AN APPLICATION OF MARGINAL LOG-LINEAR MODELS TO EXAMINE CHANGES IN SOCIAL MOBILITY IN HUNGARY DURING THE TRANSITION PERIOD

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The paper analyzes social mobility data for Hungary from the years 1987, 1992 and 1999. The main focus is put on testing Treiman's modernization hypothesis that was posed in 1970 and is still widely cited today in the context of transition. The objective variables involved in the hypothesis are completed with subjective social position and subjective intergenerational mobility, aiming to take into account perception as a pathway through which objective factors have an impact on individual behavior. The fitted models are graphical models based on directed acyclic graphs and the values of marginal log-linear parameters (as proposed in Rudas, Bergsma, 2004) are used to gain insight into the strengths of associations. The main findings include that according to some parameters, a downward mobility trend prevailed between 1987 and 1992 as opposed to the upward trend between 1992 and 1999. That is, when investigating transition process we should distinguish these two periods.

Key words: modernization hypothesis, political thesis, intergenerational mobility, graphical model, directed acyclic graph

1 BACKGROUND

1.1 Significance Of The Topic

According to Treiman's widely cited modernization hypothesis, economic processes driven by technological change lead to a labor market in which social origins can no longer affect an individual's socio-economic position, because jobs demand increasingly higher skill levels from the workforce (Treiman, 1970). Andorka et al. detected slow and uncertain decrease in social inequalities by investigating Hungarian mobility data from 1973, 1983 and 1992, which they interpret as a weak support for the hypothesis (Andorka et al., 1994).

The question arises whether the comparison of these years is actually an appropriate way to test the modernization hypothesis? Transition was a multidimensional process, with tightly intertwined political, social and cultural components. Assuming a causal relation between the economic development and the social changes while neglecting the simultaneity of the other components would be an overestimation of the economic component and would lead to fallacy[3].

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[2] The author would like to thank Péter Róbert and Tamás Rudas for their valuable comments.
[3] Erikson and Goldthorpe state that political system has an impact on mobility patterns independently from the state of economic development, and so do the welfare system, and the institutionalized relations between educational system and labor market (Ganzeboom et al., 1991).

Assuming the transition period as a permanent development may also lead to misinterpretation. 1992 showed the worst of the negative concomitant phenomena of the economic transformation. Presumably a later time point as a reference would be a better choice for the investigation of modernization.

This paper focuses on following social transformation during the transition period by analyzing three datasets collected in 1987, 1992 and 1999. *The first research question is to test the modernization hypothesis, i. e. to investigate whether there have been significant changes in the relations between paternal occupational status, education, occupational status and income.* The sign of these changes is of our interest as well, since economic changes during these two periods (1987-1992 and 1992-1999) have had an opposite direction in Hungary from many points of view. According to the problems mentioned above, the tendencies detected should not be interpreted simply as the consequences of the economic changes, but as the consequences of many simultaneous components of the transitional process.

The objective variables of the model involved in Treiman’s hypothesis are completed with subjective social position and subjective intergenerational mobility (see Figure 1). The study of subjective stratification factors has recently been recognized as equally important as the study of objective factors. It has been showed that subjective perception of a position does not necessarily tally with objective position, but is influenced by it. Importance of subjective factors stems from the aim to take into account perception as a pathway through which objective factors have an impact on individual behavior. E.g. according to this assumption subjective social mobility is considered to be a determinant of political behavior (e.g. Lazarsfeld et al., 1974, Lipset, 1981), while subjective social position has the role of a psycho-social mediator factor between objective social position and health status in epidemiological causal models (e.g. Wilkinson 1997). A causal relation is assumed between the two subjective factors investigated in this paper, hence subjective mobility has an independent influence on the perception of social position (Róbert-Sági, 1992). *The second research question is as follows: what is the effect of occupational status and paternal occupational status on subjective mobility? How did this relation change over time?*

The third research question refers to the objective and subjective determinants of subjective social position, and to the change in these relations during the given period.

1.2 Historical Background

The paper analyzes social mobility data for Hungary from the International Survey Programme (ISSP) „Social Inequalities” surveys conducted in 1987, 1992 and 1999. It is a lucky coincidence that this series of surveys was conducted in these years, since they are three typical points in the transition process. A closer look at Hungary’s history will reveal that the pace of economic progress has not been stable over the whole period concerned. Discontinuities and irregularities are very useful for our research because they provide a sharper test of the modernization thesis. When the direction of the economic progress is upward or downward, the transition from “ascription to achievement” and vice versa should be expected. Although the ISSP surveys give a unique possibility to follow the transition, nobody has compared the three Hungarian datasets before.

