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Modernization and Social Fluidity in Hungary, 1870–1950

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Abstract

This article addresses how modernization processes influenced social openness in Hungarian municipalities between 1870 and 1950. Our focus is on relative occupational mobility, which reflects the underlying pattern of inequalities in attaining class positions. We derive hypotheses from the 'theory of industrialization' on the association between social fluidity and modernization processes. We test these for a late-industrializing country, Hungary. A large-scale historical micro-data set, spanning the period 1870–1950 is used to construct 633 mobility tables based on marriage cohorts within 62 municipalities. We specify parsimonious association models to estimate social fluidity from each mobility table, and test our hypotheses in a subsequent step, using multivariate regression analyses with cohort-and-municipality–based indicators of modernization processes. We use a stronger explanatory design than previous studies by including fixed effects to control for stable historical municipal characteristics. We find that increasing educational opportunities led to a decline in nonagrarian manual and nonmanual class rigidities, and that industrialization decreased class rigidities of the nonmanual classes. Agrarian class reproduction was unaffected by modernization. Modernization processes explain most of the temporal variation in the social fluidity of manual classes.

Introduction

Modernization has shaped societies in important but contested ways. The question at the heart of the debate is whether modernization processes break down social barriers, leading to greater equality of opportunity, or social 'fluidity', and the literature has yet to reach consensus on this point (Blau and Duncan, 1967; Parsons, 1967; Landes, 1969; Featherman, Jones and Hauser, 1975; Kerr, 1983; Erikson and Goldthorpe, 1992; Ganzeboom, Luijkx and Treiman, 1989; Goldthorpe, 1985; Breen 2004). Modernization theory (Parsons, 1967; Landes, 1969) predicts a secular process of increasing openness as societies modernize. A vast literature investigates this claim by studying whether there is variation in intergenerational mobility across countries and periods (Hauser and Grusky, 1988; Ishida, Goldthorpe and Erikson, 1991; Erikson and Goldthorpe, 1992; Breen and Whelan, 1994; Ringdal, 1994). Some studies have found cross-sectional or temporal variation in class fluidity (Ganzeboom Luijkx and Treiman, 1989; Breen, 2004; Beller and Hout, 2006; Breen and Jonsson, 2007), while others did not (Ishida Goldthorpe and Erikson, 1991; Ringdal, 1994; Yaish, 2004). The growing number of studies on long-term social mobility shows divergent temporal patterns in fluidity. Social fluidity in Britain increased between 1839 and 1914 (Miles, 1994), while in the United States, there was a decrease between the late 19th century and the 1960s (Guest, Landale and McCann, 1989). France and the Netherlands did not experience change in social fluidity (van Leeuwen and Maas, 1997; Bourdieu, Ferrie and Kesztenbaum, 2009). In Sweden and Hungary between the 1860s and 1940s, certain class barriers to mobility became weaker, while others upheld their strength, or became even stronger (Lippényi, Maas and van Leeuwen, 2013a; Maas and van Leeuwen, 2002).

Descriptions of long-term mobility trends do not give direct answers as to why there are divergent trends. To solve this problem, a number of studies investigated which macro-level modernization processes influence social fluidity by measuring the effect of country- or regional-level modernization on fluidity (Hazelrigg and Garnier, 1976; Tyree, Semyonov and Hodge, 1979; Grusky, 1983; Grusky and Hauser, 1984; Treiman and Yip, 1989; Breen, 2004; Zijdeman, 2009). A major difficulty to explain fluidity is the potentially large number of historical–institutional factors that may influence both historical modernization and changes in fluidity, and could serve as an alternative explanation (Breen, 2004). The majority of studies is based on small cross-sectional samples of countries or regions, and while some studies control for a few measureable characteristics such as political democracy (e.g. Tyree Semyonov and Hodge, 1979) no study up to now used a research design that controls for unmeasured historical factors. It is certainly also challenging for mobility researchers to obtain comparable measures of the inequality of opportunity, notably so over time. Studies that use upward/downward mobility rates (Hazelrigg and Garnier, 1976; Tyree Semyonov and Hodge, 1979) or intergenerational status associations (e.g. Zijdeman, 2009) do not distinguish between 'relative mobility' that reflects underlying class inequalities and 'structural mobility' that reflects the pattern of occupational distribution and its shifts over time (such as the historical decline in the agrarian production). These measures of mobility are therefore more difficult to compare over time and contexts, and also more difficult to compare with other measures of intergenerational association, which filter out structural influences (e.g. Grusky and Hauser 1984; Breen, 2004).

Our study is a test of the 'theory of industrialization' (most succinctly formulated by Treiman, 1970), which outlines the mechanisms through which specific modernization processes, such as educational expansion, urban population growth, and growth of industrial production, break down social barriers to mobility. We test modernization mechanisms directly by estimating the effects of modernization indicators, measured over time on the level of municipalities, on the degree of social fluidity. Our empirical analyses are based on the recently collected Hungarian Historical Social Mobility File (Lippényi, Maas and van Leeuwen, 2013b), a large mobility data set constructed from marriage records. The data set contains mobility data for every region of present-day Hungary between 1870 and 1950. Altogether, it relates to ~73,000 marriages from 62 municipalities, representing variation in municipal development in Hungary. We improve explanatory analyses of social fluidity and conduct stronger tests of the theory of industrialization than previous studies by estimating municipal fixed effects models to control for unmeasured historical characteristics of the municipalities.

