



**Forschungsinstitut
Freie Berufe**

Do high incomes reflect individual performance? The determinants of high incomes in Germany

Dierk Hirschel

FFB Discussion Paper No. 42
August 2003



Fakultät II - Wirtschaft und Gesellschaft

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ISSN 0942-2595

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Summary

In neoclassical economic theory the level of individual income is predominantly determined by individual job performance. Thus high incomes reflect the high marginal productivity of labour of the affluent working population. While the scientific research of poverty has a long tradition, nearly nothing is known about the rich. This study tries to diminish this research gap by investigating the structure of high labour incomes in Germany. By revealing the determinants of high incomes by descriptive and panel econometric analyses mit Daten des Sozio-ökonomischen Panels, we want to answer the question if high incomes are especially the result of individual job performance or rather the result of social selection through social background or sexual discrimination.

Theme: Welfare, income distribution and poverty

JEL: J30, J31J41, J71

Keywords: *High incomes, social background, discrimination, human capital, job performance, GSOEP, theory of justice.*

Zusammenfassung

In der neoklassischen ökonomischen Theorie wird das individuelle Einkommen durch die individuelle Job-Performanz bestimmt. Somit reflektiert ein hohes Einkommen eine hohe marginale Arbeitsproduktivität der reichen Arbeitenden. Während die wissenschaftliche Forschung zur Armut eine lange Tradition hat, ist nur sehr wenig über Reiche bekannt. Mit dieser Studie wollen wir diese Forschungslücke verkleinern, indem wir die Struktur hoher Arbeitseinkommen in Deutschland untersuchen. Durch die Quantifizierung der Determinanten hoher Einkommen mit deskriptiven und panelökonometrischen Methoden mit Daten des Sozio-ökonomischen Panels wollen wir die Frage beantworten, ob hohe Einkommen vor allem das Resultat individueller Job-Performanz oder eher das Resultat sozialer Selektion mit dem sozialen Hintergrund oder geschlechtsspezifischen Diskriminierung ist.

Thema: Wohlfahrt, Einkommensverteilung und Reichtum

JEL: J30, J31J41, J71

Schlagwörter: *Hohe Einkommen, Soziale Herkunft, Diskriminierung, Humankapital, Leistung, Sozio-ökonomisches Panel, Theorie der Gerechtigkeit*

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Do high incomes reflect individual performance?

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1 Introduction

In neoclassical economic theory the level of individual income is predominantly determined by individual job performance. Thus high incomes reflect the high marginal productivity of labour of the affluent working population. Despite the popularity of the thesis, empirical evidence is scarce. While the scientific research of poverty has a long tradition, nearly nothing is known about the rich, although the research of high incomes is of central socio-political significance. The questions of the role and legitimacy of high incomes can only be answered, when we have empirical information about the amount and formation of high incomes. This study tries to close this research gap by investigating the structure of high labour incomes in Germany. By revealing the determinants of high incomes, we can make positive statements about the general direction: Are high incomes mainly the result of individual job performance or rather the result of social selection through social background or sexual discrimination? Furthermore the reasons of the financial success answer the question of its legitimacy. The paper is structured as follows:

In chapter 2 we link the debate about high incomes to the discussion about wealth, which has a long tradition in the history of economics. The theoretical foundations of the study are the economical and sociological theories of income determination. The different theories are well known amongst the scientific community. For that reason we go straight to the construction of the hypotheses in chapter 3. In chapter 4 we discuss some relevant methodological questions and present the database. The database is the German-Socioeconomic-Panel (GSOEP). By using this database we establish the determinants of high incomes and the structural differences between the determinants of high incomes and those of the remaining economically active population. For the econometric analysis we used a panel-econometric Probit-Model. In chapter 5 we show the empirical results of the descriptive and econometric analysis, concluding (chapter 6) with the discussion of these results in a political context.

2 High incomes in a interdisciplinary perspective

The scientific debate about high incomes is embedded into the socioeconomic discourse about wealth. This discourse can be traced back to the beginnings of the political economy of Adam Smith (1993) and David Ricardo (1953). These economists interpreted the accumulation of wealth as a central characteristic of capitalist societies. In Economics, research of wealth concentrates itself on the analyses of economic resources and the individual utility which emanates from these resources.

The resources income and wealth determine the opportunities of individual activity. In the centre of mainstream economic debate about wealth is the trade-off between distribution and economic growth. An unequal distribution of income and wealth sets the incentives for economic growth in the way that the individuals try to improve their socio-economic status. In that sense the recipients of high incomes are promoters of economic growth because their high saving ratio boosts investment and economic growth. On the other side the Keynesian Theory accentuates the dysfunctional effects of a high concentration of income and wealth on the business activity (cp. Kalecki 1933; Keynes 1936). The low consumer demand of the low and middle income recipients reduces the dynamic of economic growth. Microeconomics is concentrated on the determination of personal income and wealth.

From a sociological perspective wealth is not only based on economic resources. Dimensions like education, health, the family background and social networks are included. The sociological analysis of the genesis of individual wealth is concentrated on the transmission of economic, social and cultural capital (Bourdieu 1997).

Table 1: Legitimacy of economic inequality and high incomes

Theory of Justice	Legitimacy of Inequality	Implications for the determinants of high incomes ¹
Utilitarianism	Growth of total utility	Without significance
Liberalism	General effects of wealth, Fair uniform rules Social mobility	Individual determinants ² which represent the individual job performance
John Rawls	Fair uniform rules Equal uniform fundamental freedoms ³ , Rising position of wealth of the underclass if inequality grows; Social mobility	Individual determinants ² which represent the individual job performance
Marxism	no legitimacy of inequality produced by capitalist societies	Structural determinants ⁴ dominate in capitalist societies

¹ Which determinants dominate according to the particular theory of justice?

² Endowment with human capital, working time etc.

³ Fundamental freedoms are: Personal rights of freedom, political and civil rights

⁴ Sexual discrimination, class and Stratification-affiliation, social background etc.

From a philosophical point of view we ask for the legitimacy of wealth. Theories of social justice developed criteria for the legitimacy of high incomes and wealth. From the

great variety of theories of social justice we selected four theories which played a central role in the intellectual history of Europe: Utilitarianism, Liberalism, Rawls Theory of Justice and Marxism (Bentham 1992; Hajek 1981; Rawls 1979; Marx 1959).