Political system change in Hungary began in 1989 and finished in 1993. The process and the new political roles stabilized between 1993 and 1998. It is important to mention that while 1989 is in fact a turning point in political changes, economic transformation processes began earlier. At the beginning of the 1980s, the national debt per capita increased, and both the pace of economic development and the improvement of living conditions decelerated. The former dual (primary and secondary) economy emerged into a dual society combining redistributive features and market elements (Kolosi 1988); this process was unique among the former state socialist countries. 1987 is the last year preceding the system change, when the macroeconomic problems have already appeared. The period of 1992-1995 is the worst of the transition process from many points of view. Level of industrial production and real value of incomes have reached their minimum in this time, inflation rate and rate of unemployment peaked as well. After this decline a clear upturn appeared, while structural economic and social transformation has largely finished by 1999.

1.3 Theoretical Background, Former Investigations

According to Treiman's *modernization hypothesis*, rapid technological innovation and economic development leads to a more complex and differentiated labor market in which efficient selection processes are needed (Treiman 1970). The labor market changes into one with a growing need for highly qualified employees working in specialized jobs in the industrial and service sector, and the educational system expands to satisfy this growing need. Efficient selection processes imply meritocratic principles; it is not family background but individual qualities that determine school success and occupational achievement in modern societies. If the economic aspect of transition is emphasized, modernization hypothesis would predict decrease in the impact of family background on educational achievement.

Luijkx et al. (1997) tested Treimans's hypothesis on Hungarian data from 1973-1993. They found the increasing trend for achievement and the decreasing trend for ascription, however, for both trends they found a reversal: both trends started to turn back to some extent after the mid-1980s. According to their comments these results basically confirm the industrialization hypothesis by taking into account decline in modernization and industrialization from the mid-eighties.

With respect to Hungary, earlier research on consequences of the communist take-over after 1949, especially on the consequences in the *educational* inequalities has come up with quite different results. Some studies observed change, others did not. Simkus and Andorka (1982) argued that inequalities appeared to decrease at the lower levels, but the effects of fathers' occupation on educational transitions at the higher levels turned out to be stable over time.

In the following the focus is on *intergenerational occupational mobility*. Former studies on intergenerational mobility under socialism concluded that general association between fathers' occupation and sons' or daughters' first occupational positions has decreased for the older cohorts but that the decline has diminished for the youngest (Wong and Hauser, 1992). Andorka and Zagorski (1980) found that mobility responses to political action are only visible with regard to the restructuring of the labor market, especially agricultural collectivization process and forced industrialization.

Students of *subjective intergenerational occupational mobility* arrived at the conclusion that respondents living in socialist countries were less likely to report upward mobility as compared to respondents in market-regulated countries before 1989 (Róbert, 1999). By employing Hungarian ISSP data from 1999 Róbert (1999) observed that perception of mobility is behind actual mobility, although objective mobility has a significant effect on mobility attitude.

In a similar way, *subjective social position* is determined not only by objective social position. Perception of social class is shaped by many factors. Reference-group theory holds that people perceive the world as an enlarged version of their reference group. They access their own class conditions in light of the people around them, hence most people locate themselves near the middle of the class hierarchy (Simpson et al. 1988, Evans et al., 1992). In this study determinants of subjective social position are occupational status, educational achievement, income (most important objective status dimensions) and subjective intergenerational occupational mobility. The latter one was involved in a causal model describing determinants of subjective social position by Róbert and Sági as well (1992), and it was found to have strong influence on subjective position even after controlling for demographic variables. In this study objective mobility does not appear among the determinants of subjective mobility (see Figure 1), since it is assumed to have an influence on the latter one only through its subjective perception.

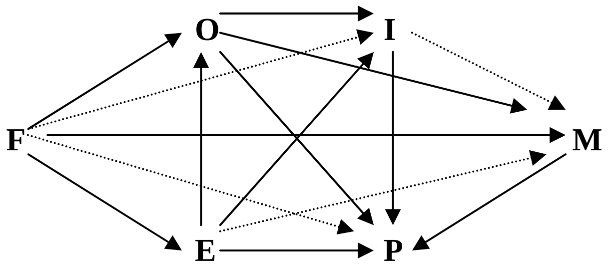
2 METHODS

2.1 The Model

This paper discusses a model representing causal relations. Assumption of a cause-and-effect relationship is hard to justify in general. Among two simultaneously changing variables, one can be the cause of the other and vice versa (cf. mental disorders - economic background). The present case is clearer since either a time ordering among the variables (e.g. paternal occupation $\rightarrow$ education) or logical considerations (subjective mobility $\rightarrow$ subjective position[4]) suggest possible causal relationships.

A model describing the association structure among the six variables involved, i.e. their joint distribution can be defined by a directed acyclic graph (see Figure 1). In this case a variable is assumed to be conditionally independent from its nondescendants, given its ancestors, where nondescendants are the nodes from which no directed path leads to the variable, and parents are the nodes from which arrows points to the variable. In the figure arrows not included in the model but pertaining to possible effects are marked by broken arrows. All the arrows form a complete graph, which can be easily proved: exactly 5 in/out arrows pertain to each node.