The society we study, Hungary during its early modernization period between 1870 and 1950, has been relatively less explored in research. Mobility studies have shown that the intergenerational association in Hungary had decreased before the communist restructuring in the 1950s (Simkus, 1981; Ganzeboom, De Graaf and Róbert, 1990; Lippényi, Maas and van Leeuwen, 2013a). As one of the later-industrializing nations, Hungary's industrial production, transport, and educational institutions began to modernize before World War I (WW I) (Berend and Ránki, 1974; Berend, 2003). Local differences in opportunities were profound in Hungary during its early modernization, as municipalities were less interconnected by transportation and labor force mobility than today, and geographical inequalities in access to schooling and to industrial jobs were large (Beluszky, 2001; Beluszky and Győri, 2005).

Modernization Processes in Hungary and Social Fluidity

Education

In Hungary, during the 19th and early 20th century, there was a substantial increase in the proportion of the population enjoying primary education. The illiteracy rate dropped from around 70 per cent in the mid-19th century to 33 per cent by 1913 and to 6 per cent by 1949 (Dányi, 1964) as a result of efforts to eradicate educational inequalities by establishing elementary schools in rural areas (Kövér and Gyáni, 1998). Secondary schools were to a great extent available only in towns. Academic educational trajectories (the humanities-oriented *Gymnasium* or science-oriented *Reálschool* and university) were a privilege of the few (Simkus and Andorka, 1982).

It has been debated how educational expansion is related to the persistence of class inequalities in educational and occupational opportunities (e.g. Shavit and Blossfeld, 1993; Breen and Jonsson, 2007; Ballarino *et al.*, 2009; Breen *et al.*, 2009). Shavit and Blossfeld's (1993) and Breen *et al.*'s (2009) findings for multiple countries show that secondary educational expansion in the 20th century led to an equalizing in chances of the lower strata to enter secondary education; the evidence for the effect of educational expansion on the higher level is, however, more mixed. These studies did not investigate the period of expansion in primary education as we are able to do here.

In traditional societies, literacy, knowledge, or social norms are largely transmitted through kinship and family because formal education is not institutionalized. In modern societies, educational institutions take over a large part of this role, and are also the most important agents in labor market allocation (Kerckhoff, 1995). By being taught a standardized educational curriculum, pupils are able to increase their acquaintance with universal knowledge and with different social settings. This provides them with opportunities to acquire occupational skills different from those of their parents (Treiman, 1970). Schools are expected to transmit meritocratic norms, through the evaluation of their pupils based on academic (or other) performance, by public examinations and via the discussion of universal norms in scientific subjects (Parsons, 1967). Some scholars, however, argue that educational institutions reinforce social class differences through selection and evaluation favouring higher classes (Bourdieu and Passeron, 1977; Collins, 1979). The expansion of primary education in Hungary between 1850 and 1950, however, especially meant that lower class children and children from rural areas got access to knowledge and skills necessary to enter nonmanual and skilled occupations. Based on these arguments, we expect greater social fluidity in places with more primary educational opportunities (*H1*).

Transport and Population Size

The Hungarian railroad system expanded rapidly from the end of the 19th century onward. From 2,000 kilometers in 1867 it grew to 22,000 kilometers in 1913. Rail density became especially advanced, approaching Western European standards (Berend and Ránki 1974). The development of transport facilitated geographic mobility, and the share of the population living in cities increased. In 1870, around 20 per cent of the populace lived in towns and cities, increasing to 30 per cent before WW I, and to 35 per cent in the 1930s (Census, 1930, 1935; Dányi, 1998).

According to the theory of industrialization (Treiman, 1970), the increasing size of rather anonymous communities and growing possibilities for geographic mobility provided opportunities to meet others outside the sphere of kin and village, with other norms, values, and knowledge. This lessened the influence of parental class-based norms and values on occupational choices. In large cities, it is also more difficult for employers to select candidates on the basis of parental social class, as they can be from other places and there is less information available about their social backgrounds. Furthermore, it is easier in large urban communities to access information of value for attaining a new class positions via local newspapers and libraries. Therefore, the class-based inequality of access to such assets will be less. We expect that social fluidity will be greater in places with larger population size (*H2a*) as well as in places with more opportunities for geographic mobility (*H2b*).

