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### Health Situation in the Russian Federation

The study is of research interest since special attention should be paid to the health status of the Russian population. In 2008, Russians faced an average life expectancy of about 13 years shorter than their European neighbours.

Non-communicable diseases (NCDs) contribute the lion's share to the worrying morbidity and death rates.

NCDs are directly related to nutritional behaviour (micronutrient deficiencies, unhealthy diets) and lifestyle (e.g. smoking or drinking habits).

This study

- (i) develops a diet quality index based on the Diet Quality Index-International (DQI-I) (Kim et. al. 2003),
- (ii) describes the diet quality of the Russian society in total as well as for specific strata of the population, and
- (iii) investigates relevant determinants of a healthy diet, including psychological factors.



### Grossman's Health Investment Model (1972, 2000)

Utility function:

$$U(T) = \int_0^T U(Z(t), h(H(t)); X, Y) e^{-\rho t} dt$$

$$U_z > 0, U_h > 0, U_{zz} < 0, U_{hh} < 0$$

H: health capital  
h: amount of healthy time  
Z: vector of commodities  
X: individual characteristics  
Y: household characteristics

Equation of motion of health capital H:

$$\dot{H}(t) = I(t) - \sigma(t)H(t)$$

$$\sigma > 0, \dot{\sigma}(t) > 0 \forall t \in [0, \infty]$$

$$H(0) = H_0; H(T) = H_{min}; H(t) > H_{min} \forall t \neq H_c$$

I: investment in health capital  
 $\sigma$ : depreciation rate of health capital

Equation of motion of financial assets A:

$$\dot{A}(t) = rA(t) + w(t)h(t) + y(t) - \pi_Z(t)Z(t) - \pi_H(t)I(t)^\alpha$$

$$A(0) > 0, A(T) \geq 0$$

w: wage rate  
y: other income  
r: interest rate  
 $\pi_H$  shadow price of investment in H  
 $\pi_Z$  shadow price of Z vector

Investment in health capital:

$$I(t) = I(C_f(D(t)), M(t), m(t); X, Y, E)$$

Demand function for diet quality (Chern, 2003):

$$D(t) = D(p_f(t), A(t), w(t), t, H(t); E, X, Y)$$

M: consumed medical goods  
m: time invested in health in period  
D: diet quality, expressed in consumed  $C_f$  (measured by DQI-I or separate dimensions)

### Healthy Diet Measurement: DQI-I

The Diet Quality Index-International developed by Kim et al. (2003) consists of the following four categories:

#### Variety:

Assesses, whether the diet consumed consists of a sufficient variation of different food groups

#### Adequacy:

Evaluates, if the intake of different dietary elements is adequate to guarantee a healthy diet.