Figure 1. The Causal Model



F: father's occupational status
O: occupational status
E: education
I: income
P: subjective social position
M: subjective occupational mobility

[4] The direction can be justified in a purely exploratory way as well, by comparing goodness of fit results between the given model and the one with the effect reversed. Model obtained by reversing the M-P arrow in Figure 1 shows a bad fit for each year when measuring fit by likelihood-ratio statistics: 1987: 60.17 (p=0.00698), 1992: 95.13 (p=0.00000), 1999: 57.799 (p=0.01204). Compare these goodness-of-fit test statistics to the ones in Section 3.

Possible relationships among F, E, O and I are based on Treiman's hypothesis[5]. Assumption of relations between the subjective factors and the objective ones is based on former investigations as described in Section 1.3

The model can be equivalently defined by conditional independences:

$$I \perp FM \mid OE,$$

$$P \perp F \mid EOIM, \quad (1)$$

$$M \perp EI \mid FO.$$

The aim of our analysis is primarily not to test whether the model fits the data, since the model is not intended to be a full-scope one (e.g. subjective perception also has mental determinants etc). Rather the values of marginal log-linear parameters (as proposed in Rudas, Bergsma, 2004) are of interest to gain insight into the strengths of associations and into their change over time.

2.2 Sample, Definition Of Variables

The universe in case of income-related questions consisted of respondents being in the labor market, and those who never had a work were out of subjective mobility's universe. Hence final sample employed in the analysis involves only respondents who were in paid work at the time of the surveys. Cases with missing values for any of the six variables are excluded. 0.5 is added to every empty cell, in order to avoid sampling zeroes. Final sample sizes are as follows:

1987: 1452
1992: 963
1999: 830

Weighting factors included in the original datasets are used in the analysis, by transforming them to keep sample size unchanged.

Due to the limitation coming from the sample size of 1000, we aimed to reduce number of categories when defining variables. *Educational achievement* is defined as binary variably with categories 1: "high school or university" and 0: "lower than high school". *Income* is also used as binary variable, respondent's monthly earnings were categorized into the classes 0: "below median" and 1: "above median" in order to correct for inflation. Dichotomization of *subjective social class* was carried out by grouping together 1-5 (1: "upper class") and 6-10 (0: "lower class") classes. In case of *subjective mobility* three categories were formed as 0: "downward", 1: "about equal", 2: "upward".

Definition of *occupational status* and *paternal occupational status* was the most difficult to complete. It was hard to find a common intersect of the three years' questionnaires. On the other hand, content and prestige of some occupation has actually changed during this period. To capture intergenerational occupational mobility it would be most adequate to use the

[5] Paternal educational achievement was also included in the original hypothesis, but was not asked in the ISSP 1987 questionnaire.

respondent's first job, but this information was not gathered for all of these three years. Finally two categories were formed: 1: "high prestige" (non-manual occupations with manual supervisors and foremen included), and 0: "low prestige" (skilled, semi-skilled, unskilled manual workers, farmers and farm laborers). The classification corresponds to the EGP10 occupational prestige scale (which is widely accepted as the international standard for the categorical classification of occupations): the last four EGP classes are grouped together as "low prestige" category. Occupations were recorded according to ISCO 1968 scheme in 1992, their conversions into EGP was carried out by using a standard algorithm[6].

2.3 Statistical Methods

Parameter estimates

The model defined by the graph in Figure 1 is a marginal model. A marginal model imposes structural restrictions on certain *marginals* (i.e. subsets) of the variables involved in the analysis. There are many ways to define marginal *loglinear* parameters, the definition used here corresponds to effect coding. Model parameters are associated with the arrows in the graph and their values can be interpreted in an intuitively obvious way.

Graphical loglinear modeling is a plausible alternative of the popular LISREL approach, since in LISREL, numbers assigned to the arrows are regression coefficients of different marginal regression equations and their consistency cannot be checked. In the marginal loglinear approach a model is specified with respect to the entire joint distribution hence contradicting model specifications are impossible (Rudas, Bergsma, 2004). The analysis of the model in Figure 1 was repeated by applying path analysis (about the methods and results see Section 5) [7].

The parameterization of marginal log-linear models defined by directed acyclic graphs is based on the adjacency relations of the nodes, where the set M of marginals consist of the nodes and their ancestors. In the present case the set M, in an ordering that gives hierarchical parameterization, is the following: F, FE, FEO, EOI, FOM, EOIMP.