The utilitarian and liberal (including Rawls) theories of justice legitimate high incomes if they are based on individual job performance. The liberal theories add equal opportunities as a necessary requirement (cp. Rawls 1979: 46). This implicates the domination of individual determinants (endowment with human capital, working time, etc.) in the genesis of high incomes. If this is not the case and structural factors like discrimination and social background explain the majority of the determination process of high incomes this outcome would undermine the legitimacy of high incomes in free market economies.

3 Determinants of high incomes

The theoretical explanation of the genesis of personal income is an object of economics, sociology and political science. We concentrate our study on labour income, which is the most important source of income of individuals and households. In the past economists developed different taxonomies to distinguish systematically between different theoretical approaches of the determination of labour income (cp. Wolff 1997; Hübler 1984). None of these proposals can fully satisfy (cp. Hübler 1984: 34). In our study we distinguish between individual and structural approaches. The individual approaches put the characteristics of the individual in the centre of their explanation of the genesis of labour income. These are the ability-theory, the well known human capital theory and the screening-approach. The block of structural theories includes discrimination theory, segmented labour markets, regional and inter-industrial wage differences and class- and stratification-theories integrating the family background. These theories explain the determination of labour income out of the policy of enterprises and of the social structure of society. The different theories are part of the common knowledge of labour economics and sociology and must not be explained in detail (cp. Ashenfelter/Layard 1986; Becker 1971, 1975; Dworschak 1986; Wolff 1997). We apply these theoretical approaches to the determination of high incomes and derivate 19 different hypotheses. These hypotheses have been constructed for the probability of receiving a high labour income.

3.1 Individual Determinants

As conventional in labour economics we used human capital as a proxy for individual job performance (cp. Mincer 1970; Becker 1975). The schooling model was fundamental for the empirical operationalization (cp. Mincer 1974). With consideration to the database we can generate the hypotheses one until three of table 2.

3.2 Structural Determinants

Discrimination theory focuses on citizenship, colour of the skin, age and sex as further reasons for differences in the level of incomes (cp. Becker 1971; Cain 1986; Wolff 1997; Rosenfeld 1990). In our study we concentrate on sex and citizenship. Different regions represent a different business environment and different advantages or disadvantages of agglomeration. In congested urban areas with a developed infrastructure and historical high economic growth the chances of receiving high incomes are higher than in rural areas (cp. Bade 1984; Franz 1996). The employment in

different industrial sectors implies different levels of incomes depending on the economic characteristics of the industrial sectors (cp. Dickens/Lang 1985; Galbraith/Calistri 1999; Haisken-DeNew/Schmid 1999). The same applies for firm size (cp. Abwod et. al. 1998; Schmid/Zimmermann 1991).

Table 2: Hypotheses for the determinants of high incomes

Individual (meritocratic) determinants		
(H1)	Human Capital	„The probability of receiving a high labour income, rises ceteris paribus (c.p.) with increasing duration of training“.
(H2)		„With increasing working experience c.p. the probability of receiving a high labour income grows“.
(H3)		„Increasing last job tenure rises c.p. the probability of receiving a high labour income“.
Structural (non-meritocratic) determinants		
(H4)	Discrimination	„Women have c.p. a lower probability of receiving a high labour income than men“.
(H5)		„The labour force without German citizenship has c.p. a lower probability of receiving a high income than German citizen“.
(H6)	Regional and Inter-industry Income differences	„The affiliation to a prospering metropolitan area increases c.p. the probability of receiving a high labour income “.
(H7)		„The probability of receiving a high labour income rises c.p. with the size of the firm“.
(H8)		„The affiliation to different industrial sectors characterized by high capital intensity, a high degree of monopoly, high profits and/or a dynamic economic growth rises c.p. the probability of receiving a high labour income.“
(H9)	Class- and Stratification-Theory	„The affiliation to one of the upper classes of society rises c.p. the probability of receiving a high labour income.“
(H10)		„The probability of receiving a high labour income rises c.p. with an occupational status which expresses a high endowment of human capital.“
(H11)	Family Background	„A high occupational status of the father rises c.p. the probability of a high level of educational attainment.“
(H12)		„A high school leaving certificate of the father rises c.p. the probability of a high level of educational attainment.“
(H13)		„A high level of professional training of the father rises c.p. the probability of a high level of educational attainment.“
(H14)		„A high occupational status of the father rises c.p. the probability of receiving a high labour income.“
(H15)		„A high school leaving certificate of the father rises c.p. the probability of receiving a high labour income.“
(H16)		„A high level of vocational training of the father rises c.p. the probability of receiving a high labour income.“
(H17)	Structure of household and marital status	„A high number of (employable) household members rises c.p. the probability of receiving a high labour income.“
(H18)		„A low number of children in the own household rises c.p. the probability of receiving a high labour income.“
(H19)		„Not married singles have c.p. the highest probability to receive a high labour income.“

Class-Theories classify society into different social groups which are characterized by their homogeneous position in the process of production, a comparable endowment with economical and cultural resources and as a consequence common chances of living and individual development (cp. Erikson/Goldthorpe 2002). The classification criteria of stratification-theories are the occupational prestige or the socio-economic status of individuals. The class-theory has a stronger economic and historical foundation (Geißler 1996: 70).

According to the influence of family background on high labour income we distinguish between direct and indirect effects (cp. Schnapp 1997). Indirect effects connect family background and labour income via the level of educational attainment: Because of restrictions of the database the father has to represent the family background. The direct effects between family background and high individual labour income are interpreted as intergenerational transmission of social and cultural capital via social networks (cp. Bourdieu 1997). The structure of the household determines via selection of working time and labour mobility the level of labour income. The same applies for marital status.

4 Methodological Aspects

Before we start with the presentation of the empirical results we have to clarify some methodical questions about the concept of income, the threshold of high incomes, the data base and the applied econometric methods.

The concept of income

There is a great diversity in the interpretation of income. For our study we used the concept of individual gross labour income. The individual gross labour income is the most important income source for the majority of individuals. It defines the income which is obtained by employees and self-employed on the labour market. Taxes and social contributions are included. Additional monthly wages, gratifications and bonuses are as well included. In our study we took the time period of one month.