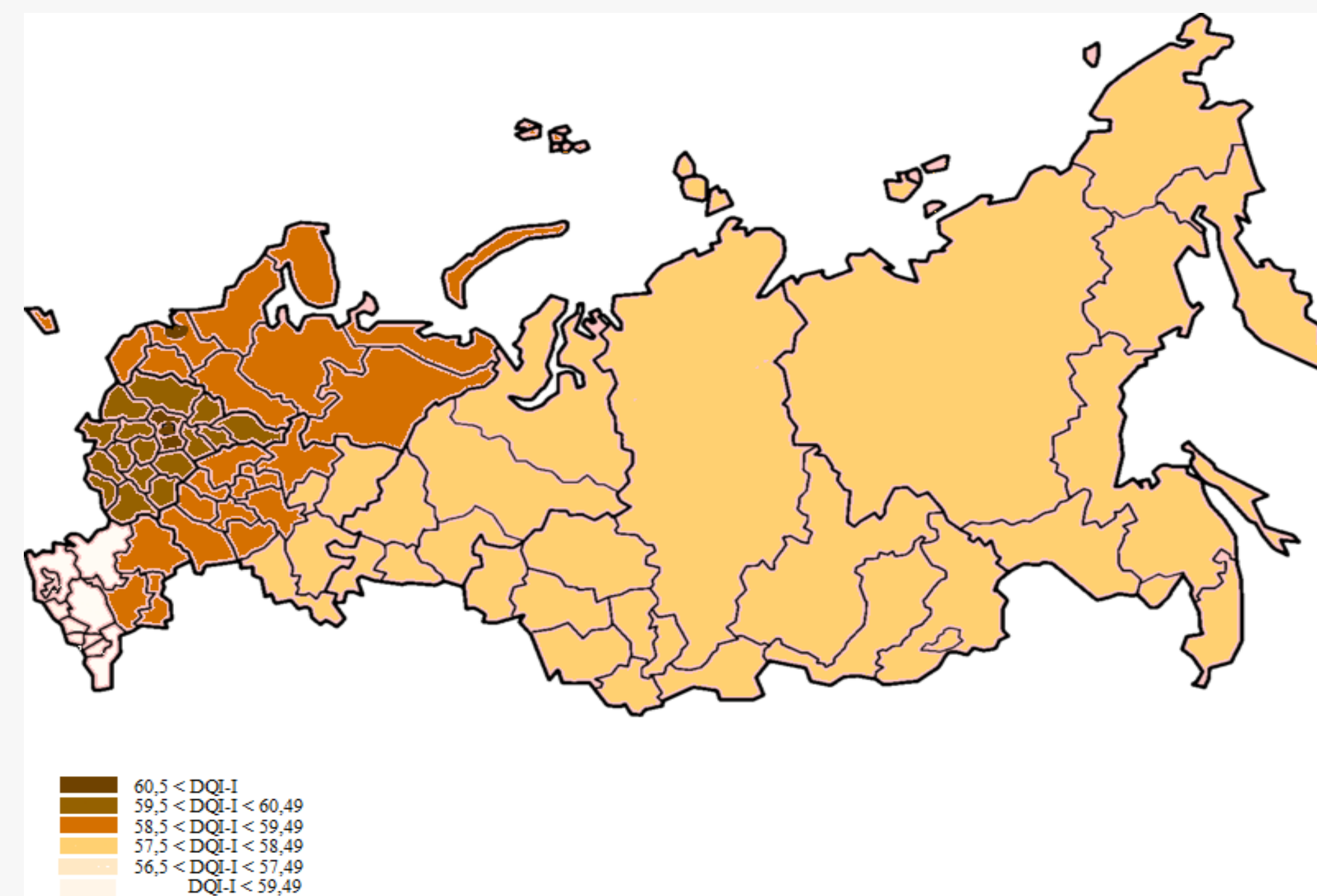
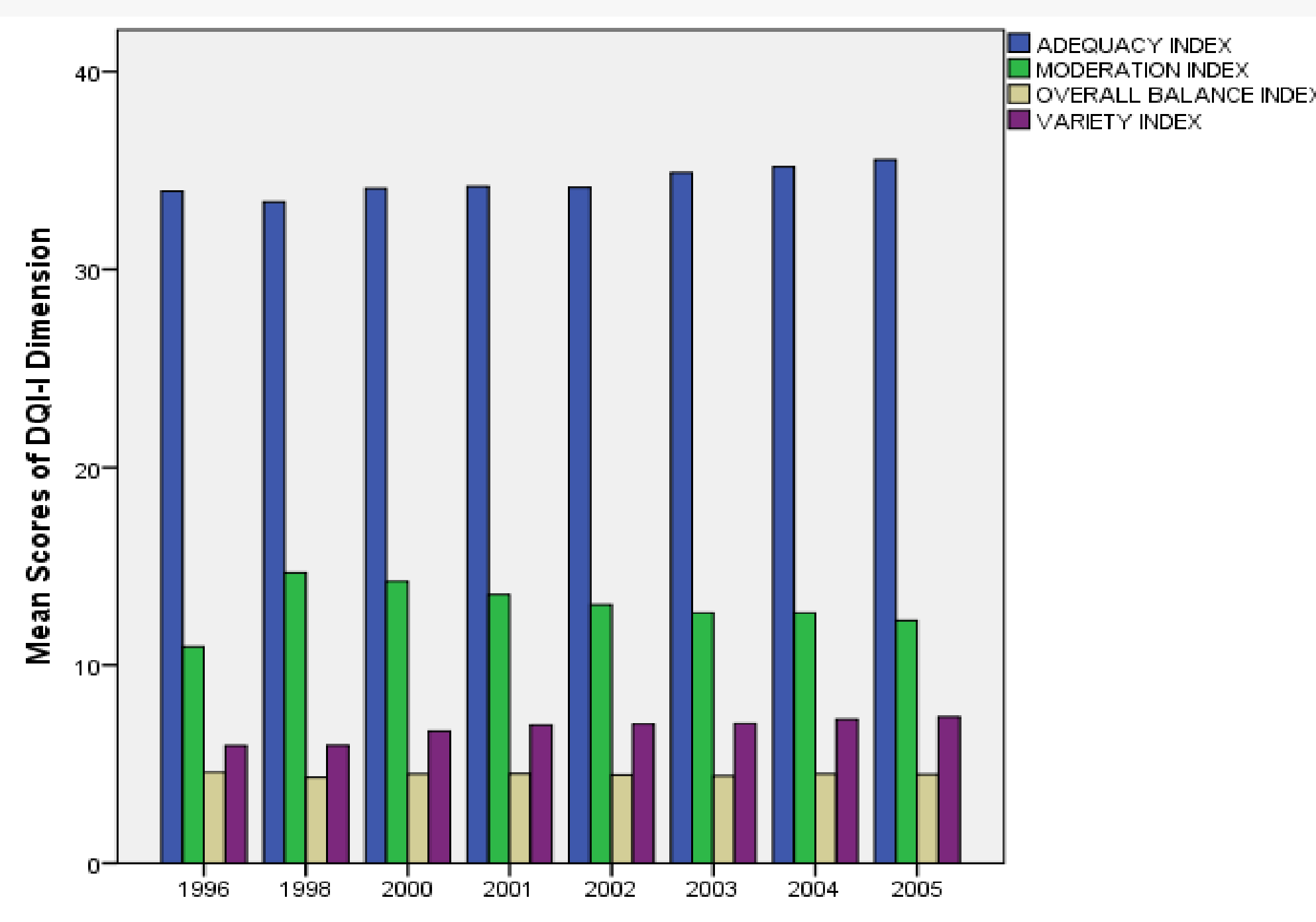
#### Moderation:

Evaluates to what extent foods and nutrients which are related to chronic diseases are avoided in the diet.

**Overall Balance:** Addresses the proportionality in energy sources and fatty acids composition.



### DQI-I in the Russian Federation: Distribution and Development over Time



Russian Diet (N=63.169)	Max. Score	Mean	% of Max. Score	Std. Deviation
Variety	20	6,93	35%	2.76
<b>Variety Index</b>	<b>20</b>	<b>6.93</b>	<b>35%</b>	<b>2.76</b>
Adequacy fiber	4	3.55	89%	0.83
Adequacy vitamin A	4	3.13	78%	1.22
Adequacy vitamin B6	4	3.94	98%	0.35
Adequacy vitamin B12	4	3.26	82%	1.31
Adequacy vitamin C	4	2.88	72%	1.36
Adequacy folic acid	4	3.27	82%	0.97
Adequacy calcium	4	3.02	75%	1.05
Adequacy magnesium	4	3.78	94%	0.58
Adequacy iron	4	3.88	97%	0.44
Adequacy zinc	4	3.93	98%	0.37
<b>Adequacy Index</b>	<b>40</b>	<b>34.62</b>	<b>87%</b>	<b>6.00</b>
Moderation of alcohol intake	6	3.61	60%	2.84
Moderation of fat intake	6	1.42	24%	2.15
Moderation of empty calorie	6	4.86	81%	1.93
Moderation of saturated fat	6	0.25	4%	1.00
<b>Moderation Index</b>	<b>30</b>	<b>12.94</b>	<b>43%</b>	<b>5.53</b>
Macronutrient ratio	5	3.07	61%	0.70
Fatty acid requirements	5	1.39	28%	1.57
<b>Overall Balance Index</b>	<b>10</b>	<b>4.45</b>	<b>45%</b>	<b>1.70</b>
<b>Diet Quality Index-I</b>	<b>100</b>	<b>58.64</b>	<b>58.64%</b>	<b>8.68</b>

Data Source: RLMS /1996-2005

### Empirical Results

Presentation of selected results:

Regressors	Moderation Index	Adequacy Index	DQI-I	
Ln income	Ln total hh income	-0.9576***	0.8000***	0.4159***
Age	Age of individual	0.0110***	0.0059*	0.0309***
Health evaluation	1-5, 5=best health	-0.1112*	-0.2139***	-0.3818***
Gender	0-1, 1=female	1.338***	-0.1393**	1.2467***
Maximal education	0-5, 5=graduate school	-0.6467***	0.3343***	0.0283
Sport	0-1, 1=exercises	-0.5976***	0.2886***	0.2880*
Smoker	0-1, 1=smoker	-1.2761***	-0.1035	-1.577***
Feels to be good person	Factor values	-0.0854**	0.1993***	0.1666**
Has power to change life	Factor values	0.3570***	-0.1457***	0.0566
Depression	1-3, 3=depression	-0.2471***	0.2065***	0.1759
Social respect	1-9, 9=highly respected	-0.0257	-0.0555**	-0.0620*
Satisfaction with life	1-5, 5=satisfied	-0.1788***	0.0234	-0.1245*
Members in hh	# of hh members	0.4285***	-1.6098***	-0.9183***
Land used	0-1, 1=land used	0.2477**	0.3241***	2.934***
R <sup>2</sup>		0.1665	0.2885	0.1559
N		36574	36298	36574

\* p<0.05; \*\* p<0.01; \*\*\* p<0.001

Pooled OLS regression with cluster-robust standard errors

### Concluding Remarks

The Russian diet has tremendous deficits in the moderation of empty calorie foods and the moderation of total fat intake, especially regarding the absolute amount and the share of saturated fatty acids.

Empirical results indicate that for Russian individuals major drivers of diet quality are:

- at the individual level: gender, age, lifestyle, health status, and
- at the household level: total household income, household size, land used for household production.

Additionally, a significant effect of psychological variables on the healthy eating behavior can be shown, especially the constituent traits of neuroticism - the higher a person is depressed and the less the person has confidence in his own strength to change his personal situation, the less is the moderation of NCD causing foods and nutrients.