Elements of **M** with the corresponding subsets **L** give the set of ordered pairs which characterize the set of parameters [8]:

M	**L**
F	ø, F
FE	E, FE
FEO	O, EO, FO, FEO
EOI	I, OI, EI, EOI
FOM	M, OM, FM, FOM
EOIMP	P, EP, OP, IP, MP, EOP, EIP, EMP, OIP, OMP, IMP, EOIP, EOMP, EIMP, OIMP, EOIMP

The corresponding hierarchical marginal loglinear parameters are $\lambda_{\emptyset}^{F}$, λ_{F}^{F}, λ_{E}^{FE}, λ_{FE}^{FE} … λ_{EOIMP}^{EOIMP}. Hierarchical ordering of set of ordered pairs follows from construction.

[6] Downloaded from H. van de Werfhorst's page at http://users.fmg.uva.nl/hvandewerfhorst/occrecode.htm
[7] About this method see for example Agresti, A. (2002) *Categorical Data Analysis*, Wiley, P217-219.
[8] About the definition of this parameters see Rudas, Bergsma 2002.

The number of the above parameters is 32. The other parameters needed for total parameterization (their number is 32, because $2^6 = 64$ is needed overall) are set to zero according to the model. These parameters can be easily obtained with the help of a proposition that is for constructing a complete and hierarchical parameterization for any incomplete hierarchical set of parameters (Bergsma, Rudas, 2002):

$$\lambda_{IM}^{EOIMP}, \lambda_{EIM}^{EOIMP}, \lambda_{OIM}^{EOIMP}, \lambda_{EOIM}^{EOIMP}, \lambda_{EM}^{EOIMP}, \lambda_{EOM}^{EOIMP},$$

and

$$\lambda_{*}^{FEOIMP},$$

where * is:

FI, FP, FEI, FEM, FEP, FOI, FOP, FIM, FIP, FMP, FEOI, FEOM, FEOP, FEIM, FEIP, FEMP, FOIM, FOIP, FOMP, FIMP, FEOIM, FEOIP, FEIMP, FOIMP, FEOMP, FEOIMP.

The number of cells in the six dimensional $F \times E \times O \times I \times M \times P$ table is $2 \times 2 \times 2 \times 2 \times 3 \times 2 = 96$, i.e. the joint distribution can be parameterized by 96 non-redundant parameter values. Since variable S has 3 categories, 2 non-redundant parameter value pertain to each (L_i,M_i), $i = 1…64$ parameter which contains S as a subset in its L_i element. There are 32 such parameters, so we obtain $32 \times 2 + 32 = 96$ parameter value as it was expected. Among them $12 + 20 \times 2 = 52$ are set to zero, hence the model's degree of freedom is 44.

The maximum likelihood estimate of the distribution under the model can be obtained by Wicher Bergsma's Mathematica routine[9]. The routine's input are the observed frequencies, the values of fixed parameters (zeros in our case) and the matrices needed to obtain the fixed parameter values from the frequencies. Definition of the latter matrices goes in an uneasy way, mostly if we have many variables. For those who are interested in reproducing the computations of this study employing their own data set: my routine which gives a solution for the definition of these matrices, and other additional materials can be found on my home page at www.tatk.elte.hu/~nemeth.

Test of model fitting

Likelihood ratio test statistics is used for testing goodness of fit of the model. The model's degrees of freedom is 44, as computed above.

Test of significance of parameters

Significance of a parameter pertaining to a given arrow was tested by performing likelihood-ratio test to test the model with the given arrow excluded against the original model. E.g., significance of $F \rightarrow E$ was tested by performing an LR test on the model with the arrow

[9] The routine can be downloaded from:
http://www.uvt.nl/faculteiten/fsw/organisatie/departementen/mto/software2.html.print

excluded (which can be obtained from the original one by setting λ_{FE}^{FEO} to zero) against the original model.

Test of changes over time

Significance of changes in parameters between 1987-1992, 1992-1999, and 1987-1999 was also tested. This significance can be tested by setting the corresponding parameter to zero. E.g. when investigating change in parameter λ_{EP}^{EOIMP} between 1987 and 1992, joint distribution of variables F, E, O, I, M, P, T should be considered, where T is a binary variable coding time. 2×96=192 non-redundant parameters identify the distribution uniquely. In order to keep our original model unchanged, conditional statements (see Equation 1) on the FEOIMP|T=1987 and FEOIMP|T=1992 conditional distributions should hold. These statements imply setting 2×52=104 parameters to zero. As our aim is to define uniform parameter over time, an additional restriction is needed: parameter λ_{EPT}^{EOIMPT} is set to zero. The model defined in this way is a marginal loglinear model, since the statements in Equation 1 pertaining to conditional distributions can be also expressed by parameters of the entire joint distribution, for example:

$$\begin{gathered}\left(\lambda_{IM}^{EOIMP} \mid T=1987\right)=0=\left(\lambda_{IM}^{EOIMP} \mid T=1992\right) \\ \Updownarrow \\ \lambda_{IM}^{EOIMPT}=0=\lambda_{IMT}^{EOIMPT}\end{gathered} \qquad (2)$$