The threshold of high incomes

The definition of high incomes demands the setting of a specific threshold. In general we distinguish between absolute and relative measures of wealth. Because of the low representation of high incomes in our database we did not use an absolute measure like the million. We would not have got a representative sample. Thus we took the relative measure of the 200%-threshold in our study. Depending on this threshold, we call an individual rich, when she or he earns more than 200% of the average income of the whole working population we analyze.

The database and sample selection

The analysis of high incomes requires an adequate data base which got the necessary information about incomes as well as information about the socio-economic background. The data base we used for our study is the German Socio-Economic-Panel (GSOEP). Compared to alternative German data bases it has the most extensive accumulation of the socio-economic information. This compensates the disadvantage of the low representation of high incomes in the sample. The GSOEP is a panel dataset from 1984 to the present consisting of some 13,500 individuals and roughly 7,000 households living in West and East Germany (since 1990) (cp. Hasiken-DeNew et al.

2001). The representative sample of households and individuals is repeated annually. All adult persons in a household aged 16 years and older are surveyed. The central issues of the panel dataset are the structure of households, labour participation, labour mobility, income trends, living conditions, regional mobility, education and training, health, socioeconomic status etc. In our study we analyzed the period from 1986 to 1999. We selected the active population from the age of 16 to 65. We only selected full-time employees.

Econometric Methods

To analyse the determinants of high incomes we used a panel-econometric Probit-Model. The binary dependent variable in that model is the variable “rich”, which represents the status of being rich or not being rich. The Probit-Model assumes a normal distribution for the critical value. The Probit-Estimation is based on a latent model for the observable status (rich/not rich). The not observable variable (y^*) determines the value of the variable which has to be explained (y). If the not observable variable exceeds a certain threshold the observable variable gets the value one. If not it gets the value zero. The not observable variable (y^*) depends on the independent variables and a additive stochastic error term.

$$y_i^* = x_i b + e_i \quad (1)$$

$$y_i = \begin{cases} 1 & \text{if } y_i^* > a \\ 0 & \text{else} \end{cases}$$

The Probit-Model calculates the probability of the occurrence of a certain status (rich/not rich) as follows (McFadden 1974):

$$p_i = \int_{-\infty}^z \frac{1}{\sqrt{2\pi}} \exp \left\{ -0.5 u^2 \right\} du \quad (2)$$

, whereas:

$$z = b_0 + b_1 x_1 + \dots + b_K x_K$$

The coefficients are represented by β_K , the independent variables by x_K . For the estimation of the model we used the Maximum-Likelihood-Method. The significance of the model can be verified with a Likelihood-Ratio-Test. The goodness of the fit can be calculated with the McFadden Pseudo R^2 . The longitudinal construction of our database allows us to control for unobserved individual heterogeneity (cp. Greene 1997: 615). To do this we have to transform the Probit-Model into a panel structure. In our study we estimated a Random Effects Model¹:

$$y_{it} = a + x_{it} b + e_{it} \quad e_{it} = u_i + h_{it} \quad (3)$$

In the Random Effects Model a is specified as a group specific stochastic error term. The parameter u_i is a random distribution of i observations. The individual effects are

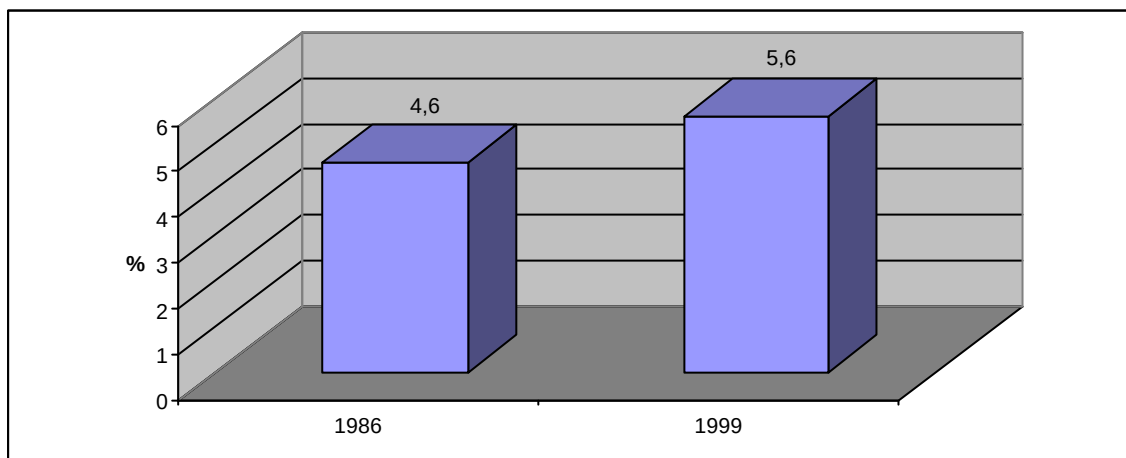
¹ We could not estimate a fixed effect model cause of the high number of time invariant variables.

assumed as not correlated with other independent variables. For the panel-econometric Probit-Modell we use equation 3 to calculate the non observable variable.

