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Incomes in a Planned and a Market Economy: The Case of the German Democratic Republic and the 'Former' Federal Republic of Germany

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ABSTRACT This paper examines the extents and determinants of earned income inequalities in the German Democratic Republic and the 'former' Federal Republic of Germany. In both systems income differences can be distinguished on the basis of individual and structural inequalities as well as according to organizational and economic structures. Nevertheless, different theoretical explanations must be used, in particular regarding structural inequalities. In the FRG, economic structures are mainly based on the market position of the firms. In the GDR, however, they refer to the firms' importance for the national economy and their bargaining positions in relation to superior institutions. The organizational structures in the Federal Republic of Germany can be characterized, for example, by the workers' affiliation to the firms' core or periphery, by firm-internal career-ladders, and by the specific qualification-based bonds between employers and employees. Examples for the GDR are informal rules and bargaining positions in relation to superiors.

The empirical analyses (OLS estimates and residual variance analyses with the data from the German Socio-economic Panel East and West) show that in both systems individual productivity-relevant characteristics are responsible for the main part of the income differences. Nevertheless, women's incomes are—independent of the system—much lower than those of men (both the overall and the gender-specific differences are smaller in the GDR than in the FRG). Furthermore, structural variables like industry, firm size, and job requirements are important determinants of income differences in the GDR as well as in the FRG. This is the case for both women and men. In contrast to the GDR, however, organizational structures are more and economic structures are less important in the FRG.

INTRODUCTION

For most people social inequalities are developed and become apparent mainly in the labour market. For the employees and their families, this market determines, among other things, what financial resources they will have to satisfy their needs and (life-) plans. The labour market also plays an essential role through generating prestige, job security, and working conditions. These job rewards not only reflect and offer better or worse chances in the labour market, but at the same time they also affect the physical and psychological well-being of the employees as well as their private life, their leisure time, and not least their social relations.

The structuralist labour-market research (see among others Baron and Bielby, 1980; Sørensen, 1986; Kalleberg, 1988; Szydlik, 1990, 1991) holds that inequalities, which are ascribed to the labour market, are not based on individual inequalities alone. Although the different characteristics of employees, such as qualifications, motivation, and their physical and mental abilities, lead to unequal productivities and thus compensations, monetary and non-monetary work gratifications also depend on the position

of the employees in the labour market. In this case 'position in the labour market' means the affiliation of employees to higher units which can be differentiated from one another by specific characteristics: 'social inequality may be examined at five hierarchically connected units of analysis: economy, industry or sector, firm, job, and individual' (Baron and Bielby, 1980: 738).

On the respective levels of society and economy, specific differences can be presumed, especially between free-market and planned economies. It is assumed that specific social-inequality systems result from specific economic systems. If on the one hand the supply of goods and services is planned centrally, and if on the other hand this task is left to a more or less free market, different mechanisms as well as diverging extents of social inequalities should develop.

Thus the terms 'planned economy' and 'free-market economy' should not be used as a dichotomy. They are, rather, poles on a fictive continuum of economic conditions, on which the real planned-economy and free-market systems occupy different positions. The United States, for example, is closer to the free-market pole than is the Federal Republic of Germany. Considering that France is a free-market economy, it has a relatively large number of state-owned enterprises, banks, and insurance companies. Though Hungary belonged to the planned-economy system, there has been more freedom, especially on the firm level, since the end of the 1960s and the beginning of the 1970s, than in the German Democratic Republic (see also Deppe and Hoß, 1989; Zagorski and Domanski, 1991). Thus it has to be emphasized restrictively that a comparison of the German Democratic Republic with the 'former' Federal Republic of Germany cannot be seen as a comparison of two perfect examples of, respectively, planned-economy and free-market systems.[1] That means that—as in other comparative analyses of this kind—both system characteristics as well as national characteristics could be responsible for the differences. This applies not least to the specific system competition between the GDR and the FRG.

This paper investigates the extents and determinants of earned income inequalities in the German Democratic Republic and in the Federal Republic of Germany. It is primarily concerned with individual inequalities and their empirical operationalization. It discusses the extent to which the Western human-capital theory can be applied to the GDR. The discussion of structural inequalities is guided by the concepts of 'organizational structures' and 'economic structures'. By using these concepts, system-specific mechanisms in particular will be shown as generating income inequalities. After the presentation of the database (the German Socio-economic Panel East and West), the empirical results will be documented. Next, mean incomes and their extents are presented, followed by analyses of income differences due to individual inequalities and different structural units (industries, firm sizes, and job requirements for women and men in the GDR and in the FRG). Finally, the theoretical considerations and empirical analyses will be summarized and evaluated.

INDIVIDUAL INEQUALITIES

In this paper individual inequalities are understood as differences between individual productivities. An ideal rule can be said to be that incomes follow productivity.[2] The neoclassical economic model assumes this principle for free-market economies. In a perfect market with unlimited information and without mobility barriers, earnings coincide at least in the long term with individual productivity. Deviations from this principle occur only temporarily. The marginal productivity theory assumes that employers hire (and, respectively, fire) employees until the achieved prices correspond with the production costs. The principle of 'equal pay for equal work' was also an ideal in the GDR (Manz and Winkler, 1988). But here productivity was defined not least by 'social productivity' (Rößler *et al.*, 1986). Thus there were attempts to pay more for work which was thought more important to the economy. By means of earning incentives attempts were also made to 'lure' workers into sectors which were seen to be important for economic growth. With this concept it was possible to deviate from the ideal principle of 'equal pay for equal work' (Vortmann, 1985: 48).

The empirical operationalization of individual productivity-relevant inequalities is based on the human-capital theory (Mincer, 1974; Becker, 1975). Using this approach we can examine in what respect earnings follow the ideal principle of productivity or if and to what extent structural factors play a role as well.

The human-capital theory assumes that employees are paid only because of their productivity. This productivity itself depends on the qualifications of the employees. Thus the better the education of the employees the higher their productivity and the more they will earn. But higher qualifications are not to be gained free of charge. Investments in human capital are, for example, tuition fees, costs for teaching aids, and the loss of income during the time of education. Although theoretically these costs are often ascribed to the individuals they can also (jointly) be carried by employers or the state. The profits are then ascribed to the respective parties carrying the costs. Thus the investments in human capital have to be worthwhile. The effective interests may not be ultimately lower than the employed capital, for example if there are—due to older age—only relatively few years of employment left.

In its theoretical premises for the GDR, as well as for the FRG, human-capital theory shows some deficits. First of all, it is questionable to assert that individual decisions concerning investments in education should be seen as exclusively a result of a rational calculation made for the benefit of ultimate efficiency. Secondly, in the GDR there were fewer degrees of freedom concerning individual decisions of qualification than in the FRG.[3] However, it can theoretically be assumed that investments in education can be made more efficiently in planned economies. The future application of these investments will be rather unpredictable in free-market systems due to limited information. This means that those qualification redundancies which were caused by insufficient information should, in theory, have been more seldom in the GDR (in practice, however, the possibility that inefficient production structures cause a discrepancy between the acquired and the required qualifications in planned rather than in market economies cannot be ignored). Ultimately, chronic scarcities of employees present better conditions for payments adequate to education levels than does unemployment.

It is vital that the theses:

1. higher qualifications lead to higher productivities; and
2. higher qualifications must be rewarded accordingly for incentive reasons (this means incentives for (further) education as well as for the use of education on the job; as mentioned before, the loss of income during the time of education is also to be seen as an investment)

can be applied to both free-market and planned-economy systems. If the question in the case of income differences is to separate the individual from the structural determinants, the individual productivity-relevant differences can be identified by means of the empirical operationalization of the human-capital theory (see nn. 17 and 18; see also Schwarze, 1991*a*, 1993).

