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FACTORS OF INCOME DIFFERENTIATION IN LATVIA: 2000—2011

The tendencies of income change and income differentiation levels, as well as the impact of some factors on income differentiation in Latvia within the period from 2000 to 2011 are determined with the use of the methods of degree and structural average, dispersion measures and Herfindahl index. For the analysis of the impact of the available for the research factors of population differentiation the regressive analysis is used.

Keywords: *income; income differentiation; population; Latvia.*

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ЧИННИКИ ДИФЕРЕНЦІАЦІЇ ДОХОДІВ НАСЕЛЕННЯ ЛАТВІЇ: 2000–2011

У статті визначено тенденції зміни доходів та рівнів їх диференціації, а також вплив різноманітних чинників на зміну диференціації доходів населення Латвії у період з 2000 по 2011 рік. Для аналізу даних використано методи ступеневої та структурної середньої, дисперсійний аналіз та індекс Герфіндаля. Для аналізу міри впливу різних змінних на зміни диференціації доходів населення Латвії використано регресійний аналіз.

Ключові слова: *прибуток; диференціація прибутків; населення; Латвія.*
Табл. 8. Форм. 2. Літ. 35.

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ФАКТОРЫ ДИФФЕРЕНЦИАЦИИ ДОХОДОВ НАСЕЛЕНИЯ ЛАТВИИ: 2000–2011

В статье определены тенденции изменения доходов и уровней их дифференциации, а также влияние различных факторов на изменения дифференциации доходов населения Латвии в период с 2000 по 2011 год. Для анализа данных использованы методы степенной и структурной средней, дисперсионного анализа и индекс Херфиндаля. Для анализа меры влияния различных переменных на изменения дифференциации доходов населения Латвии использован регрессионный анализ.

Ключевые слова: *доход; дифференциация доходов; население; Латвия.*

Introduction

High level of income differentiation contributes to the increase of poverty, as well as decreases the benefits of economic growth for poor families, since due to the large initial inequality the poor get smaller share from benefits. Consequently, without reference to the level of income in a country, wide income differentiation has a direct negative impact on social welfare. Thus, the research of income and its differentiation has been of great importance at state, as well as regional levels.

A number of factors influence the process of income differentiation: economic, social, demographic, political, psychological etc. Some of them affect the given process at the macro level, others – at microlevel, the third – at mesolevel; some factors have direct impact, others – indirect, the third serve as a background for other factors. Some factors have the impact on the formation of population income, others – on the process of its distribution and redistribution. Some factors of differentiation can be modified or prevented, others – not. At the same time all of them are

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interrelated and interdependent, they do not act separately, but all together intensifying or weakening one another. The factors of income differentiation can have a long-term, as well as a short-time character. Many of them have equivocal character in their action.

Methodology and research methods

Factors that influence income differentiation at the macro level have been deeply studied by the representatives of liberal economics. Many economists emphasize the dominant importance of economic growth on the increase of population income (Balke, Slottje, 1993; Bluestone, Harrison, 2000; Freeman, 2001; Jorgenson, 1998; Blank, 2000).

Consistent economy growth from the point of view of liberal economics is determined by free economics, the increase of labour productivity and the decrease of unemployment. The supporters of liberal economics believe that free market is the most effective economical system that is also effective for the solution of social problems. Consequently, they disapprove the state interference as a method of poverty reduction and demand the limitation of welfare state (Darity, Myers, 1987; Okun 1975; Lindbeck, 1995; Gilde, 1981).

Generous social protection, according to their point of view, is an anti-stimulus for work, contributes to the formation of incomplete families. Welfare state, according to them, can only increase population income for the short period of time, but hereafter due to the negative impact on economy growth leads to more intense poverty (Bane, 1994; Danziger, 1981). High social transfers fixate the labour market and do not allow reducing tax load.