5 Empirical results

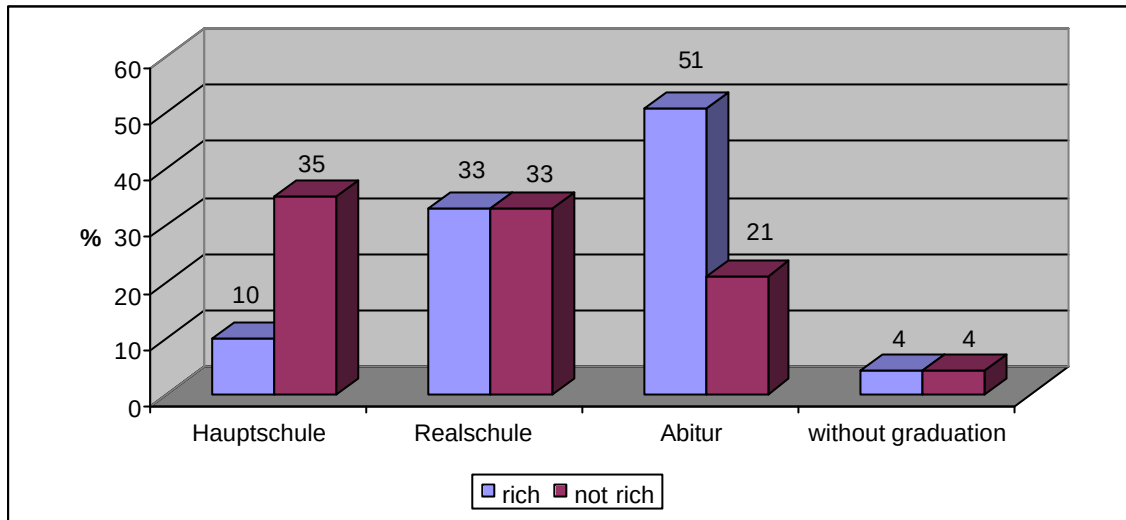
Before we start with the econometric analysis of the determinants of high labour incomes we present some selected descriptive information about the sample. The number of rich employees and self-employed earning more than 200% of the mean income of the full time working population increased in the observation period.

Figure 1: Percentage of the rich (200% threshold)



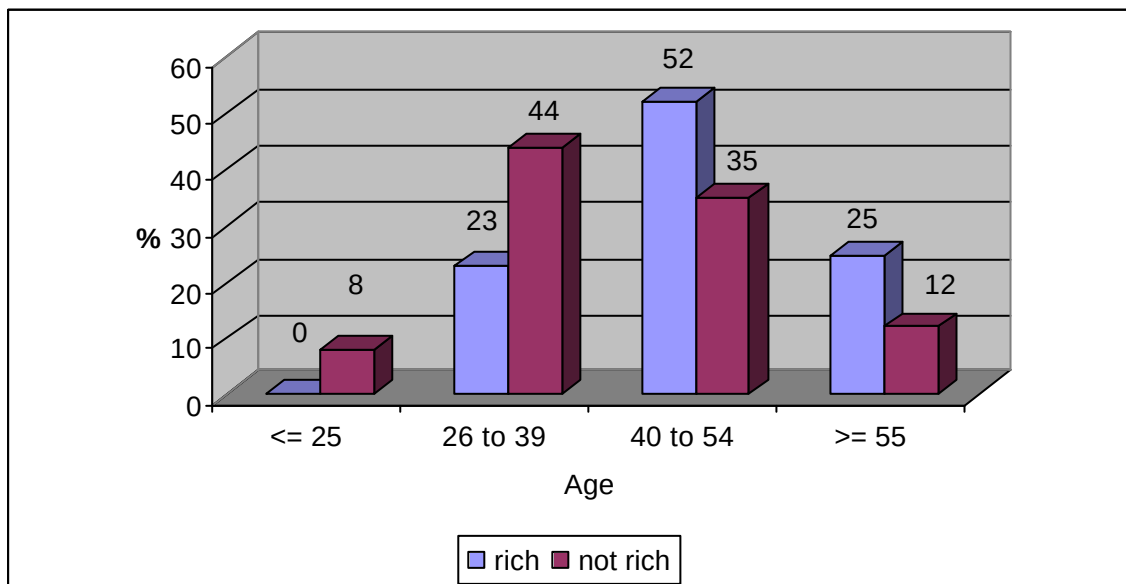
Source: GESOP, waves C (1986) and P(1999), weighted, own calculations

First of all we look at the individual characteristics. As expected employees and self employed with high incomes have a better formal educational attainment compared to the rest of the observed working population. The quota of high school diplomas (Abitur) along rich working population is around 50%.

Figure 2: School leaving certificates, rich – not rich, 1999

Source: GESOP, waves C (1986) and P (1999), weighted, own calculations

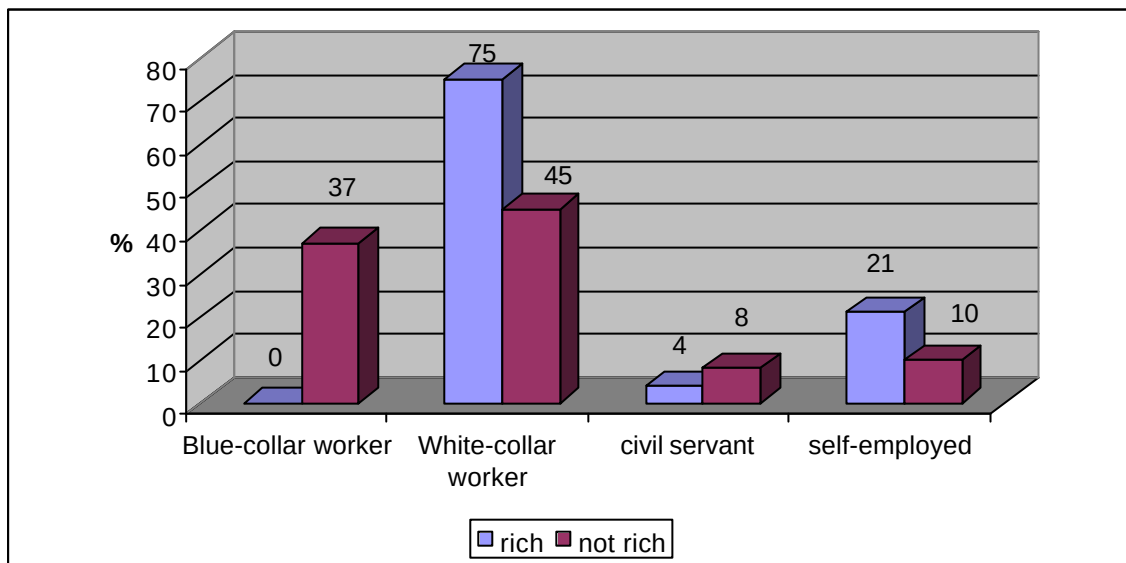
We get a similar picture for vocational training and working experience. Rich employees and self-employed have a better vocational training and more working experience compared to the reference group (cp. table 3). The age structure of the rich differs significantly from the age structure of the rest of the working population. The rich are predominantly in their 40ties and 50ties. Rich employees and self-employed work more than the reference group without high incomes.