STRUCTURAL INEQUALITIES

Structural inequalities are differences which exist independent of individual productivities. They are based on organizational structures, economic structures, and on a combination of these factors. Organizational structures are those institutions, patterns, and arrangements (see Kalleberg and Berg, 1987) which exist within organizations: that is, within firms, companies, and enterprises. They determine the position of the employee within the company. Economic structures are institutions, patterns, and arrangements which go beyond the level of a company. They determine the position of firms, companies, and enterprises within the economy. The nature of the organizational environment as well as the position of the companies in this environment also determine the job rewards of the employees who work in these firms. This dichotomy of determinants of structural inequalities can be applied to both free-market and planned-economy systems.

There is evidence for and references to the importance of economic structures for income

inequalities in the FRG as well as in the GDR. For example, in the FRG macrostructural factors, such as enterprise density in industries (measured by profit/number of enterprises), have a significant influence on incomes even if the human capital is equivalent (Szydlik, 1993*a*). The market position of the company is an important determinant of the income differences among employees. The affiliation to the core or the periphery of the economy leads to different incomes even in the case of similar productivity-relevant individual characteristics (Szydlik, 1990; 1991). A similar rule applies to the affiliation to industrial segments (Schömann *et al.*, 1991).[4] In the GDR the firm's wage and bonus funds were not least determined by the state-defined economic importance. Thus structural differences can be assumed to exist between industries as well as between the *Kombinate* ('collective combines': large state-owned concerns covering almost all respective enterprises belonging to one branch of production) and companies. Although the former differentiation into industries and company classes after 1976 was applied to the companies (Vortmann, 1985), income differences between industries can still be assumed. According to this, employees working in the mining industry, chemical industry, heavy industry, microelectronics, and in some fields of the machine-building industry might well have earned productivity-independent, i.e. structural, incomes. Though at different times different levels of economic importance were ascribed to the industrial sectors (Bundesministerium für innerdeutsche Beziehungen, 1985: 990 ff.), once determined, preferential treatment was not withdrawn even if the emphasis was put on a different sector. Likewise firm size in planned systems should, in contrast to market economies, not represent market power but should work as an indicator of an unequal bargaining position in relation to superior institutions (see also Kalleberg, 1988; Deppe and Hoß, 1989: 62; Gerlach and Schmidt, 1989).[5]

There is evidence for and reference to the importance of organizational structures for income inequalities in the FRG, as well as in the GDR. For example, in the FRG the internal labour market is determined by the affiliation of employees to the firm's core, limitations of recruitment on certain entry ports, internal career ladders, seniority pay, customary laws, strong employees' representatives, and in general by strong ties between employees and employers (Lutz, 1987; Sengenberger, 1987; Szydlik, 1990).

The terms 'core' and 'marginal' staff could, in a sense, also be applied to the GDR. The affiliation to one of these groups, however, was not so much determined by the calculation of the company, but rather defined by the employees. The marginal staff primarily consisted of employees who often changed their job of their own accord. Thus core staffs can be primarily described by way of tenure and less by way of the affiliation of employees to central firm sectors with extremely high (firm-specific) qualification requirements.

A similar argument could be applied to internal career ladders. It can be assumed that in the GDR a longer tenure could possibly lead to better bargaining positions as well as to greater promotion prospects. However, it cannot be assumed that the employees necessarily wanted occupational advancement, because job shifts did not necessarily lead to increased influence, prestige, or income. Thus the promotion to the rank of master, for example, was motivated more by a pull from above rather than by a push from below (see also Rottenburg, 1991: 313; Marz, 1991: 1307).[6]

If it was important for the workers to be employed in an industry, a *Kombinat*, and a firm with large wage and bonus funds, it was also a matter of getting the highest possible share out of these funds for oneself.[7] Thus Kern and Land (1991) define 'promoters', that is, exceptionally active employees at the internal compromise-making processes, by their high factual qualifications and their employment in a strategic sector of the company.[8] Other employees ('the more passive elements of the staff') were then able to profit from the activities of their promoters (see also Deppe and Hoß, 1989: 100 f.).

The existence of informal rules is obviously not restricted to the GDR or other planned-economy systems. In the FRG there have been also more than slight deviations from the formal rules. Among these are, for example, illicit

	GDR	FRG
Individual Inequalities	Individual productivity	Individual productivity
Structural Inequalities	State-governed labour-force allocation	Labour-market structures
Economic Structures	Economic importance, Bargaining position in relation to superior institutions	Market position of the firm
Organizational Structures	Bargaining position in relation to superiors persons	Affiliation to the firm's core or periphery, internal career ladders, specific bonds between employees and employers

FIGURE 1 *Summary: Determinants of Income Inequalities in Planned and Free-Market Economies*

work, pay which is lower than the collective agreements, the 'pushing over' of orders from the state to specific firms, and the slipping of extra pay for overtime into the hands of employees in the construction industry. In contrast to the GDR, however, these informal practices should be seen as exceptions rather than the rule. For example, especially in big companies with a correspondingly stronger union, an attendance bonus for weekend work is hardly possible. Thus a general institutionalization of informal rules is less noticeable in the FRG than in the GDR.

In general, a combination of individual and structural income determinants can be assumed for the FRG as well as for the GDR. Likewise, for both systems the influences of organizational and economic structures can be presumed. The structural factors, however, are based on different mechanisms. The differences in the FRG can be attributed to labour-market structures. The structural income inequalities in the GDR, however, were oriented by the legal rules given by the state, which included intentional rules (ideal and formal) as well as unintentional consequences (informal rules).

Furthermore, one can assume that the structural determinants in the GDR and in the FRG are not only based on different mechanisms, but that they are also differentially important. In a planned economy like the German Democratic Republic, economic structures might be a more important influence on income inequalities than organizational structures. The more centrally the economic decisions are made, the higher might be the level of analysis on which inequalities are generated. This hypothesis, however, is questioned by the different bargaining positions of the employees in relation to their superiors. In a market economy like the Federal Republic of Germany, however, where the economic decisions are made in a much more decentralized way, in general organizational structures might be more important income determinants than economic structures. Here, not least the different organizational features of internal labour markets in comparison to secondary labour markets (e.g. core vs. marginal staff) might play a more important role in the generation of inequality.

Finally, for both systems a combination of both economic and organizational structures can be assumed. Employees in the FRG, for example, who can be ascribed to the same labour-market segment (and who have similar individual productivity-relevant characteristics) still experience different incomes due to their industry affiliation (Szydlik, 1993*b*). Regarding structural determinants, for the GDR a mixture of influences on different planning levels can be assumed. There were more or less important industries/ministries, but these industries still included more or less important collective combines and firms, respectively. Last, but not least, for the employees not only the industry, the collective combine, and the firm were important, but also their own position within the firm. Thus it can be presumed that employees, who are exposed to similar economic structures, might still receive different job rewards because of organizational structures, and vice versa.

DATABASE AND PROCEDURE

The database for the empirical analyses is the German Socio-economic Panel East and West (SOEP-East and SOEP-West; Projektgruppe, 1990; Schupp and Wagner, 1991). The survey in the GDR (the first wave of the SOEP-East) was done before the currency, economic, and social union on 1 July 1990. (It included 4,453 persons in 2179 households; only 3 per cent of the households could have been surveyed wholly during the first week of July). The first wave

of the SOEP-East does not represent a perfect baseline in the sense of a basic survey in a stable planned economy system. But Schwarze (1991*b*: 205) concludes: 'Hence the income generating process has not changed significantly in the first three-quarters of the year after the fall of the Wall' (see also n. 23). The information for the FRG refers to the sixth wave of the SOEP-West (1989; altogether 9,710 persons in 4,690 households). Later waves do not reflect the 'old' FRG but the Western part of the 'new' FRG. In these analyses the possible income effects of the transformation processes should be excluded, both for the GDR and the 'former' FRG (for the latter, due to labour migration from East to West and increases in production of West German firms in order to fulfil the demands of the new markets in East Germany). Furthermore, in contrast to the sixth wave of the SOEP-West, the seventh wave does not provide any information about a possible disabling of the respondents, which is one of the variables needed to control for individual differences in productivity (see below).[9]

Strictly speaking, the net incomes of all employees in the GDR should be compared with the gross incomes of the West German employees in the private sector. This would be the most consistent comparison of free-market and planned-economy determinants in the income-difference generating process. In the case of the FRG income inequalities (social contributions and tax effects) which are not generated in the labour market should be excluded, as well as the special employment conditions in the civil service (see also Szydlik, 1990, 1991). However, if the question is one of representing the income differences in a planned economy, the gross incomes reflect only one part of the plan. Hence, in this case, the net incomes should be used.