Structural theory indicates the changes in demographic structure as the factor increasing the possibility of low income (Wilson, 1996). The researchers on the base of this theory usually take into account the population of elderly people, the number of children in family, immigration (Polityka Unii Europejskej, 2008), as well as female employment at labour market (Alderson, Nielsen, 2002; Gustafsson, 1995). Institutional economics indicates that institutional factors generate the difference in the volume of welfare. The difference in the level of poverty observed among countries, as well as among social groups in one country, emerges due to the level of state determined income redistribution and the level of social transfers directed for the help for the poor. The supporters of welfare state prove that the expansion of social protection is the most significant factor for poverty reduction (Page, Simmons, 2000; Korpi, Palme, 1998; Kenworthy, 1999; Brady, 2005; Moller, Bradley, Nielsen, Stephensen, 2003; Blank, 2000; DeFina, Thanawalda, 2001). According to P.Krugman, institutes, norms and political surroundings mean a lot more for income distribution, in turn objective market forces – less: "the leading role in inequality increase was played by the erosion of social norms and institutions that once supported equality" (Krugman, 2009).

How can multiaspectual differences at meso level that cause the differences in population income in various territories be explained?

There are quite a large amount of researches connected with the development of interrelations between central and periphery regions. According to the theory of growth poles (25 key books on economics, 1999), economy growth in regions is not even; growth appears in several points (growth poles) and later spreads on whole economy.

F.Perroux (The general economic theory of Francois Perroux, 1993) characterizes inequality as a basic principle of economic activity. Inequality of economic items leads to the deformation of economic space. One of the most interesting types of deformation, described by Perroux, is the polarization of space around the leading sphere ("growth poles").

The theory of poles is reflected in the works by Myrdal (1957), Hirschman (the "core – periphery" model).

The factors of income differentiation that have influence at micro level are explained by the theory of human capital, theory of filter or economic theory of signaling, as well as they have probable character that forms under the influence of occasional causes.

One of the researchers of the human capital theory is Theodore Schulz. He wrote (Schulz, 1960): "one of the forms of capital is education, human it is called because this form becomes a part of the human, and capital it becomes as a result of being a source of future satisfactions or future profits, or both together".

J.Mincer (1994) believes that relation between profit and education is not constant during the life time of an employee. In total approximately 25% of income inequality is caused by the differences in education. The importance of production experience makes up approximately the same share.

R.Eckaus (1973) showed that secondary school graduates and college graduates have quite strong tendency: the higher is the level of their mathematic skills, the higher is the amount of average income for white males in the USA in 1969.

The model introduced by G.Becker (1975) explains the inequality of income not only due to the labour (in fact – human capital), but also possessions.

P.Taubman (1978) using the samples of twins shows that 45% of income differences are due to genetic potential, 12% due to social origin, and due to education – only 6%.

R.Herrnstein (1971) proves that if social privileges were removed, there would be a new form of elite – biological elite.

Other researchers (Arrow, 1973) interpret education as a means of selection, some kind of filter that sorts students.

However, there is an opposite point of view: the place of a worker in income hierarchy is conditioned by his/her social origin. Education here plays a role of a mediator, modifying inequality in social origin into income inequality.

K.Jencks (1997) believes that income determination process has a probable character. In addition, according to the evaluation, all factors that influence the level of income – origin, genetic potential, gender, age, color of skin, education, occupation and others – are able to explain not more than 22% of all the differences in income. Hereof the conclusion can be drawn that income depends mainly on the number of occasional causes – "luck", "fortune" of a person etc.

The state of health of each person also can be treated as the capital one part of which is inherited, and another – acquired. Good health of population positively correlates with population income (Bloom, Canning, 2007). Higher income allows strengthening health by food improvement, and also expansion of opportunities for the purchase of better services of medical care. However, health can be not only a consequence, but also the reason of high income (Bloom, Canning, 2000). Smith (1999) also indicates a two-way relationship between health and wealth.