Figure 3: The age structure, rich - not rich, 1999

Source: GESOP, waves C (1986) and P (1999), weighted, own calculations

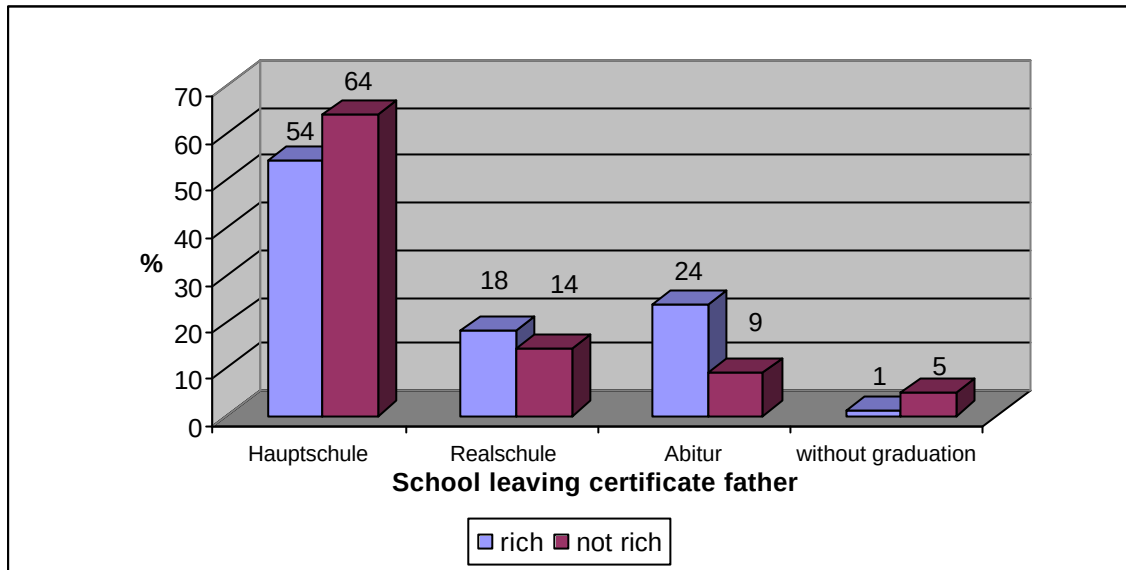
From recent research in labour economics it is a well known fact that women earn less than men despite having the same qualification (cp. Cain 1986; Wolff 1997; Rosenfeld 1990). Discrimination increases if we go up the income-ladder. The representation of women amongst the group of rich employees and self employed is below the representation of women amongst the whole working population (cp. table 3). The social background also has a strong effect on high labour incomes. If we look at the occupational status of rich employees we can see that blue-collar workers are not represented. High incomes are predominantly received by white-collar workers and self-employed.

Figure 4: Occupational status, rich – not rich, 1999



Source: GESOP, waves C (1986) and P (1999), weighted, own calculations

Another important field of research concerning the determination of high incomes is the family background. What we found from the descriptive analysis was the importance of the parents' high economic, cultural and social capital.

Figure 5: School leaving certificate of the father, rich – not rich

Source: GESOP, waves C (1986) and P (1999), weighted, own calculations

Figure 5 documents the relevance of cultural capital expressed by the school leaving certificate of the father for high incomes. Furthermore we found comparable results for the occupational status and the vocational training of the father. The following table represents an overview of the most important results of the descriptive analyzes.

Table 3: Selected results of the descriptive analyzes of high incomes

	Not rich 1999	rich 1999	? $x_{rich,2}$ not-rich	? $x_{99}/? x_{86}$³
Ratio of the sample	94,4%	5,6%	X	X
Labour income ¹	4388 DM	12.948 DM	+8.560 DM	+21%
Individual determinants				
Real working time ¹	43,3 Std.	50,1 Std.	+6,8 Std.	-5,6%
Human Capital				
Duration of training ¹	12,2 Years	14,5 Years	+2,3 Years	-20,7%
Last job tenure ¹	10,3 Years	15,0 Years	+4,7 Years	+38%
Potent. working experience ¹	21,9 Years	26,7 Years	+5,8 Years	+41,4%
Ratio from the age of 40 till 54	35,4%	52,3%	+16,9	-21,4%
Ratio of people with highest school leaving certificate	21,2%	50,7%	+29,5	-19,2%
University degree	15,7%	54,2%	+38,5	-14,8%
Structural determinants				
Social background				
Highest class	10,1%	56,0%	+45,9	-15,9%
Ratio of blue collar workers	36,5%	0,3%	-36,2	-5,5%
Ratio of white collar workers	45,4%	74,7%	+29,3	+ 61%
Father with Abitur	9,2%	24,3%	+15,1	+10,2%
Father with university degree	11,2%	20,5%	+9,3	-6,1%
Rato of white collar fathers	26,0%	42,7%	+16,7	+24,9%
Discrimination				
Ratio of women	35%	7%	-28	+13,8%
Ratio of foreigners	9,1%	4,0%	-5,1	+4,1%
Branches				
Ratio of manufacturing employees	32,2%	46,4%	+14,2	+29%
Ratio of employees in the finance sector	4,0%	10,6%	+6,6	+23,8%
Firmsize				
Ratio of small firms	25,2%	16,9%	-8,3	-65%
Regions				
Bavaria	13,7%	18,3%	+4,6	-22%
Baden-Württemberg	12,5%	17,8%	+5,3	+23,3%
Marital Status				
Maried	55,4%	80,8%	+25,4	+7,6%
Wealth				
Ratio of heritages	14,9%	23,7%	+8,8	X