When implementing the problem in Mathematica we made use of Equation 3, which states that uniformity over time can be reduced to equality of parameters pertaining to conditional distributions:

$$\begin{gathered}0=\lambda_{EPT}^{EOIMPT} \\ \Updownarrow \\ 0=\left(\lambda_{EP}^{EOIMP} \mid T=1987\right)-\left(\lambda_{EP}^{EOIMP} \mid T=1992\right)\end{gathered} \qquad (3)$$

3 RESULTS

The LR test gives the following p-values:

1987: LR = 49.69, p = 0.257
1992: LR = 54.37, p = 0.136
1999: LR = 49.70, p = 0.257,

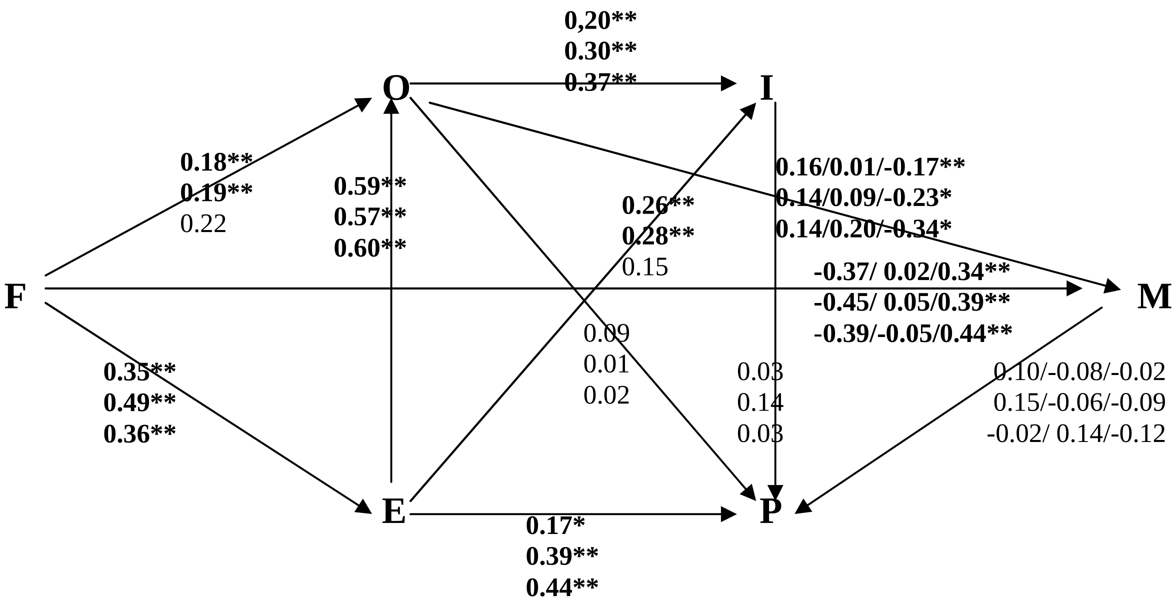
which would imply that the model fits the data well.

Figure 2 presents the parameter estimates. Three different estimates can be found on each arrow corresponding to 1987, 1992, and 1999 (up to down). The values assigned to the arrows belong to the value(s) of the corresponding parameter:

Arrow	*Parameter*
F → E	$\lambda_{FE}^{FE}(1,1)$
F → O	$\lambda_{FO}^{FEO}(1,1)$
E → O	$\lambda_{EO}^{FEO}(1,1)$
O → I	$\lambda_{OI}^{EOI}(1,1)$
E → I	$\lambda_{EI}^{EOI}(1,1)$
O → M	$\lambda_{OM}^{FOM}(1,1)$, $\lambda_{OM}^{FOM}(1,2)$, $\lambda_{OM}^{FOM}(1,3)$
F → M	$\lambda_{FM}^{FOM}(1,1)$, $\lambda_{FM}^{FOM}(1,2)$, $\lambda_{FM}^{FOM}(1,3)$
E → P	$\lambda_{EP}^{EOIMP}(1,1)$
O → P	$\lambda_{OP}^{EOIMP}(1,1)$
I → P	$\lambda_{IP}^{EOIMP}(1,1)$
M → P	$\lambda_{MP}^{EOIMP}(1,1)$, $\lambda_{MP}^{EOIMP}(1,2)$, $\lambda_{MP}^{EOIMP}(1,3)$

Significant parameters are in boldface; within this * assigns significance at level 0.05, and ** assigns significance at level 0.01.