In this research such objective factors of differentiation of family income as education and employment of the head of a family, family residence (city or rural areas), the number of members of a household, are studied as well as interrelation of personal income with education of an individual.

For the research of the level and differentiation of income of the population the authors use several averages – an arithmetic average, structural averages – a median, and quintiles. In certain cases neither average value, nor a median, nor the research of quintile groups can give a reliable picture that leads to the use of such important statistical sizes as dispersion indicators – amplitude and a standard deviation, and also some indices of income differentiation – Lorenz coefficient and Herfindahl index.

It is possible to use relative indicators of variation: amplitude coefficient K_R and variation coefficient V_δ. In formulas their calculation looks the following:

$$K_R = \frac{X_{\max} - X_{\min}}{\overline{x}}; V_\delta = \frac{\sigma}{\overline{x}}, \quad (1)$$

where X_{max} and X_{min} – the highest and the lowest values of indication; x – the average value; x_i – indication variants.

The increase of amplitude coefficient and variation coefficient indicates directly to the strengthening of the variation of indication in the studied set. The sets having variation coefficient more than 30–35%, in statistics are considered to be non-uniform.

Herfindahl index is calculated according to the formula:

$$K_r = \sum_{i=1}^{n} d_i^2, \quad (2)$$

where d_i – the share of each population group in the total amount of population monetary income, $i = 1,2,\ldots,n$ – the number of groups (Litvinov, 1997).

The limits of values of Herfindahl index is from 0 to 1. At number of groups advancing to infinity Herfindahl index advances to 0. When there is only 1 group, the coefficient is equal to 1. Herfindahl index is indifferent to the line of theoretically possible uniform distribution (Litvinov, 1999).

For the analysis of influence of the factors of differentiation of the population the regression analysis is also used in the present research.

The results of the research

The empirical base of the research is the questionnaires of the population of Latvia carried out by SKDS firm within reports of the University of Latvia on economic development of Latvia for 2000, 2005, 2007, 2008 and 2011, and also the questionnaire of the population "Social inequality III", carried out by the Institute of Philosophy and Sociology of the University of Latvia in 2009.

In the article for the study of family's income the indicator of monetary income after payment of taxes on one family member (including social transfers) is used.

Tendencies of income change of the population of Latvia.

During the research 2 tendencies took place: the tendency of increase in the average income of population during the period since January 2000 till January 2008 (the average income increased by 222% at the increase of inflation index during the similar period for 57,1%) and a tendency of reduction of population average income

during the period from January 2008 till January 2011 (the average income decreased by 22%, the inflation index during the similar period increased for 1,8%) is established.

Table 1. **Income of the population of Latvia in quintile groups within the period from 2000 to 2011, lats per month**

Indicators	Year	In Latvia	Part of the population				
			First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Average income in lats	2000	66	17	36	52	69	161
	2005	106	35	67	90	128	232
	2007	151	62	95	126	183	308
	2008	213	78	128	164	225	446
	2009	202	76	125	163	221	443
	2011	166	58	104	147	190	332
Quintile points in lats	2000		1-28	29-44	45-60	61-83	84-2500
	2005		5-54	55-75	76-100	101-150	151-1000
	2007		0-80	81-100	101-150	155-200	205-800
	2008		0-114	115-149	150-199	200-291	292-3000
	2009		0-100	101-145	146-180	181-267	268-2000
	2011		0-85	86-126	127-160	161-220	221-900

Source: Authors' calculations within the SPSS program according to the questionnaire of the University of Latvia within the report on development of national economy for 2000, 2005, 2007, 2008, 2011 and the questionnaire data of the University of Latvia for 2009.