In this paper preference is given to a comparison of the net incomes of all employees (that is, excluding trainees and the self-employed) in the GDR and in the FRG. One advantage of this choice is the use of the same measure. But it also allows us to examine to what extent the specific characteristics of a planned-economy system and a free-market system, of the FRG and the GDR, finally have an influence on income inequalities. Net wages represent an altogether better measure of the material conditions of the employees—and thus of the actual social inequalities—than do gross incomes.[10] First, I present analyses including foreigners (Table 1 and Figure 2), and then separate analyses for German women and German men (Tables 2 and 3).[11] In these analyses industries, companies, and job requirements will be examined as possible structural units.

TABLE 1 *Hourly Net Income and Economy System Affiliation*

	Mean	Median	Standard deviation	Coefficient of Variation	N
All					
GDR	4.99	4.86	1.17	0.24	2 499
FRG	12.15	11.50	3.83	0.32	4 177
Women					
GDR	4.55	4.37	1.04	0.23	1 179
FRG	9.85	9.34	2.86	0.29	1 627
Men					
GDR	5.37	5.26	1.17	0.22	1 330
FRG	13.63	12.75	3.83	0.28	2 564

Source: The Socio-economic Panel, analyses for the years 1989 (SOEP-West) and 1990 (SOEP-East), weighted results, author's calculations.

EMPIRICAL ANALYSES

Table 1 shows the hourly mean net incomes, there medians, and their standard deviations and coefficients of variation for employees in the German Democratic Republic and in the Federal Republic of Germany.[12] Since these measures are based on different currencies, the absolute differences between the GDR and the FRG cannot be compared. Thus Table 1 initially offers information only on the respective internal income structures. In the GDR the hourly mean net income amounted to just under DMU-5, whereas in the FRG it amounted to DM 12.15. In the GDR, as well as in the FRG, the distributions are right-skewed. The medians, which are lower than the means, indicate that the average income was achieved only by a relatively small number of employees. The means, which are comparatively higher, can be attributed to relatively few employees who are paid extremely well.

The average internal income differences between women and men are particularly

evident. In the GDR the mean incomes of women amounted to 44 *Pfennige* (the currency of the GDR) under the total mean (DM 4.99–4.55). In the FRG, this difference is DM 2.30. When comparing the respective relative differences between women and men, the data show that in the FRG the highest incomes for women amounted to 72 per cent of the incomes of men. In the GDR this figure was 85 per cent. Hence, a first result of these analyses is that the income inequalities between women and men are altogether greater in the FRG than in the GDR. But there were also considerable income inequalities between women and men in the GDR.

Although the absolute differences between the GDR and the FRG cannot be compared, it is possible to compare the relative differences. The same applies to the coefficient of variation as a measure of spread which is independent of the mean (v = standard deviation/mean).[13] As expected, the result shows that the range of incomes is significantly greater in the FRG than in the GDR. This result applies likewise to women and men. The deviations hardly differ between the genders, but they do so considerably between the systems. Assuming that the range of incomes mirrors the extent of all chances and risks, Table 1 confirms the greater security but also the smaller spectrum of possibilities in the GDR. This also applied equally to women and men.

The graphs represent the distribution of the single proportional deviations from the respective total mean (formula: income × 100/total mean). For the GDR, for example, it is shown which proportion of the employees (y-axis) earned 60, 100, 140, etc. per cent (x-axis) of the DM 4.99 shown in Table 1. The results presented in Table 1 are further differentiated in the figures.

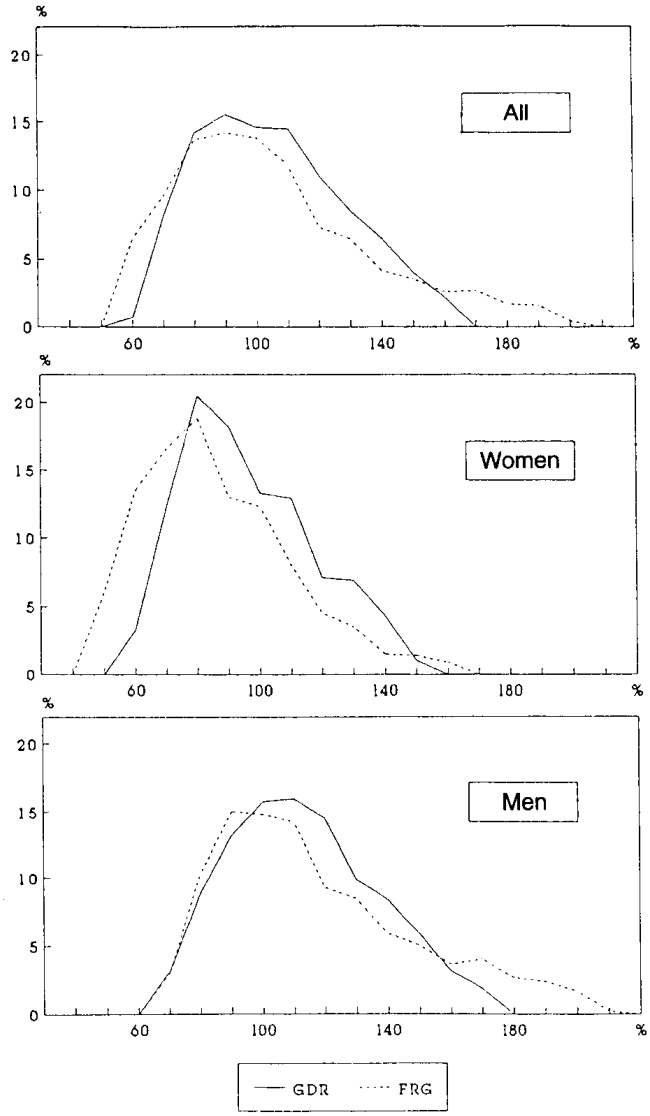

FIGURE 2 *The Structure of Income Inequalities in the GDR and in the Federal Republic of Germany (Hourly Net Incomes). Source: The Socio-economic Panel, analyses for the years 1989 (SOEP-West) and 1990 (SOEP-East), weighted results, author's calculations*

At first there seem to be no significant differences between the GDR and the FRG. The total graphs are comparatively close together. It becomes obvious, however, that there is a greater income range in the FRG. The corresponding graph for the FRG rises higher in the lower- as well as in the upper-income section than that for the GDR. In the German Democratic Republic 8.9 per cent of employees achieved an income which did not even amount to 70 per cent of the total mean. In the FRG this applied to 16.1 per cent. In the GDR 2.2 per cent of the employees achieved at least one-and-a-half as much as the average income; the corresponding figure for the FRG is 9.0 per cent. Besides the deviations the figures also indicate the right-skewed distributions already presented in Table 1. Thus it becomes clear that the upward shifting of the average incomes due to a relatively small number of employees occurs rather more in the FRG than in the GDR.