Figure 2. Parameter Estimates



The parameters can be derived from odds ratios which gives a straightforward interpretation to them. E.g. if A, B and C are binary:

$$\lambda_{AB}^{AB}(1,1) = \frac{1}{4}\ln OR(AB),$$

$$\lambda_{ABC}^{ABC}(1,1,1) = \frac{1}{8}\left[\ln OR(AB \mid C=1) - \ln OR(AB \mid C=2)\right], \qquad (4)$$

$$\lambda_{AB}^{ABC}(1,1,1) = \frac{1}{8}\left[\ln OR(AB \mid C=1) + \ln OR(AB \mid C=2)\right],$$

from which we obtain:

$$\left[\exp\left(\lambda_{AB}^{AB}(1,1)\right)\right]\wedge 4 = OR(AB),$$
$$\left[\exp\left(\lambda_{ABC}^{ABC}(1,1,1)\right)\right]\wedge 8 = \frac{OR(AB \mid C=1)}{OR(AB \mid C=2)}, \qquad (5)$$
$$\left[\exp\left(\lambda_{AB}^{ABC}(1,1,1)\right)\right]\wedge 4 = \sqrt{OR(AB \mid C=1) * OR(AB \mid C=2)},$$

where OR stands for odds ratio. According to the third equation in Eq 5, λ_{AB}^{ABC} can be transformed to get the geometric mean of OR(AB | C = i).

Figure 3 shows the result of the test of changing over time, when parameters pertaining to Treiman's hypothesis are investigated. Broken line assigns non-significant change, normal line assigns significance at level 0.07, while thick line assign significance at level 0.05. As a help, the title of the figure tells what kind of trend is predicted by modernization hypothesis in case of the given parameter. Test results of the change in the other parameters are displayed in Table 1, where 0 assigns non-significant change, * / 0 assigns significance at level 0.07, and * assigns significance at level 0.05.

Figure 3. Change In Parameters Pertaining To Treiman's Hypothesis

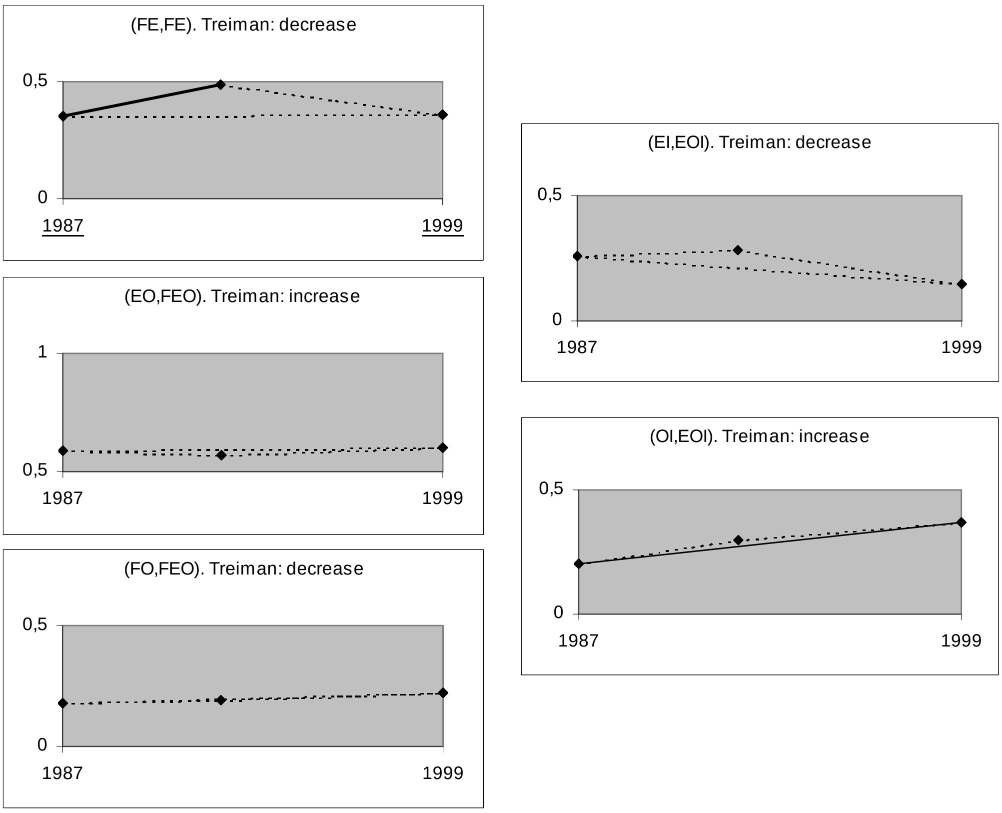


Table 1. Test Of Change In Parameters Not Pertaining To Treiman's Hypothesis

	1987-1992	*1992-1999*	*1987-1999*
λ_{OM}^{FOM}	0	0	*
λ_{FM}^{FOM}	0	0	0
λ_{EP}^{EOIMP}	* / 0	0	*
λ_{OP}^{EOIMP}	0	0	0
λ_{IP}^{EOIMP}	0	0	0
λ_{MP}^{EOIMP}	0	0	0