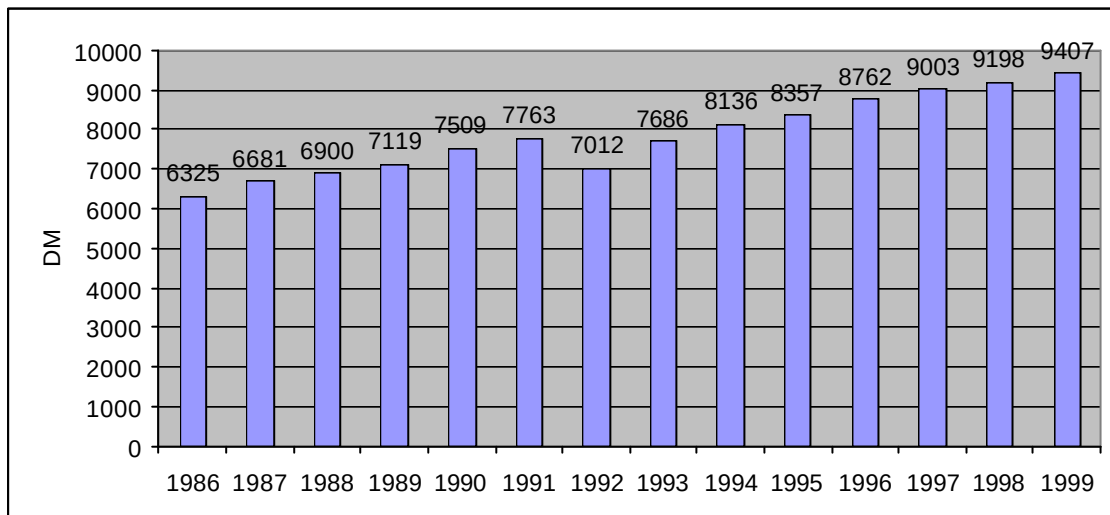
¹ Mean² Difference: rich – not-rich³ Growth rate.

Source: SOEP, wave C (1986), wave P (1999), weighted, own calculations

Multivariate Analysis

Multivariate econometric methods allow us to let the different theories of income determination compete against each other. This method allows us to ascertain if either individual or structural determinants are dominant in the explication of high labour incomes. To estimate the probability of receiving a high labour income we have build two different models. The major difference between the two models is the way we tried to map the social structure of the German society. The Stratification-Model distinguishes between different social groups by occupational status. The Class-Model uses the class schema of Goldthorpe (2002) to structure the German society.² Because of the panel structure of the models we can control for individual heterogeneity. In the Probit-Estimation the endogenous variable is the variable “rich” with its parameter values “rich” and “not rich”. The threshold for the state “rich” is defined by the 200%-frontier. This threshold was constructed for every year of the observation period.

**Figure 6: Annual thresholds of high incomes (200%)
Germany 1986 until 1999**



Source: SOEP, waves C (1986) to P (1999), unweighted, own calculations

² The Class Schema of Goldthorpe is a combination of occupational grouping and the regulation of employment.

Table 4: Probability to receive a high labour income, Panel Econometric Probit-Estimation, Random Effects (Pooled), Stratification- and class-model (Model 1 and 2), Germany 1986 to 1999

	Stratification-Model (Model 1)		Class-Model (Model 2)	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Endogenous Variable				
Not rich – rich (0/1)				
Human Capital Variables				
Duration of training	0,454***	0,0066 (19)	0,257***	0,0023 (26)
Duration of last job tenure	0,017***	0,0002 (46)	0,004	0 (56)
Potential working experience	0,233***	0,0034 (29)	0,193***	0,0017 (31)
Potential working experience ²	-0,353***	-0,0051 (26)	-0,274***	-0,0024 (25)
Discrimination				
Sex (1=Woman)	-2,256***	-0,0331 (2)	-1,704***	-0,0149 (8)
Nationality (1=German)	-0,576***	-0,0085 (15)	-0,115	-0,0010 (44)
Occupational Status				
Blue-collar worker (Reference)	X	X	X	X
White-collar worker	0,343***	0,0050 (27)	X	X
Civil servant	-0,724***	-0,0106 (13)	X	X
Self-employed	1,088***	0,0160 (9)	X	X
Social Class				
Upper service-class (Reference)	X	X	X	X
Lower service-class	X	X	-1,051***	-0,0092 (14)
Simple clerical occupations	X	X	-1,537***	-0,0134 (11)
Self-employed, 1-20 employees	X	X	-0,267**	-0,0023 (26)
Self-employed without employees	X	X	-0,529	-0,0005 (49)
Farmers	X	X	-0,804*	-0,0070 (16)
Executive employees, engineers	X	X	-1,759***	-0,0154 (7)
Skilled manual worker	X	X	-2,529***	-0,0222 (4)
Blue-collar worker	X	X	-2,896***	-0,0253 (3)
Agricultural labourer	X	X	-1,104*	-0,0097 (13)
Simple manual occupations	X	X	-15,022	-0,1317 (1)
Social background				
Graduation father				
Secondary school I (Hauptschule) (Reference)	X	X	X	X
Secondary school II (Realschule)	0,483***	0,0071 (18)	0,415***	0,0036 (22)
High School Diploma (Abitur)	1,374***	0,0201 (8)	0,737***	0,0065 (17)
Other certificate	-0,026	-0,0003 (45)	0,192	0,0017 (31)
No certificate	-1,072**	-0,0157 (10)	-0,193	-0,0017 (31)
Vocational training father				
Apprenticeship (Reference)	X	X		
Job training (Ausbildung)	0,092	0,0013 (36)	0,038	0,0003 (52)
University	-1,035***	-0,0152 (11)	-0,143	-0,0013 (41)
No training	-0,354**	-0,0051 (26)	0,157	0,0014 (39)
Occupational status father				
Blue-collar worker (Reference)	X	X	X	X
White-collar worker	0,180*	0,0026 (31)	0,120	0,0010 (44)
Civil servant	0,401***	0,0059 (21)	0,243**	0,0021 (29)
Self-employed	0,170	0,0025 (34)	-0,081	-0,0007 (47)