By comparing the income structures of women and men, a contrary system-specific

TABLE 2 *Income Determinants in the GDR and in the FRG*

	GDR		FRG	
Variables	Women	Men	Women	Men
Constant	0.8542[a]	2.0229[a]	1.7279[a]	3.5909[a]
Qualification				
Education	0.0644[a]	0.0347[a]	0.0652[a]	0.0518[a]
Experience	0.0057[b]	0.0161[a]	0.0228[a]	0.0332[a]
(Experience)^2	−0.0001[c]	−0.0004[a]	−0.0004[a]	−0.0007[a]
Tenure	0.0106[a]	0.0026[a]	0.0191[a]	0.0075[a]
(Tenure)^2	−0.0002[b]		−0.0005[a]	
Hours Worked	−0.0065[a]	−0.0270[a]	−0.0220[a]	−0.0728[a]
(Hours Worked)^2		0.0001[a]	0.0002[a]	0.0006[a]
Motivation	0.0302[c]	0.0104	0.0838[b]	0.0498[b]
Disability	−0.1000[a]	−0.0488	0.0619	0.0181
Industry				
Restaurants	0.0356		−0.0236	
Agriculture	−0.1211[a]	−0.1923[a]		
Banking, insurance	−0.0190		0.1155[b]	0.0415
Churches, associations	0.0115		0.0322	−0.0626
Retail trade	−0.0138	−0.0265	−0.1831[a]	−0.1503[a]
Textile industry	−0.0770[b]	−0.0665	−0.1352[b]	−0.0609
Food industry	−0.0547	−0.0250	−0.1084	−0.0630
Wholesale trade	0.0464		−0.0999	−0.0045
Wood, paper, printing	−0.0127	−0.0378	0.0376	0.0127
Personal services	−0.0376		−0.2384[a]	
Legal advice		0.0033	0.0389	0.1369[b]
Electrical industry	−0.0225	−0.0321	−0.0666	0.0268
Railway, postal service	0.0387	0.0325	0.0362	−0.1135[a]
Plastics, rubber				0.0900
Social security			0.0824	0.0551
Chemical industry	0.0057	0.0214	0.2555[a]	0.0939[b]
Ancillary to the construction ind.		0.0235		−0.0569
Traffic, communication	0.0200	0.0917[a]		−0.1064[b]
Iron and steel	−0.0099	0.0672[b]	0.1312[c]	−0.0104
Quarrying industry	0.1624[b]	0.1043[c]		0.0501
Machine-building	−0.1284[a]	0.0262	0.0709	0.0576[b]
Territorial authorities	−0.0151	0.1155[a]	0.0841[c]	−0.0118
Construction	−0.0357	0.0227	0.0929	0.0346
Public health service	0.1065[a]	0.1279[a]	−0.0143	−0.0595
Education, culture	0.0572[b]	0.0320	0.1059[b]	−0.0189
Energy, mining	0.0500	0.1197[a]		0.0292
Firm size				
Below 20 employees	−0.0839[a]	−0.0594[b]	−0.1338[a]	−0.1090[a]
20 to 200 employees	−0.0059	−0.0238	−0.0245	−0.0494[b]
More than 2,000 employees	0.0477[b]	0.0225	0.0535	0.0471[b]
Job requirements				
No training	−0.0480	−0.1652[a]	−0.3546[a]	−0.1301[a]
Short-time instruction	−0.0335	−0.1663[a]	−0.2826[a]	−0.0977[a]
Longer training period	−0.0136	−0.0794[b]	−0.1569[b]	−0.0496
Vocational education	0.0691[c]	−0.0296	−0.0783	0.0331
University education	0.2255[a]	0.1323[a]	0.1368[c]	0.3238[a]
R^2 of the Human Capital Model	0.2979	0.3080	0.3073	0.5097
including industries	0.3370	0.3885	0.3656	0.5290
and firm size	0.3484	0.3933	0.3848	0.5411
and job requirements	0.3725	0.4231	0.4300	0.5892
N	1203	1327	894	1437

Notes: Dependent Variable: Logarithm of the hourly net incomes. Regression Coefficient significant to the [a]<0.01 −, [b]<0.05 −, and [c]<0.10-Level. Reference firm size: 200 until below 2,000 employees. Reference job requirements: attending of specific courses. Industries not presented here include only very few cases.
Source: The Socio-economic Panel, Analyses for the years 1989 (SOEP-West) and 1990 (SOEP-East), no weighting factor, author's calculations.

tendency becomes apparent. For men the FRG seems to offer greater income chances. In the GDR nearly five per cent of men achieved at least one-and-a-half as much as the total mean; in the FRG this applies to almost three times the number of men. The lower incomes of men are about the same in the FRG and the GDR. For women the reverse is the case. For them the greater downward deviation in the FRG, that is, the danger of earning very little, is hardly compensated for by any prospect of relative high earnings. In the FRG a little less than one-fifth of women earn less than 60 per cent of the total mean. In the GDR this only applied to 3.3 per cent of the women (all these numbers refer to the proportions without the upper and lower 5 per cent of the cases). This means that if the graph of the FRG lies above that of the GDR in the upper- as well as in the lower-income sectors, the comparatively low incomes can be attributed to women and the higher incomes to men.

Since it cannot be assumed that the regression lines for women and men in the GDR and the FRG have the same slope on a possibly different level, the estimates will be carried out separately for each of these four groups.[14] The number of cases equals the lowest common denominator. This means that the people included here gave valid answers for all levels of analysis. The R^2 differences should be attributed to the variables and not to more or fewer cases. But Table 2 not only presents four regression analyses; it also refers to a step-by-step inclusion of three structural levels of analysis into an extended human-capital model. Thus the presented effects of the individual characteristics represent only the human-capital model without controlling for structural determinants. The coefficients of the industries, firm sizes, and job requirements, however, also include the human-capital variables. The firm sizes also include the industry affiliations, and the job requirements also include industry affiliations and firm sizes. Thus their parameters are estimated including all levels of analysis examined here.

For three of the four groups, variance explained by the human capital of the employees lies at around 30 per cent. Thus the individual inequalities examined here in their entirety were likewise responsible for women and men in the GDR. In the FRG, however, there are great discrepancies. In the case of West German men the six variables explain more than half of the income differences. In the case of women they explain nearly 31 per cent.[15] In contrast to the results presented in Table 1 it can now be examined to what extent the system-specific income inequalities between women and men can be attributed to qualification differences. For this, the equivalent years of education, experience, and tenure are put into the corresponding regression equation and the resulting incomes are calculated.[16] Even if assuming the same amount of time for training for women and men (in this case ten years of education, ten years of full employment, five years of tenure, 40 hours of work per week, no high motivation, no disability) women still earn significantly less than their male colleagues in both systems. In the GDR these women earned only 78.1 per cent of the men's income; in the FRG they earn only 71.1 per cent. If, for example, we assume five instead of ten years of tenure, the discrepancy is reduced respectively to 80.2 or 72.5 per cent. Thus gender-specific income differences cannot be attributed only to differences in qualification. In the case of similar individual productivity-relevant characteristics the gender-specific income differences even show a partial increase. These results also contradict the official claim in the GDR of a defeat of gender-specific income differences (Manz and Winkler, 1988). Apparently, this obviously wrong statement could still be maintained because of a prohibition on the publication of income statistics.

With an income increase of more than 6 per cent per year of education this variable indicates for women in both the GDR and the FRG relatively high effective interests.[17] In the FRG men can expect profit rates of 5 per cent, in the GDR they could expect rates of only 3.5 per cent. In the case of experience there are significant system differences.[18] Compared to the GDR, in the FRG each additional year of experience is twice as important for men and as much as four times as important for women. Within the GDR, again, men benefited three times as much as women from longer experience. In the FRG there is only a minor difference.