The first research question…

… is to test the modernization hypothesis, i. e. to investigate whether there have been significant change in the relations between paternal occupational status, education, occupational status and income. By formalizing Treiman's hypothesis, it predicts that modernization leads to a decrease in parameters λ_{FE}^{FE}, λ_{EI}^{EOI}, λ_{FO}^{FEO} and an increase in parameters λ_{EO}^{FEO}, λ_{OI}^{EOI}.

The effect pertaining to F → E in Figure 2 say that respondents having a higher occupational prestige father have a 4-7 times greater chance to achieve higher educational level (to get odds ratios from the parameters see Equation 5). Moreover, this effect increased significantly between 1987 and 1992, after that it falls back to a level around the 1987's one.

Parameter pertaining to E → O shows the effect of Education on Occupation averaged on Father's occupation (see the third equation in Eq 5). Results show that Education has a strong, significant effect on Occupation, those with higher educational level have 10-11 times greater chance to have a higher prestige occupation. There is no significant change over time.

Interpreting effect of F → O in a similar way, we observe that the averaged odds ratio has a value of 2-2.5, which shows a moderate positive effect, i.e. respondents with higher-prestige father are more likely to have a higher prestige occupation. On the other hand, the effect is no more significant in the year of 1999. Education has a stronger effect on Occupation, than Father's occupation. No significant change in time can be detected.

Parameter pertaining to E → I shows that Education has a moderate positive impact on Income, which looses its significance by 1999. The effect is unchanged between 1987 and 1992, then drops in the next period but with a non-significant decrease.

Occupation has a moderate significant positive effect on Income according to the values assigned to O → I. Strength of association has continuously increased, the change between 1987 and 1999 is significant at the level of 0.07.

The second research question…

… is the following: what is the effect of occupational status and paternal occupational status on subjective mobility? The answer to this question relies on parameters λ_{OM}^{FOM}, λ_{FM}^{FOM} but on λ_{FOM}^{FOM}, as well, since the joint effect of Occupation and Father's occupation on Mobility is also of our interest. Estimates pertaining to the latter parameter are displayed in Table 1.

Table 2. Parameter Estimates of the interaction FOM

	1987	*1992*	*1999*
$\lambda_{FOM}^{FOM}(1,1,1)$	0,03	0,03	-0,03
$\lambda_{FOM}^{FOM}(1,1,2)$	0,07	0,06	0,21
$\lambda_{FOM}^{FOM}(1,1,3)$	-0,10	-0,09	-0,18

Figure 2 shows that sign of parameters pertaining to F → M and O → M agrees with what could be logically expected: children of a father with lower prestige occupation are less likely to be downward mobile, while those with a lower prestige occupation have greater chance to mobilize upward. Both effects are significant in all three years. Table 1 shows that effect F → M has not changed significantly during the given period, but association between O and M has got to be stronger significantly between 1987 and 1999. Table 2 gives the result that there is a moderate joint effect of Occupation and Father's occupation on Mobility, which has slightly increased during the given term. Sign of interaction effect is mostly the same as expected, e.g. $\lambda_{FOM}^{FOM}(1,1,3)$ is negative which shows that those who reported upward mobility are less likely to have low prestige occupation, if their father also had low occupational prestige.

The third research question…

… refers to the objective and subjective determinants of subjective social position, and to the change in these relations during the given period. Figure 2 shows that Education has the strongest impact on Position. This association is significant during the whole period, moreover, it shows a significant increase between 1987 and 1999. Occupation, Income and Mobility have a non-significant positive effect on Position in all three years, which effect did not change in any of the periods investigated.

4 DISCUSSION

Answering the second research question

Association between Occupation and Mobility has become significantly stronger between 1987 and 1999 as opposed to the impact of Father's occupation, which shows that the role of the present occupation has become more important in the perception of mobility. The moderate but increasing joint effect of Occupation and Father's occupation on Mobility shows that there are other determinants of subjective mobility apart from the objective factors (presumably individual psychological factors etc), but their importance has been slightly falling.

Answering the third research question

In our findings occupational prestige and income - which generally are considered to be independent and important status indicators - do not have a significant effect on subjective class position which confirms the relativity of subjective self-classification. Subjective mobility did not show a significant effect on subjective position neither, which contradicts to Róbert and Sági's findings (1992).