The average income per one family member in Latvia in 2000 made 78% of the minimum consumption basket (84 lats a month), in 2005 the average income per one family member was even to the size of the minimum consumption basket (105 lats a month). During the period from 2006 to 2009 the average income per one family member considerably oversized the minimum consumption basket (by 1,1–1,5 times), however in the winter 2010–2011 it returned to the level of 2005. As for the families where each member of a household has less than one set of the minimum consumption basket, than up to 2009 their quantity decreases: from 81% from all Latvian families in 2000 to 40% in 2009, however the result of 2011 returned to quantity of households with consumption below the minimum basket on the level of 2005 (65%).

Thus, the tendency of increase in the average income of families during the period from 2000 to 2008 is stated, it is also possible to state a negative influence of crisis on the income of Latvian population. In 2008 and 2009 the influence of crisis on the income of Latvian households is expressed very poorly, most strongly the consequences of crisis were revealed in the winter 2010–2011.

Tendencies of the change of income differentiation of the population in Latvia.

Analyzing the changes of the total income in quintile groups during the period from 2000 to 2011 (see Table 2), it is established that the total income of the population of the first (poorest) quintile group fluctuates within 5–9% slowly, and the total income of the fifth (richest) quintile group slowly, but steadily decreases (from 47% to 40%). The dynamics of the change of the size of the total income of the second, third and fourth quintiles is not unambiguous therefore it is impossible to judge the differentiation according to the total quintile income and it is necessary to apply other methods to establish the tendencies of the change of income differentiation of all population.

Table 2. **The share of the income of the population in Latvia in 20% groups by years, in %**

Group of the population	2000	2005	2007	2008	2009	2011
First	5	7	9	7	8	7
Second	10	14	12	9	11	12
Third	18	17	19	17	16	18
Fourth	19	21	20	25	23	23
Fifth	48	41	40	42	41	40
Total:	100	100	100	100	100	100

Source: Authors' calculations within the SPSS program according to the questionnaire of the University of Latvia.

In Table 3 the average values of the income of the population in Latvia, the amplitude of variation (R), the standard deviation (σ) for 2000, 2005, 2007, 2008, 2009 and 2011 are reflected. It should be noted that the amplitude of variation is calculated as a difference between "max" and "min" of the inhabitants income, and standard deviation is a quantitative distinction of the importance of income for separate units of the considered set (population).

Table 3. **Variation indicators of income**

	2000	2005	2007	2008	2009	2011
Latvia	$\bar{x}$=66 R=2500 σ=66	$\bar{x}$=106 R=1000 σ=78	$\bar{x}$=151 R=800 σ=97	$\bar{x}$=208 R=2500 σ=153	$\bar{x}$=202 R=2000 σ=160	$\bar{x}$=166 R=900 σ=106
K_R% (year 2000 – the base)	37,88 100%	9,4 25%	5,3 14%	12,0 32%	9,9 26%	5,4 14%
V_δ% (year 2000 – the base)	1 100%	0,74 74%	0,64 64%	0,74 74%	0,79 79%	0,64 64%

Source: Authors' calculations within the SPSS program according to the questionnaire of the University of Latvia.

Analyzing the Table 3 it should be noted that the coefficient of the amplitude K_R during the period from 2000 to 2011 decreased by 86%, and the variation coefficient V_δ during the similar period decreased by 36%. That unambiguously establishes a tendency of reduction of income differentiation of the population. However, in 2008 the insignificant increase in differentiation took place: the coefficient of variation increased by 10% in comparison with 2007, coefficient of dispersion – respectively by 6,7%. In 2009 the coefficient of variation increased by 5% though the coefficient of dispersion decreased by 2,1%.

The changes of the Herfindahl index value from 0,31 in 2000 to 0,27 in 2011 (see Table 4) confirms the above-established tendency.

Table 4. **Herfindahl index**

	2000	2005	2007	2008	2009	2011
Herfindahl index	0,31	0,27	0,26	0,28	0,27	0,27

Source: Authors' calculations within the SPSS program according to the questionnaire of the University of Latvia.