According to the human-capital theory, tenure is an indication of firm-specific qualifications. Longer tenures increase human capital and hence productivity. In the FRG men and women respectively get paid approximately twice as much as in the GDR for longer tenures. Though for men the corresponding effective interests lie significantly below experience, for women a different picture can be observed. On the one hand, for women, the corresponding growth rates seem to decline with long tenures. On the other, it was more important for women in the GDR to stay with the same firm for a longer time than to have longer experience. In the FRG, the difference between tenure and experience is also smaller for women than for men.[19]

Inadequate motivation or disability are supposed to indicate lower productivity due to lack of desire or inability.[20] Because of their different operationalizations, these coefficients are hardly comparable between the systems.[21] Furthermore, they are not always significant. It seems, however, that labour motivation has a greater influence on the incomes of women than on those of men. Women in the FRG who are highly motivated achieve an income 8 per cent higher than the average income. In the GDR this figure was 3 per cent (though only of low significance). Disability only shows statistically significant parameters for women in the GDR. Those women who were absent from work for at least 40 days in the year before the survey earned on average one-tenth less. This result could also be attributed to a selection effect which cannot be controlled here: in the GDR more people with a disability were employed than in the FRG, where there is an emphasis instead on transfer payments.

As a next step the industry affiliation is added to the human-capital variables.[22] Corresponding *F*-tests which do not relate to single industries but to the influence of the industries altogether indicate that the extent of explanation increases significantly. The highest increase of the R^2 can be observed for men in the GDR. Here the introduction of the industry variables increases the explained variance by 8 per cent (see also Table 3).

On the one hand, economic structures which are measured by industry affiliation are important inequality determinants for all four groups. But on the other hand, there is no industry which shows, in both the GDR and the FRG, and for both women and men, the same and at the same time significant effects. Though there are some industries with similar income effects (but with different structural mechanisms) most industries show system-specific differences.

The incomes in certain industries in both systems hardly differ from all other branches. This applies to women and men in the wood, paper, and printing trade. Furthermore, for women the railway and postal service has to be added and for men the electrical industry, the construction industry, and the education and culture sector. The significantly negative coefficients in the case of agriculture in the GDR cannot be examined for the FRG since there are not enough cases. But it can be assumed that the self-employed in the FRG also have lower incomes. The textile industry shows negative parameters for all four groups. These are significant in the case of women. The education and culture sector, however, offers higher incomes for women—independent of the system.

System differences, for example, exist in the banking and insurance sector, the railway and postal service (for men), the iron and steel industry, the territorial authorities, and the public health service. Though all regression coefficients are negative in the retail trade, only the differences in the FRG are worth mentioning. The same is true of the personal services. Male employees in the 'traffic and communication' sector in the FRG have to accept incomes which are around one-tenth lower. In the GDR, though, men in the same sector achieved a higher income of around 9 per cent. The earnings in the chemical industry in the FRG are distinctly above the mean income of the other branches for women and men. In the GDR, however, there is no effect.

In the German Democratic Republic mining, the chemical industry, heavy industry, microelectronics, and some fields of the machine-building industry were categorized as being extraordinarily important to the economy. However, the empirical analyses presented in Table 2 only partly indicate the practical significance of this claim. It is true that it shows significantly higher incomes in the iron and steel

industry and in the energy and mining sector, but on the one hand, this only applied to men, and on the other, the electrical, chemical, and machine-building industries do not show any effects or even have negative coefficients. Thus pre-defined economic importance did not generally result in higher incomes for the corresponding employees.[23]

Firm size can represent organizational structure as well as economic structure. In the FRG it stands for organizational structure if one assumes, according to size, different internal allocation mechanisms (for example, the existence and the extent of internal career ladders and vacancy chains). It represents economic structure, however, if it is a question of the market position of the company. Thus the greater degrees of freedom of successful companies can lead to higher incomes for their employees. For the GDR it can be assumed that the firm size mirrors different bargaining positions in relation to the governmental authorities planning the economy, specific possibilities for informal rules (the bigger the company, the higher the demand for workers, and thus the height of the firm's wage and bonus funds could possibly be raised), as well as state-defined economic importance (see above).

The introduction of the variable of firm size increases the explanatory power of the models significantly (as shown in *F*-tests). It becomes obvious, however, that firm sizes are more important in the FRG than in the GDR. In the FRG men with similar qualifications achieve—after controlling for their industry affiliation—an 11 per cent lower income if they work in firms who have less than 20 employees rather than in firms with 200 to 2,000 employees. In the case of women the difference amounts to as much as 13 per cent. But also in the GDR there are significant firm-size differences which are independent of individual characteristics.

Finally, the job requirements are included in the models.[24] These variables are also more important in the FRG than in the GDR. In the FRG men who work in jobs which usually require a university education achieve net hourly earnings which are higher by almost one-third than those of their colleagues who work in jobs with only course requirements. Women have to accept income reductions of around 35 per cent in jobs without training requirements. Here, both their human capital and their industry and firm-size affiliations were controlled for.

Organizational structures were also important causes of income inequalities in the GDR. Assuming that jobs with high qualification requirements belong to strategic sectors of the company (Kern and Land, 1991), higher incomes indicate corresponding informal rules. Men in the GDR who worked in jobs requiring a university education achieved an income 13 per cent higher than the reference group, even if their human capital is controlled for. For them, the work in jobs with low requirements led to even higher income reductions than in the FRG. Women could achieve incomes as much as 22 per cent higher in jobs where a university education was required. In contrast to the attending of specific courses, a completed vocational education payed off for women with a higher net income of around 7 per cent (this result is of only little significance).

TABLE 3 *Residual Variances (% in Relation to the Basic Model)*

Excluded level of analysis	GDR		FRG	
	Women	Men	Women	Men
Qualification	73.9 (117.7)[a]	72.7 (126.0)[a]	74.2 (130.2)[a]	78.1 (190.0)[a]
Industry	66.5 (105.9)[a]	63.4 (109.9)[a]	61.0 (107.0)[a]	43.1 (104.9)[a]
Firm size	63.7 (101.4)[a]	58.2 (100.9)[b]	59.5 (104.4)[a]	42.3 (102.9)[a]
Job requirements	65.2 (103.8)[a]	60.7 (105.2)[a]	61.5 (107.9)[a]	45.9 (111.7)[a]
Basic model	62.8 (100.0)	57.7 (100.0)	57.0 (100.0)	41.1 (100.0)
N	1203	1327	894	1437

Source: The Socio-economic Panel, analyses for the years 1989 (SOEP-West) and 1990 (SOEP-East), no weighting factor, author's calculations; *F*-Test: Regression Coefficients significant to the [a]<0.01 and [b]<0.05-Level.

On the basis of Table 3, the importance of the various levels of analysis concerning the generation of income inequalities of women and men in the German Democratic Republic and in the Federal Republic of Germany can be summarized. The procedure is of a relatively restrictive nature. The focus is exclusively on the effects of all human-capital, industry, firm-size, and job-requirement variables. The effects of single industries, for example, are not considered here. Furthermore, individual variables (for example tenures) can also often be attributed to structural determinants or to a corresponding interaction of individual and structural factors. The basic models are the regression equations, which include all levels of analysis examined here. Proceeding from this basic model in each case the human-capital, industry, firm-size, and job-requirement variables are excluded.[25]

The residual variance of 73.9 in the first cell indicates that the three structural levels of analysis, without the individual qualification, cannot explain 73.9 per cent of the total variance. In contrast to the basic model this is an increase of 17.7 per cent. The higher the values, the more important the corresponding level of analysis. This also applies to the percentages (in brackets) of the basic models to which the interpretations mainly refer. The residual variances are not estimated for the single levels of analysis since the other levels should be controlled for. In order to compare the single values they are standardized by their shares of the residual variance of the basic model. *F*-tests are used to examine whether the effects of the corresponding variables (for example those of the industries) are significantly different from zero. This is the case for all levels of analysis.

All in all, individual differences are responsible for the greatest part of the income differences explained here. None of the other three levels of analysis achieves such a considerable increase in the residual variance. This applies most evidently to men in the FRG. Even if the industries, firm sizes, and job requirements are put together, these structural characteristics are still less important than the individual characteristics. The increase in the non-explained variance, however, are still 11.8, 19.9, 21.6 and 19.2 per cent (these values are based on the R^2s of the human-capital models shown in Table 2). Besides qualifications, industry affiliation was additionally of special importance for employees in the GDR. In the FRG, however, the job requirements seem to be a more important structural level. This applies more to men than to women. In the FRG organizational structures are more important, whereas in the GDR economic structures played a greater role. For the generation of income inequalities the results presented in Table 3 indicate system differences rather than those between women and men.