Answering the first research question

When investigating changes between 1987 and 19999, results agree with or at least do not disprove Treiman's hypothesis. Effect O → I has become stronger, effect E → I and effect F → O has lost its significance by 1999, while the other parameters have not changed. If the period is split into two sub-periods, an important process appears: effect F → E significantly increases between 1987 and 1992, while – according to the hypothesis – drops back in the second sub-period, following a U-shaped curve. This observation indicate that the given period is not homogeneous, it should be split into two sub-periods according to most of the economic indicators which followed a J-shaped curve during this time, as mentioned in Section 1.2. These findings are in accordance with Luijkx et al's results(1997), who indirectly confirmed the validity of Treiman's modernization theory on Hungarian data from 1910-1993. They found that the theory cannot be demonstrated for Hungary precisely, because the theory is valid only during the periods of industrialization and economic growth. To sum our results up, according to our findings transition process should not be considered a homogenous social process, the early reorganization and the subsequent rising up should be distinguished.

There are further questions to be considered. It would be useful to broaden our scope by employing ISSP data from other former state-socialist countries, since quasi-market forms existing in Hungary before 1989 were unique among the other socialist countries. Similarly, market-regulated countries e.g. the Netherlands, GB, Italy or the USA (each representing a distinct type of welfare state and employment structure) would be also interesting to involve in the analysis in order to detect possible changes in a balanced non-revolutionary situation.

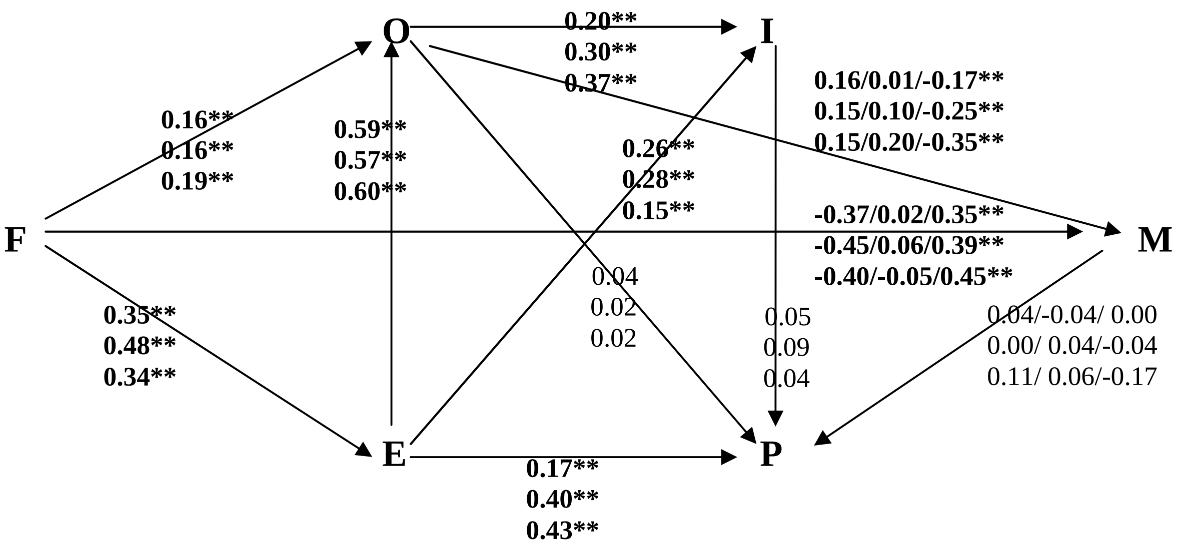
5 APPENDIX: SOLVING THE PROBLEM BY PATH ANALYSIS

Strengths of associations in causal models are usually measured by performing path analysis and using regression equations. Each variable at a tip of an arrow is a response for a regression-type loglinear model. The explanatory variables are those from which directed path leads to the response node. Interactions that do not contain the response are all allowed in the model. Figure 4 displays the models investigated. The models are hierarchical models, hence they are identifiable by their higher order interactions (see the third column).

Response	*Explanatory variables*	*Model*	*Parameters of interest*
E	F	FE	FE
O	FE	FEO	FO,EO
I	FEO	EOI,FEO	OI,EI
M	FEOI	FOM,FEOI	OM,FM
P	FEOIM	FEOIM,EOIP,OMP	EP,OP,IP,MP

Significance of an effect pertaining to an arrow was tested by performing likelihood-ratio test, when the hierarchical model with the given interaction excluded against the hierarchical model with the interaction included was tested. E.g., significance of F→O was tested by performing an LR test with the model (FE, EO) against the model (FEO), where the hierarchical model (FE, EO) = (FE, EO, F, E, O, ∅) was obtained from the hierarchical model (FEO) = (FEO, FO, FE, EO, F, E, O, ∅) by excluding FO and keeping hierarchy condition.

Figure 4. Parameter Estimates By Path Analysis



Results show close agreement to those obtained by marginal loglinear analysis.

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