.0	30.1	19.2	10.1	3.4	8.0	5.9	141.0	160.8	53.0	31.0	21.1	0.0	331.6	15.8	93.7	70.7
Mashine	40.1	0.0	0.0	0.3	62.4	0.0	0.0	315.4	0.0	126.7	8.2	11.1	0.3	16.2	1.0	331.0	82.0	73.5	72.6	50.8	0.0	95.9	18.9	476.3	275.0
Wood in	8.9	0.0	0.0	0.0	67.1	0.0	0.0	133.9	0.0	28.2	252.7	21.9	0.7	31.6	3.5	557.9	49.8	23.9	9.5	102.9	0.0	83.2	20.5	21.4	32.8
Constra	6.7	0.0	0.0	0.0	19.4	0.0	0.0	82.7	0.0	6.6	6.2	289.2	0.2	3.1	0.6	2346.0	24.5	58.1	8.1	61.2	0.0	76.9	34.7	3.3	35.5
Light ind	2.7	0.0	0.0	0.0	5.4	0.0	0.0	20.4	0.0	4.5	5.8	2.5	42.4	7.9	1.9	20.9	6.9	11.5	5.5	32.9	0.0	144.6	7.7	39.3	13.4
Food ind	1.5	0.0	0.0	0.0	1.1	0.0	0.0	8.1	0.0	0.9	0.8	1.6	1.0	470.5	6.2	6.7	257.8	0.3	8.1	118.8	0.0	1547.4	8.3	59.4	6.7
Other in	23.3	0.0	0.0	0.0	13.5	0.0	0.0	1.1	0.0	4.9	2.8	3.5	0.5	14.2	9.5	11.8	360.6	9.6	7.7	33.6	0.0	123.6	11.0	17.8	20.4
Constra	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultu	0.1	0.0	0.0	0.0	0.3	0.0	0.0	1.0	0.0	0.1	6.6	0.0	2.1	459.1	14.5	1.4	1180.5	0.5	0.9	61.7	0.0	215.9	3.5	21.2	2.0
Transpo	41.8	2.9	5.4	198.9	962.2	0.0	0.1	556.7	0.0	259.7	193.4	497.3	67.1	93.9	17.5	332.5	313.3	10.8	0.0	74.6	0.0	0.0	0.0	0.0	0.0
Transpo	4.8	0.0	0.0	0.6	113.9	0.0	0.0	18.4	0.0	0.9	1.0	1.2	0.1	0.4	0.1	34.7	2.4	14.4	49.6	12.5	0.0	680.3	51.9	21.6	113.4
Trade ar	0.0	0.2	16.3	33.2	344.6	0.0	0.0	149.7	0.0	195.9	68.3	127.4	187.5	548.0	26.4	0.0	498.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other A	13.4	0.0	0.0	0.1	3.9	0.0	0.0	8.6	0.0	2.1	2.6	3.8	0.5	3.7	1.3	21.6	3.2	10.2	6.7	45.6	0.0	218.5	2.9	8.4	29.4
Health c	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2	7.6	0.0	0.0	24.3	0.0	0.0	0.4
Housing	1.8	0.0	0.0	0.1	21.2	0.0	0.0	7.0	0.0	0.8	0.5	0.5	0.0	0.7	0.0	12.0	3.4	16.7	100.7	19.6	0.0	1796.1	210.2	11.7	98.1
Manage	41.4	0.0	0.0	1.7	313.2	0.0	0.0	124.1	0.0	9.1	7.8	18.8	0.5	7.9	0.5	171.0	12.1	120.7	0.0	616.9	0.0	0.0	12.1	0.0	10.2
Science	0.4	0.0	0.0	0.1	0.3	0.0	0.0	1.4	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.4	0.1	0.3	17.4	0.1	0.0	372.3	0.0	6.4	25.3

Factors allowing to assume a high degree of economic isolation of the Far East from the Russian Federation.

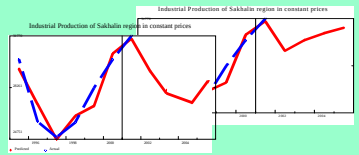
- Geographical remoteness and absence of the advanced system of communications
- Rather small population of this region;
- Rather high share of foreign economic relations in regional trade

Diagram of the model of the Far East Federal District

Interindustry model of the Russian Federation

Interindustry model of the Far East Federal District

Econometrical models of separate regions



An example of the equations of the Sakhalin region's model

Production of the industry (in the prices of 2000)

r indTS = d.out2, d.out14, d.out3

In the given distribution **intercept** - the free member of the equation, a variable **indTS** - means production of the industry of the Sakhalin region(in the prices of 2000), the variable **d.out2** means output of the oil-extracting industry of the Far East FD, **d.out4** - output of the gas industry of the Far East FD, **d.out14** - output of the food-processing industry of the Far East FD.

An example of the equations of the Sakhalin region's model

Consumer's prices index CPI

r cpibS =! b.cpi, b.prices18

Here cpibS - an index of consumer prices of the Sakhalin region, b.cpi - an index of consumer prices of the Russian Federation, b.prices18 – an index of prices in transport (cargo) of the Russian Federation.

Comparison between real and estimated values of Sakhalin economy's major indicators

	2000.00	2001.00	2002.00	2003.00	2004.00
RDP, mln rubl.					
Real data	35412,1	48113,6	56389,7	71785,1	77431,6
Our estimations	35448,4	46259,3	58942,3	70692,1	75950,6
Industrial production, mln rubl.					
Real data	30166,0	32892,0	31336,0	37252,0	43162,0
Our estimations	30567,5	32566,4	32338,5	38566,0	42387,1
Index of RDP					
Real data	0,848	1,166	1,062	1,281	1,039
Our estimations	0,848	1,149	1,076	1,241	1,027
Index of industrial production					
Real data	1,130	1,103	0,870	1,026	1,048
Our estimations	1,132	1,063	0,900	1,034	1,038
Index of agriculture					
Real data	0,902	1,247	0,934	1,125	0,849
Our estimations	0,920	1,295	0,942	1,135	0,852
Index of investment					
Real data	0,360	1,905	1,417	1,364	1,317
Our estimations	0,541	1,572	1,392	1,672	1,392

Conclusions

- Use of multilevel model in conditions of current Russian statistical information
  - Keeps an opportunity of taking in account structural parameters of the regional economy (a level of economic district, federal district or macroregion).
  - Reduces time and expenditures of labour by development of the model of the separate region.
  - Allows regional authorities and statistical bureaues to work with more easy understandable for them models and usual statistical data
  - Enables to estimate efficiency of the federal programs aimed at the group of regions

THANK YOU FOR ATTENTION