CONCLUSION

When analysing and explaining (income) inequalities, comparisons between societies are particularly informative. There are differences not only concerning the extent of inequality but also regarding its determinants and mechanisms. The specific inequalities in the Federal Republic of Germany can be made clearer by comparing them directly with the German Democratic Republic. By analysing income differences in the GDR, the inequality determinants in the FRG can be better identified, and vice versa.

In this paper the income distributions in the 'former' Federal Republic of Germany and in the German Democratic Republic were compared. With the analyses of earned incomes a partial, though important, aspect of social inequality is shown. Since this paper was supposed to examine those inequalities which are generated in the labour market, neither household nor transfer incomes were used. However, the relative importance of earned incomes in the FRG and in the GDR is quite different. Since in the GDR the monetary incomes and the supply situation did not coincide, the actual income differences can only reflect a smaller part of social inequality than in the FRG (see also Fritzsche, 1990; Hauser *et al.*, 1991). In the GDR 'better' and 'worse' employments were also determined by the access to scarce goods. Thus jobs with relatively low earnings could offer specific consumption possibilities. For example, in addition to the face value of a job, reservations in restaurants could

be exchanged for building materials, or jeans for food. The spectrum of indirect job advantages included opportunities such as making private phone calls through the company, getting fruit and vegetables through the canteen, or procuring wallpaper, paint, tiles, tools, etc.

The German Democratic Republic showed a smaller income dispersion than the Federal Republic of Germany. On the one hand, there was the security of being in little danger of declining into extremely low-income sectors. On the other, however, there were also relatively few chances of achieving extraordinarily high incomes. The earnings of women, however, fall below those of men, regardless of the system. Thus the statement that the gender-specific income differences in the capitalist states were eliminated in socialism (Manz and Winkler, 1988: 138 f.) proved to be wrong. However, these differences were less distinct than in the FRG. In the GDR the incomes of women amounted to 85 per cent of men's incomes; in the FRG this figure is 72 per cent. Even if equivalent years of education are put into the corresponding regression analyses there are still, sometimes even greater, gender-specific income differences.

If the inequalities are dichotomized into individual and structural differences in both systems the individual differences predominate. The human-capital models (for some of the variables considerably different system-specific effective interests were evident) explain a much greater part of the total variance than do the structural levels of analysis. But income in the GDR did not simply depend on individual productivity, nor does a perfect market in the sense of the neoclassical paradigm exist in the FRG. The industries and companies as well as the jobs can be seen as important structural units for income differences. When explaining (income) inequalities, structural factors are not to be neglected, either intranationally or internationally.

If income inequalities can be attributed to individual as well as to structural characteristics, the structural differences are based on organizational and economic structures. In both systems, in the GDR as well as in the FRG, both kinds of structure are important. In contrast to the GDR, however, economic structures are less and organizational structures are more important in the FRG. The inequalities in centrally planned economies are rather generated at higher levels of analysis, whereas decentralized market economies generate differences at lower levels. In the GDR there were particular differences at the industry level. These inequalities, however, did not necessarily reflect income advantages in sectors which were categorized as being extraordinarily important for the economy. In the GDR formal and informal firm-internal rules proved to be significant inequality determinants as well, but in total they were still rather less important than the industry affiliation. In the FRG, however, the firm size, and especially job requirements, seem to be of a considerably greater significance for incomes. The greater relevance of jobs in the FRG can be attributed to organizational determinants such as career ladders, workers' affiliation to the firm's core or periphery, and the closing of internal markets, as well as to greater application deficits between the acquired and the required qualifications.

NOTES

1. The term 'Federal Republic of Germany' in this paper means the 'former' Federal Republic of Germany before 3 October 1990.
2. The discussion deals with the inequalities generated in the labour market. Thus the model of the Federal Republic of Germany, the social market economy, implies a softening of the consequences of a free market through a taking of social responsibility (Müller-Armack, 1947; Helmstädter, 1989). In the GDR the so-called 'second pay packet' (*zweite Lohntüte*), that is the subvention of essential goods and services such as basic food, children's clothing, public transport, laundry services, energy, heating, and rent by the state (see also Schwartau and Vortmann, 1989: 297), was part of a corresponding social policy.
3. Thus the number of participants in the various courses of training was centrally defined. In the case of incongruence of desired and offered occupations individuals were advised to choose the latter. Within the given framework, however, decisions concerning investments in education were also made individually.
4. There are also a number of empirical studies revealing income differences between industries (e.g. Krueger and Summers, 1988; Hübler and Gerlach, 1990) which chose the efficiency-wage theory as a theoretical explanation.

The efficiency-wage theory claims that employers pay higher wages to their employees with the goal of increasing productivity. Because of voluntary benefits which lie above the original productivity of the workers there is less shirking, striking, and turnover. In addition, higher qualified people generally apply for higher-paying jobs (for an overview of the efficiency-wage theory see e.g. Thaler, 1989 and Szydlik, 1993*b*). Since the efficiency-wage theory is mostly employed to explain income differences between industries, one might presume that this approach mainly concentrates on economic structures. This, however, does not seem to be the case: the shirking model, the turnover model, the adverse-selection model, the fair-wage–gift-exchange model, and the union-threat model all concentrate on the organizational level of analysis (for a more detailed discussion of this argument see Szydlik, 1993*a* and 1993*b*).

5. Thus when determining the wage and bonus funds of the *Kombinate* and companies on the level of governmental authorities planning the economy, it was mainly a matter of 'objective' plan reference figures. The financial resources which were available to the various ministries were not equally distributed to the *Kombinate* and companies which were subordinate to these ministries. With this, the laying down of the so-called one-year-plans (*Einjahrespläne*) was of great practical importance. Here, in the third phase of the planning process, which involved the directors of the *Kombinate*, the outline of incomes for the next year was determined. The so-called 'plan reference figures' (*Plankennziffern*) and their respective evaluations were of special importance. This category included, among others, quantitative and qualitative work productivities (industrial production of goods), their development and costs, as well as the extent of the goods sold at home and abroad. The directors of the *Kombinate* were obviously interested in reaching those criteria of assessment which put a high value on the strength of their respective *Kombinat* and which de-emphasized their weaknesses. Besides the productivity reference figures, the number of employees played a significant role in determining the wage and bonus funds of the *Kombinate*. However, the corresponding financial supports were not dependent on the actual but on the required number of employees. Because of the general shortage of labour, new jobs and longer working hours for those already employed had to be included in the plan. Thus the directors of the *Kombinate* tried, in competition with other producers for the existing resources, to make the strongest demand for workers. In addition, from time to time informal agreements were made between the managements of the *Kombinate* to ensure mutual support when negotiating within the ministry. Similar strategies and informal rules can be assumed concerning the negotiations between the *Kombinate* and the companies.
6. The last two paragraphs provide only two of the arguments that suggest why the labour-market segmentation theory, which was developed (Lutz, 1987; Sengenberger, 1987) and tested (Blossfeld and Mayer, 1988; Szydlik, 1990, 1991, 1993*b*) for the 'former' FRG, cannot be applied to the GDR. Other counter-arguments include the non-applicability of the so-called 'unstructured labour-market segment', which, in a way, reflects the perfect market of the neoclassical paradigm. Also, production in the GDR was rarely differentiated between standardized and non-standardized production (see Voskamp and Wittke, 1991), which is suggested by the labour-market theory. Thus, in this paper the labour force in the GDR will not be differentiated in the labour-market segments which were developed for the FRG. However, the label 'segmentation theory' is used for a number of heterogeneous theories. Schömann *et al.* (1991), for example, explain income differences in the 'former' FRG with the help of industrial segments. They use Stinchcombe's (1979) 'classification of industries in Norway by labor market structure'. It is also questionable whether this segmentation typology can be applied to the GDR. To give some examples: The 'Traditional primary industries' (e.g. agriculture), 'tend to be organized with family property in small enterprises, with some or all of the labor going into the enterprise coming from the family itself'. This was hardly the case in the GDR. 'Relatively small firms in a competitive commodity market', which are typical for the segment of the '"classical" capitalist industries', were certainly not typical of the GDR. Similarly, nor was the segment of the 'competitive or small-scale industries with skilled workers', which is 'characterized by a small-firm structure, [and] generally competitive commodity or service markets' (Stinchcombe, 1979: 219 ff.; see also Schömann, 1991: 11 ff.). Nevertheless, it cannot be excluded in general that adjustments of these segmentation approaches or different definitions of 'segmentation' can be applied to planned economies as well (which is not the goal of this paper). Stark (1986), for example, suggests the existence of internal labour markets in the planned economy of Hungary, which followed in particular from semi-autonomous subcontracting units inside the enterprise. Such units, however, did not exist in the GDR (for a more detailed discussion of this issue see Szydlik, 1993*b*).
7. Within their companies employees had a number of possibilities at their disposal to increase their low basic incomes. The chronic shortage of labour as well as the labour law can be seen as the main reasons for their exceptionally good bargaining position (Thiel, 1990; Rottenburg, 1991: 312). Due to future voluntary overtime, working processes that were difficult to control, or internal threats concerning a work-to-rule, the relatively unfavourable bargaining position of the superordinates (the master was a central key figure in the companies of the GDR) now and then led to payments which were much higher than the official salaries and wages (see also Deppe and Hoß, 1989: 103 f.). An undermining of the formal rules was caused by the assignment of employees according to salary scales. Although these were defined through a state-