	Stratification Model		Class Model	
	Coefficient	marg. Effect	Coefficient	marg. Effect
Industrial sector				
services (Reference)	X	X	X	X
Agriculture	-0,139	-0,0020 (37)	-0,052	-0,0005 (49)
Energy	0,148	0,0022 (36)	0,159	0,0014 (39)
Mining	-0,050	-0,0007 (40)	0,026	0,0002 (55)
Manufacturing	0,531***	0,0077 (17)	0,724***	0,0063 (18)
Construction	0,553***	0,0081 (15)	0,543***	0,0048 (20)
Trade	0,390***	0,0057 (24)	0,446***	0,0039 (21)
Transport	-0,083	-0,0012 (37)	0,126	0,0011 (42)
Financial services	0,445***	0,0065 (20)	0,628***	0,0055 (19)
Regions				
NRW (Reference)	X	X	X	X
Schleswig Holstein	0,233	0,0005 (43)	-0,125	-0,0011 (42)
Hamburg	-0,353	-0,0004 (44)	0,035	0,0003 (52)
Lower Saxony	0,075	0,0011 (38)	-0,204	-0,0018 (30)
Bremen	-0,848	-0,0124 (12)	-0,886	-0,0078 (15)
West Berlin	0,367**	0,0054 (25)	-0,282	-0,0025 (24)
Hessen	0,403**	0,0059 (21)	0,144	0,0016 (37)
Rheinland-Pfalz, Saarland	0,287*	0,0042 (28)	-0,063	-0,0006 (48)
Baden-Württemberg	0,425***	0,0062 (20)	0,251**	0,0022 (28)
Bavaria	0,616***	0,0090 (14)	0,324**	0,0028 (23)
East Berlin	-2,252***	-0,0331 (2)	-2,103***	-0,0184 (5)
Mecklenburg-Vorpommern	-1,399***	-0,0205 (7)	-1,85***	-0,0130 (12)
Brandenburg	-2,943***	-0,0432 (1)	-3,232***	-0,0264 (2)
Saxony-Anhalt	-1,788***	-0,0262 (5)	-1,652***	-0,0145 (9)
Thuringia	-1,764***	-0,0259 (6)	-1,604***	-0,0141 (10)
Saxony	-2,112***	-0,0310 (4)	-1,828***	-0,0160 (6)
Firm Size				
Firm Size < 20 employees (Reference)	X	X	X	X
Firm size >=20 < 200	-0,178**	-0,0026 (31)	-0,198**	-0,0017 (31)
Firm size >= 200 > 2000	0,062	0,0009 (39)	0,004	0 (56)
Firm size > 2000	0,176*	0,0026 (31)	0,106	0,0009 (46)
Firm without employees	0,043	0,0006 (42)	-0,052	-0,0005 (49)
Further socio-demographic background				
Household membership	0,051*	0,0007 (40)	0,021*	0,0003 (52)
Number of children	0,143***	0,0021 (35)	0,194***	0,0017 (31)
Marital status (married and living together)	0,205**	0,0030 (30)	0,181**	0,0016 (37)
Rho	0,822***		0,781***	
Constant	-13,099***		-8,825***	
N		46152		46005
Random-Effects				
McFadden-R ²		0,572		0,588
Log-Likelihood Function		-4439		-4265
LR-Test		4706***		3704***
Pooled				
McFadden-R ²		0,345		0,409
Log-Likelihood Function		-6792		-6117
Random vs. Pooled: LM-Test		665***		535***

Level of significance: *(90%), **(95%), ***(99%)

Marginal effects as partial derivations calculated at the particular mean of all observations

Source: SOEP, waves C (1986) to P (1999), own calculations

Concerning the interpretation of the results, first of all we control for the right specification of the model we used. The high and significant values for the Lagrange-Multiplier-Test tell us for both models that we should prefer the random-effects-model instead of the pooled-model. Class- and Stratification-Model are both statistically significant. The results for the McFadden Pseudo R^2 are satisfactory. The coefficients have to be interpreted qualitatively as effects on the probability of receiving a high labour income. The marginal effects at the mean represent the particular contributions to the overall probability. The interpretation of the coefficients in detail:

The coefficients of the human capital variables are all significant and have the expected algebraic signs. The duration of training and the last job tenure as well as the working experience have all positive effects on the probability of receiving a high labour income (only the last job tenure in the Class-Model lacks statistical significance). Sexual discrimination also has a significant effect on the probability of receiving a high labour income. This holds for both models. The results for discrimination of citizenship are negligible. The occupational status has a significant effect on the probability of receiving a high labour income. Compared to blue-collar workers self-employed and white-collar workers have a significant higher probability of receiving a high labour income. The same applies to the affiliation to the upper classes of society compared to the bottom of the class-hierarchy.

In our models the family background determines the probability of receiving a high labour income via the economic, cultural and social capital of the parents. The fathers' graduation, his vocational training and his occupational status are used as a proxy. A higher graduation of the father increases the probability of receiving a high labour income. Employees with a father as civil servant or white-collar-worker have a higher probability belonging to the "rich" than employees with a blue-collar-worker family background. Class- and Stratification-Model differ in the significance of the variables that represent the family background.

The place of residence is a further factor that determines the probability of receiving a high labour income. Compared to NRW employees, employees resident in the states of Hessen, Baden-Württemberg and Bavaria have a higher probability of belonging to the rich. The opposite is the case for people living in the eastern states of Germany. Compared to the sector of services employees who work in the industrial sectors of construction, energy, trade and financial services have a significant higher probability of receiving a high labour income. As expected an increasing firm size also leads to a higher probability. Regarding the further socio-demographic variables the married working population as well as the working population with children has a higher probability of receiving a high labour income.

If we look at the marginal effects we can see for the Stratification-Model that the fields of discrimination, regions, social background and the occupational status have the variables with the highest economic impact for the explanation of a high labour income. For the Class-Model these are discrimination, regions and social class.

Interaction: Education and Social Background

The variables that represent formal schooling and job training as well as the social background of the employees and self-employed have been significant determinants in the multivariate analyses. The results proved a direct effect of social background on high labour incomes. Consecutively we want to verify if there are relevant indirect effects between the social background and labour income at the same time. We suggest a transmission via the determination of school performance by social background. For this purpose we constructed two models. In the first model we try to explain the duration of training by the economical, social and cultural capital of the father. In the second model we estimated the probability of receiving a high school diploma (Abitur) subject to the family background.