Thus, it is established that the influence of crisis up to 2011 did not change the established tendency of reduction of income differentiation of the population of Latvia, and caused only small short-term increase in income inequality. However it has socially acceptable character in Latvia within the EU (Voronov, Lavrinenko, 2011).

The assessment of some factors of income differentiation of the population.

During the period from 2000 to 2011 such variables as education, household size, the status at a labour market, the place of residence are available for the research. Having built the linear regression according to 2000 for Latvia in whole where a dependent variable is the population income per 1 member of a household, and independent variables are education (number of years of training), household size (a number of people in a family), the place of residence (urban or rural area), status at a labour market (employee or unemployed), the following results were obtained.

Table 5. **Linear regression coefficients for the year 2000**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	B	Std. Error
(Constant)	119,978	23,892		5,022	,000
Number of years of training of one of family members	21,296	6,494	,111	3,279	,001
Employee / unemployed one of family members	-20,805	7,845	-,090	-2,652	,008
Household size	-15,748	2,625	-,196	-6,000	,000
Village/town as a place of residence	-18,688	7,540	-,081	-2,479	,013

Note: The dependent variable: income of one member of family per month in lats.
Predictors: (constant), village town, employee/unemployed, household size, number of years of training.
Source: Authors' calculations within the SPSS program according to the questionnaire of the University of Latvia.

The model is significant for the 1% level since the value of F-criterion is equal to 18, and the corresponding significance value is almost equal to 0. The coefficients of regression are significant at the 1% level (the exception makes only the last coefficient – importance at the 5% level).

Having interpreted the results of the regression analysis, it is possible to draw the following conclusions:

– the increase of the number of years of training of one family member for 3 years leads to the increase of income in average for 21 lats a month provided that employment, the number of people in the family, the residence does not change;

– the loss of work of one of family members will lead to the reduction of income per one member of a household in average for 21 lats a month provided that education level, the number of people in the family, the residence does not change;

– the increase of the number of family members for 1 person will lead to the reduction of income per 1 member of a household on average for 16 lats a month provided that education level, the status on labour market, the residence does not change;

– moving of a family to a village will lead to the reduction of income per 1 member of a household on average for 19 lats a month provided that education level of one of family members, the number of people in the family, the status at labour market does not change.

Table 6. **Linear regression coefficients for the year 2008**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	B	Std. Error
(Constant)	379,609	47,661		7,965	,000
Number of years of training of one of family members	42,110	12,098	,132	3,481	,001
Employee / unemployed one of family members	-77,461	14,664	-,199	-5,283	,000
Household size	-19,658	5,521	-,127	-3,561	,000
Village/town as a place of residence	-75,417	15,236	-,178	-4,950	,000

Note: the dependent variable: income of one member of family per month in lats.
Predictors: (constant), village town, employee/unemployed, household size, number of years of training.
Source: Authors' calculations within the SPSS program according to the questionnaire of the University of Latvia.

The model is significant at the 1% level since the value of F-criterion is equal to 25, and the corresponding significance value is almost equal to 0. Regression coefficients are significant at the 1% level. Having interpreted the results of the regression analysis, it is possible to draw the following conclusions:

– the increase in number of years of training of one of family members for 3 years leads to the increase of income on average for 42 lats a month provided that employment, the number of people in the family, the residence does not change;

– the loss of job of one of family members will lead to the reduction of income per one member of a household on average for 77 lats provided that education level, the number of people in the family, the residence does not change;

– the increase in number of family members by 1 person will lead to the reduction of income per 1 member of a household on average for 19 lats a month provided that education level, the status on labour market, the residence does not change;

– the moving of a family to a village will lead to the reduction of income per one member of a household on average by 75 lats provided that education level, the number of people in the family, the status at labour market does not change.