determined labour classification, it was possible to claim internal job requirements and work-loads which deviated from those set by the 'scientific work organization' (Wissenschaftliche Arbeitsorganisation; WAO). Hence higher wage and salary scales were achieved. Additionally, there were so-called 'fullfilment-of-quota pacts' (*Planerfüllungspakte*; Voskamp and Wittke, 1991). In the case of bartering of 'overtime in exchange for fullfilment of quotas', the employees were in a favourable position. In particular, if the monthly 'industrial production of goods' (Industrielle Warenproduktion; IWP) as a quantitative registration of the whole gross production could not be achieved (for example, because of the failure of machines, material bottlenecks, or shirking), overtime, weekend work, or even high productivities during regular working time had to be bought at a high price. On the one hand, extra pay from the bonus funds for higher physical job demands, shift work, and Sunday and holiday work was formally legitimate. On the other hand, there were also declarations concerning the overfulfilment of quotas which were internally negotiated or which were tolerated as fictive, an attendance bonus for weekend work, agreements on the control of surplus work, and fictive overtime which all played an important role. The formal rule to pay the basic wage only in the case of total fulfilment of the corresponding norm was hardly practicable, at any rate.

8. The strategic company sectors 'were especially those production sectors with export and import-substitution-products, IWP-sensitive positions, and under certain circumstances the equipment-making sector caused by rationalization [*Rationalisierungsmittelbau*], in which the final producer had to manufacture tools and machines for his own manufacturing after the subcontractor networks had been destroyed in the course of the foundation of *Kombinate*' (Kern and Land, 1991: 16).
9. Because of the need to resort to specific information for the analyses presented in Tables 2 and 3 only those panel participants who filled out a valid questionnaire in 1984 as well as in 1988 and 1989 could be included (see also n. 18).
10. Furthermore, a comparison between the gross incomes of the GDR and those of the FRG is rather problematic because of the differing social contributions and tax rules (see also Fritzsche, 1990; Stephan and Wiedemann, 1990; Hübler, 1984, and n. 23). Likewise, a division into a private and a public sector cannot be applied to the GDR. There was neither an extended private sector nor a public service which is typical of the West German case.
11. Among all 4,453 participants of the SOEP-East there are only 14 foreigners.
12. Here and in the figure the upper and lower 5% of the cases are excluded from the analyses because of possible misrepresenting outliers. This is a common procedure with 'robust statistics' (see also Huber, 1981; Lehmann, 1983). The means calculated by that procedure are more likely to reflect the real means. They are not affected by some very few, but at the same time very extreme, outliers (which may be due to errors in the database). The measurements of spread documented here generally underestimate the real income dispersions. This deficit, however, is more than balanced because of the comparability of the spreads between the groups. The number of cases of women and men do not equal the total sum since the corresponding 5% of exclusions are made respectively for each weighted group.
13. This assumption, however, depends on the distribution. Thus with higher means greater coefficients of variation could still be possible. Hence the corresponding values should be interpreted with relative care. In contrast to the standard deviation, though, the coefficient of variation represents a significantly better measure of spread. The second advantage of the coefficient of variation, however, applies in any case: scaling effects (here, currency effects) are definitely excluded.
14. The data are analysed using OLS regression models. For the representation of the individual productivity-relevant characteristics an extended human-capital approach is used:

$$\ln(Y) = \beta_0 + \beta_1 S + \beta_2 E + \beta_3 E^2 + \beta_4 T + \beta_5 H + \beta_6 H^2 + \beta_7 M + \beta_8 D + \beta_9 SV + u.$$

The dependent variable is the logarithm of hourly income. β_0, β_1, β_2 etc. are estimated parameters that indicate the relative increase in income per year of education, experience, and tenure etc. S stands for the duration of the formal education (schooling), E for experience, T for tenure (in years), M for motivation, and D for a disability. These independent variables are assumed to be productivity-relevant characteristics. 'Hours worked' is a control variable, and u is the error term (see the following notes). SV stands for the structural variables, which are added to the human-capital variables. Fixed-effect and error-component models are not employed here. Fixed-effect models have the disadvantage that time-constant effects like that of education cannot be estimated. The corresponding parameters would just refer to education changes, meaning that they often rely on very few cases. This, of course, also applies to variables like industry affiliation. A few measurement errors would lead to considerable distortions. The error-component models assume that the corresponding error term is not correlated with the independent variables. This assumption, however, may not be supported in reality. An unobserved characteristic like intelligence may indeed lead to a higher level of education. It is also questionable why the constant part of the error term might only be due to individual characteristics, and it is likely that work structures, for example firm or industry characteristics, play a role as well. Those disadvantages of the alternative models

may be reduced when the SOEP's future waves include more people, who, for example, changed their industry affiliation. In this research the motivation is controlled for directly by a corresponding variable. The 'unobserved variable' intelligence is partly included in the models through the schooling and vocational education certificates. For analyses with the data of the SOEP which compare the different models—the corresponding coefficients hardly differ from those of the OLS regressions—see e.g. Hujer and Löwenbein, 1991; Schwarze, 1991*b*; Schmidt, 1992. For a more extended discussion of the previous arguments, see Szydlik, 1993*b*.