Table 5: Panel Econometric Estimation of the duration of training, Random Effects (Pooled) (Model 3), Germany 1986 to 1999

Endogenous Variable: Duration of training	Coefficient
<i>Social background</i>	
<i>Graduation father</i>	
Secondary school I (Hauptschule) (Reference)	X
Secondary school II (Realschule)	0,675***
High school diploma (Abitur)	1,416***
Other certificate	-0,194
No certificate	0,675***
<i>Vocational training father</i>	
Apprenticeship (Reference)	X
Job training (Ausbildung)	0,375***
University	0,849***
No training	-0,030***
<i>Occupational status father</i>	
Blue-collar worker (Reference)	X
White-collar worker	0,050***
Civil servant	0,442***
Self-employed	1,086***
<i>Constant</i>	11.389***
<i>N</i>	54168
<i>Random-Effects</i>	
R ²	0,902
Log-Likelihood Function	-63935
<i>Pooled</i>	
R ²	0,196
Log-Likelihood Function	-120880
Random vs. Pooled: LM-Test	2198***

Level of significance: *(90%), **(95%), ***(99%)

Source: SOEP, waves C (1986) to P (1999), own calculations

Table 6: Determinants of the probability of receiving a high school diploma (Abitur), Panel Econometric Probit-Estimation, Random Effects (Pooled) (Model 4), Germany 1986 to 1999

	Coefficient	Marginal Effects
Endogeneous Variable: A-level (Yes/No)		
<i>Social background</i>		
<i>Graduation father</i>		
Secondary school I (Hauptschule) (Reference)	X	X
Secondary school II (Realschule)	0,650***	0,028 (4)
High school diploma (Abitur)	5,202***	0,224 (1)
Other certificate	0,347	0,015 (7)
No certificate	-3,788***	-0,163 (3)
<i>Vocational training father</i>		
Apprenticeship (Reference)	X	X
Job training (Ausbildung)	-0,162	-0,007 (9)
University	-0,235	-0,010 (8)
No training	-4,632***	-0,199 (2)
<i>Occupational status father</i>		
Blue-collar worker (Reference)	X	X
White-collar worker	0,265	0,011 (8)
Civil servant	0,411***	0,018 (6)
Self-employed	0,622***	0,027 (5)
Constant	-5,132***	
Rho	0,978	
n	54174	
<i>Random-Effects</i>		
McFadden R ²	0,795	
Log-Likelihood Function	-5568	
LR-Test	7420***	
<i>Pooled</i>		
McFadden R ²	0,137	
Log-Likelihood Function	-23406	
Random vs. Pooled LM-Test	3268***	

Level of significance: *(90%), **(95%), ***(99%)

Source: SOEP, waves C (1986) to P (1999), own calculations

Both models are statistically significant. The coefficients that represent the social background are predominantly significant. Therefore the endowment with human capital depends on the social background of the employees. Those from the upper social classes acquired significantly more schooling than those from poorer backgrounds. This suggests that schooling opportunity is strongly correlated with family background. There are relevant indirect effects between social (family) background and labour income.

6 Concluding remarks

The analysis of the determinants of high labour income is part of the income theory in general. On the one side the controversial positions are represented by the neoclassical approach on basis of the theorem of marginal productivity and on the other side by the Marxian-Keynesian approach which puts the emphasis on structural effects. The empiric-econometric analysis of the determinants of high incomes showed a heterogeneous picture. High labour incomes depend on individual as well as on structural determinants. But finally the effects of the structural determinants have a strong empirical relevance. The social structure of society, the characteristics of the work place and institutions determines high incomes.

Thus the determination of high incomes cannot be reduced to individual job performance. In fact general and specific human capital determines the probability of receiving high labour incomes. But as we can see from the analysis of the interaction between human capital and social background the human capital variables are not independent. They rather conceal the indirect effects of social background on high labour incomes.

Table 7: Hypothesis Test I (Interaction: Education –Family background)

	Panel Econometric Regression-Model (Model 3)	Panel Econometric Probit-Model (Model 4)
Hypothesis	verified: Yes/No	verified: Yes/No
H11 (Occupational status father – Educational attainment)	Yes	Yes
H12 (Graduation father – Educational attainment)	Yes	Yes
H13 (Vocational training father – Educational attainment)	Yes	Yes

The empirical evidence of discrimination by sex is obviously. High incomes are predominantly received by men. Unfortunately we do not have significant results for the discrimination by citizenship.

Further structural determinants like the place of residence, the industrial sector and the firm size also have a strong effect on the probability of receiving a high income. Rich employees live in economically prosperous regions, work in big firms and in sectors with a high capital intensity, a high degree of monopoly, high profits and/or a dynamic economic growth rate. In addition the occupational status as well as the class affiliation have a strong effect on high labour incomes. As mentioned above the family background has, via educational attainment, a strong indirect effect on the probability of receiving a high income. Furthermore there exists a strong direct effect of the family background on high income. This can be interpreted as the intergenerational transmission of cultural and social capital by social networks.

Table 8: Hypotheses Test II

	Panel Econometric Probit-Model (Model 1 and 2)
Hypothesis	Verified Yes/No
Human Capital	
H1 (Duration of training – rich/not rich)	Yes
H2 (Working experience – rich/not rich)	Yes
H3 (Duration of last tenure – rich/not rich)	Yes
Discrimination	
H4 (Sex – rich/not rich)	Yes
H5 (Nationality – rich/not rich)	No
Regions, Industrial sectors and firm size	
H6 (Region – rich/not rich)	Yes
H7 (Firm Size – rich/not rich)	Yes
H8 (Industrial sector – rich/not rich)	Yes
Socio-economic background	
H9 (class affiliation – rich/not rich)	Yes
H10 (occupational status – rich/not rich)	Yes
Family background	
H14 (occupational status father – rich/not rich)	Yes
H15 (graduation father – rich/not rich)	Yes
H16 (vocational training – rich/not rich)	No
Further socio-demographic background	
H17 (Household size – rich/not rich)	Yes
H18 (number of children – rich/not rich)	No
H19 (marital status – rich/not rich)	No

Household size and the marital status had also significant effects on the probability of receiving a high income. The number of children has a significant effect but not in the way to be expected.

If we embed the empirical results in the framework of theories of justice we can draw some important conclusions. The fact that structural determinants have a strong effect on high incomes undermines the legitimacy of high incomes according to the liberal justice theory. The strong influence of social and family background vitiates the publicly suggested strong relevance of job performance and equal opportunities. What we can see from the German case is that rich employees and self-employed do not earn high incomes because of their high job performance but of the fact that they got the right family background, sex and place of residence.

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