Table 7. **Linear regression coefficients for the year 2009**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	B	Std. Error
(Constant)	182,159	38,614		4,717	,000
Employee / unemployed one of family members	-81,390	12,079	-,244	-6,738	,000
Village/town as place of residence	64,248	11,686	,189	5,498	,000
Household size	-29,040	3,631	-,278	-7,997	,000
Number of years of training of one family member	8,655	1,793	,173	4,828	,000

Note: the dependent variable: the income of one member of family per month in lats.
Predictors: (Constant), village town, employee/unemployed, household size, the number of years of training. The model is significant at the 1% level since the value of F-criterion is equal to 49, and the corresponding significance value is almost equal to zero. The coefficients of regression are significant at the 1% level.
Source: Authors' calculations within the SPSS program according to the questionnaire of the University of Latvia.

Having interpreted the results of the regression analysis, it is possible to draw the following conclusions:

– the increase in number of years of training of one family member for every year leads to the increase of income on average by 8,7 lats a month provided that employment, the number of people in the family, the residence does not change;

– the loss of job of one family member will lead to the reduction of income per one member of the household on average by 81 lats a month provided that education level, the number of people in the family, the residence does not change;

– the increase in the number of family members by 1 person will lead to the reduction of income per 1 family member on average by 29 lats a month provided that education level, the status at labour market, the residence does not change;

– moving of the family to a populated place of the city type will lead to the increase in income per one family member on average by 64 lats a month provided that education level, the number of people in a family, the status at labour market of one family member does not change.

Table 8. **Linear regression coefficients for the year 2011**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	269,421	24,453		11,018	,000
Employee / unemployed one family member	-50,271	7,591	-,268	-6,622	,000
Village/town as a place of residence	-24,459	7,681	-,126	-3,184	,002
Number of years of training of one family member	3,716	1,215	,124	3,059	,002
Household size	-18,736	2,798	-,263	-6,696	,000

Note: the dependent variable: income of one member of the family per month in lats.
Predictors: (Constant), village town, employee/unemployed, household size, number of years of training. The model is significant at the 1% level since the value of F-criterion is equal to 30, and the corresponding significance value is almost equal to 0. The coefficients of regression are significant at the 1% level.
Source: Authors' calculations within the SPSS program according to the questionnaire of the University of Latvia.

The increase in the number of years of training of one family member for every year leads to the increase of income on average by 3,7 lats a month provided that employment, the number of people in a family, the residence does not change;

– the loss of a job of one family member will lead to the reduction of income per one member of a household on average by 51 lats a month provided that education level, the number of people in a family, the residence does not change;

– the increase in number of family members for 1 person will lead to the reduction of income per 1 family member on average by 18 lats a month provided that education level, the status at labour market, the residence does not change;

– moving of a family to a populated place of city type will lead to the increase of income per one family member on average by 24 lats a month provided that education level, the number of people in a family, the status at labour market of one family member does not change.

Conclusions and recommendations

The tendency of the increase of the average income of families during the period since January, 2000 till January, 2008 is established: the average income increased by 222% at the increase of the inflation index during the similar period for 57,1%.

The tendency of the reduction of average income of the population during the period since January 2008 till 2011 is established: the average income decreased by 22%, the inflation index during the similar period increased by 1,8%.

It is possible to state the negative influence of crisis on the average income of families in Latvia. In 2008 the influence of crisis was expressed very poorly, in 2009 – also, however the consequences of crisis revealed themselves most strongly in the winter of 2010/2011.

It is established that despite insignificant fluctuations of the indicators characterizing the population differentiation in Latvia, the influence of crisis did not change the established tendency of income differentiation reduction in Latvia since 2000.

If the influence of some factors available for the research on average income a month per 1 family member in the dynamics from 2000 to 2009 crisis year is analysed, it is possible to state the increase of the regional aspect influence (family residence) during this period, and also the status of family members at labour market. The influence of education of one family member on the income per month during the crisis was not as great as 9 years ago. In 2011 the factors of most significant influence on income differentiation of Latvian population were the status at labour market and the place of residence.

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Стаття надійшла до редакції 09.06.2013.