15. In contrast to other analyses (e.g. Hujer and Löwenbein, 1991) the R^2 for women is relatively small here. Those other analyses, however, are based on monthly incomes. Estimating monthly incomes and controlling for hours worked per definition should result in a considerably higher explained variance for women than for men. Additionally, the theoretical advantage of hourly wages seems to result in a higher proportion of outliers, which increase the total variance. Nevertheless, it can generally be assumed that individual characteristics explain a smaller part of the incomes of women than of the incomes of men (for a discussion of a part-time variable for women, see n. 18).
16. Due to the prior taking of the logarithm of the income, a corresponding retransformation has to be made. The use of the formula $\exp(\chi_0\beta + \sigma^2/2)$ results in a naïve unbiased estimation of the income in the respective currency. Here $\chi_0\beta$ is the logarithm of income (β represents the regression coefficients) and σ^2 is the variance of the error term of the regression (Duan, 1983).
17. The empirical operationalization of the required years of education for the GDR refers to Schwarze (1991*a*) and for the FRG to Helberger (1988). Here the various education levels are related to their required years. The years of vocational training are added to the years of schooling. Hence a person with *Abitur* and *Lehrabschluß* (upper-secondary leaving certificate and a completed apprenticeship) is considered to have a higher qualification than a person with a *Hauptschul-* and *Lehrabschluß* (lower-secondary school-leaving certificate and a completed apprenticeship). By extension and somewhat differently from Helberger, the following years of education are evaluated for the FRG: *Hauptschulabschluß* (lower secondary school-leaving certificate: 8), *Realschulabschluß* (intermediate school-leaving certificate: 10), *Fachhochschulreife* (certificate of aptitude for specialized short-course higher education: 12), *Abitur* (upper-secondary leaving certificate: 13), *Anderer Schulabschluß* (other school-leaving certificate: 8); *Lehre* (apprenticeship: + 2), *Berufsfachschule*, *Handelsschule* (specialized vocational school, commercial school: + 2), *Schule des Gesund-heit-swesens* (public health school: + 2), *Fachschule* (specialized technical school: + 4), *Beamtenausbildung* (education as a civil servant: + 1.5), *Fachhochschule*, *Ingenieurschule* (post-secondary technical college, school for engineers: + 3), *Universität*, *Hochschule* (university, institution of higher education: + 5), and *Sonstiger Ausbildungsabschluß* (other completed training: + 2 years). By extension and somewhat differently from Schwarze, the following years of education are evaluated for the GDR: *Abschluß* 8. *Klasse* (completion of training in 8th class: 8), *Abschluß* 10. *Klasse* (completion of training in 10th class: 10), *Abitur* (upper-secondary leaving certificate: 12), *Anderer Schulabschluß* (other school-leaving certificate: 8); *Berufsausbildung*, *Facharbeiterabschluß* (vocational training, skilled worker certificate: + 1.5), *Meisterabschluß* (master craftmen's certificate: + 4), *Ingenieur- und Fachschulabschluß* (school for engineers certificate, technical college certificate: + 3), *Hochschul-*, *Universitätsabschluß* (institution of higher education degree, university degree: + 5), and *Sonstiger Ausbildungsabschluß* (other completed training: + 1.5 years). In an analysis which is not documented here, it was also examined whether the assumption of the human-capital theory, that higher certificates also lead to higher incomes, can be applied to the GDR as well. For that purpose, instead of years of education, several education dummies were put into a corresponding regression model. It turned out that higher certificates usually led to higher incomes. Furthermore, for men the dummy variable model indicates—in contrast to the metric variant—a slightly lower explained variance (but for women it is slightly higher). However, the possibility cannot be excluded that the SOEP participants, when answering questions concerning income, neglected attendance bonuses, for example (which were paid directly in cash). Employees below the master's level got such high rewards that they could have incomes which were even higher than those of their supervisors (Marz, 1991).
18. Due to different operationalizations, the relevance of experience for incomes between the GDR and the FRG can only be compared with reservation. The actual years of full employment for the FRG are gained through the biography scheme, which was surveyed in the first wave of the SOEP-West (Szydlik, 1989, 1991). So far the SOEP-East does not offer such a scheme. Hence the experience had to be calculated in the usual way (experience = age − years of education − 6). A corresponding part-time employment variable for women is not included here. Though an analysis of former part-time employment years, not documented here, showed significant negative parameters with positive square terms, these coefficients cannot be attributed to the fact that each additional year of part-time employment results in a correspondingly lower individual qualification. If only those women are included who experienced years of part-time employment, there are no significant parameters. If, however, again for all women, a part-time dummy is used instead of a metric variable, there is a highly significant effect. In contrast to the *years* of part-time employment including the square term

there is also a slight increase in the explained variance. On the one hand, these results prove that a metric variable does not come close to reality. On the other, the dummy variable does not suggest human-capital differences. The part-time variable stands rather for a structural income determinant. Here inequalities determined by segments might play a role (see also Szydlik, 1990: 107 ff.). In Table 2 these are shown at least in first attempts by the models with the structural variables.

19. For possible problems with the effects of tenure see Altonji and Shakotko, 1987.
20. The actual weekly work hours are control variables. The corresponding effects can be attributed especially to persons who have 'normal' monthly incomes with relatively few or many weekly work hours. It cannot be determined definitely if these outliers are to be attributed to incorrect or true data. In the case of very high hourly earnings there is at least no economic necessity to put in longer working time in order to pay for leisure-time costs.
21. For the FRG motivation was generated in the following way (dummy): 1 = 'The occupation is so important to me that I sacrifice a lot for it'; 0 = 'The occupation is important to me but other spheres of life should not be neglected because of it' or 'The occupation is not very important to me. If I didn't have to work, I would probably give up working'. Disability was identified by the question: 'Are you seriously disabled according to official quarters?' (dummy; 1 = yes). For the GDR the interviewees were then adjudged a high labour motivation (dummy = 1) if the occupation as well as the success at work were very important for their well-being and their satisfaction. Disabilities were assumed for those SOEP participants who did not go to work between July 1989 and June 1990 for at least 40 days because of being sick. An explicit question concerning a disability was not asked before the second wave of the SOEP-East.
22. Here separate estimations are made for the various industries. Since the corresponding coefficients depend decisively on the choice of the reference group, the single branches are given in relation to all others. Thus Table 2 shows the respective difference to the mean income of the remaining industries. If an industry with extraordinarily high or low incomes was chosen, the parameters would be very high and they would show corresponding significances. Hence the effects shown in Table 2 are based on a very restrictive procedure. Because of this the effects are to be interpreted as minimum heights. Reference groups have to be chosen only for the R^2 and as a basis for the inclusion of firm sizes and job requirements. Here a medium group with a low variance and many cases is taken. In the case of men (in the GDR as well as in the FRG) that applies to the construction industry. For women in the GDR the retail trade is chosen and for women in the FRG the public health service. The rank of the industries in Table 2 is based on a hierarchy (not documented here) which results from the mean hourly net incomes of the employees in the GDR. In contrast to the original encoding of the SOEP the banking and insurance industries, personal services and building maintenance/waste removal, railway and postal service, and energy/water supply and mining are combined.
23. The SOEP-East also offers income data for May 1989 and May 1990. However, these give only gross incomes. Moreover, for these dates the SOEP-East does not provide information for all the interviewees on their individual characteristics and their employment situation. The results shown in the Tables 2 and 3 were replicated with the hourly gross earnings in May 1989 (that analysis is not documented here). Those persons who changed their job or their company after May 1989 were excluded. It is assumed that at that time individual characteristics and working times were the same as at the time of the survey. In comparison to the results presented here, there are basically—with some remarkable exceptions—the same results. In the case of women the coefficient in Table 2 for the banking and insurance industry becomes distinctively negative, and the high value for the machine-building industry disappears. There is also an exchange of the coefficients for women in the retail trade and in the textile industry. It seems that in 1989 also men achieved higher gross incomes in the education and culture sector. The high positive effects of the public health service disappear altogether. It seems as if these incomes have been raised only recently. Finally, the human-capital equation shows a higher explained variance particularly for men. On the one hand, this should not be surprising in the case of gross incomes. But on the other, this effect could also be generated by a lower income dispersion. The relations between the levels of analysis, however, do not change (Table 3).
24. To guarantee the compatability of the corresponding values the category *Eine abgeschlossene Ingenieur-oder Fachschulausbildung* (a school for engineers or a post-secondary technical college, which is added in the SOEP-East) is combined with the completed vocational training. For the same reason in the case of the firm size the category 'Less than ten employees' is combined with the category 'From ten to less than 20 employees'.
25. The explained variances (R^2) cannot be compared with each other easily. In relation to the basic model the R^2s of the single models are not independent of the total variance. Hence, instead of the explained variances the unexplained variances (residual variances) are set in relation to each other.

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