Industrialization

In the decades before WW I, the Hungarian economy experienced a relatively large-scale upsurge in industrial production, most importantly in the food, milling, and steel industry (Berend and Ránki, 1974; Good, 1984; Eddie, 1989; see also the Supplementary Appendix A to this article). Hungary's economic productivity was more modest after WW I. The modernization processes of industrialization, transport, and educational reforms increased inequalities across Hungary's regions and municipalities (Beluszky and Győri 2005; Beluszky, 2001). During the late 19th and early 20th century, Central Hungary (Budapest and surrounding) and certain areas of Transdanubia industrialized strongly (Beluszky, 2001) and experienced an enormous population growth owing to the influx of migrants (Dányi, 1998), while the Eastern part of the country remained predominantly agrarian. A good indication of unequal modernization is that a high number of official towns had a large share of agrarian population. Around 300 settlements—almost three times more than the 'official' number of towns—had urban amenities already in 1910 (Beluszky and Győri, 2005).

In preindustrial economies, there is a strong association between assets such as land, property and craftsmanship, and social class. Labor is often small scale and organized along familial or kinship lines. With industrialization the production of goods becomes increasingly mechanized and divided into a discrete set of operations, which are not carried out by the same person (Treiman, 1970). As a consequence, demand decreases for crafts and farming and for the associated skills providing entry to manual occupations. Moreover, industrialization implies the creation of new occupations concerned with supervising factory production or maintaining industrial machinery as well as administrative and clerical work (Lipset and Zetterberg, 1959). Selection into such jobs is likely to be based on skills and experience for they are complex and demand more responsibility because of the larger scale of production. Formal training is required, which cannot be acquired via family or kinship. All these processes lead to a reduction of the effect of parental class' resources, such as occupational practice, tools, and craftsmanship on inequality in class outcomes. Our hypothesis then is that social fluidity will be higher with greater industrialization of the local economy (*H3*).[1]

Political regimes, and especially democratic shifts, may influence the extent of social fluidity, but such influences are not expected for Hungary in the period studied. Arguably, both the Austro-Hungarian Monarchy (1867–1918) and the period of Admiral Horthy's governance (1919–1946) were similar in their 'conservative-authoritarian' institutional character (Berend, 1998). Major democratic changes were short-lived, such as the democratic and Bolshevik revolutions in 1919, and the multiparty democratic governance between 1945 and 1947 before the Hungarian Communist Party took power in 1948 to establish a soviet-type socialist state. We control for cohorts that married in these periods in our analyses.

We do not consider potential differences in the social mobility patterns of different ethnic and religious groups in Hungary. Pre-WW I Hungary was multiethnic, but the vast majority of ethnic minorities lived outside the borders of present-day Hungary and are therefore not present in our data. The population of the territory of present-day Hungary was rather ethnically homogeneous and predominantly Christian (see Supplementary Appendix A). While ethnic minorities were certainly overrepresented in certain professions (see [Don and Karády, 1990] on historical occupations of the Hungarian Jews), their number in our data set[2] and in the population was small.

Data and Measures

Our data come from the Hungarian Historical Social Mobility File, a large-scale stratified sample of marriages from Hungarian parish registers (Lippényi, Maas and van Leeuwen, 2013b). All large denominations in Hungary (the Roman Catholic, the Hungarian Reformed, the Lutheran, and the Hungarian Israelite) maintained registers of marriages of members of their congregation in church books. We collected data, which are usually well preserved in local congregational archives, across the country. Marriage books usually contain information about occupations, along with other basic facts like the date and place of birth, place of residence, marital status, for bride and bridegroom, and for parents too. A sample of municipalities from present-day Hungarian territory has been drawn, stratified by type of municipality (ranging from rural villages to industrializing towns) and region. Within each municipality only those marriage records were digitized that included both bridegroom's and father's occupation. The amount and pattern of missing information showed no systematic variation across municipal strata. We ensured that the amount of digitized marriages did not differ greatly between municipalities—targets were 400 to 1,000 per village and 800 to 3,000 per towns—and was evenly distributed across time by performing random sampling in towns and periods with too many marriages (for specific details on sampling procedures, see Lippényi, Maas and van Leeuwen, 2013b).

Occupational titles have been coded into the Historical Intergenerational Standard Classification of Occupations (HISCO) (van Leeuwen, Maas and Miles, 2002) and recoded in the Historical International Social Class Scheme (HISCLASS) (van Leeuwen and Maas, 2011). HISCLASS has 12 occupational classes, but some classes were small in Hungary at the time. We collapsed HISCLASS into a six-class version, distinguishing between higher managers and professionals (including large proprietors and estate owners), lower managers and professionals and clerical and sales personnel, higher skilled workers (including artisans), farmers, lower skilled workers, and farm workers. Nonranked soldiers were excluded from the analyses because the majority of them were temporarily occupied in the military under mandatory conscription.

Intergenerational mobility tables have been constructed per municipality and per 5-year marriage cohort using class of the son and that of his father at the time of marriage of the son. We omitted bridegrooms who were born elsewhere and at the time of their marriage lived outside their place of marriage (7 per cent of all cases) because they were likely to be brought up in another municipality than their place of marriage, and thus our explanatory variables, measured for the municipality of marriage, do not accurately reflect their circumstances. Furthermore, to enable the estimation of the second-stage multivariate regression models, we excluded tables for which we could not estimate the complete set of mobility parameters, in most cases due to low sample size. Separate regressions for each mobility parameter using list-wise and pair-wise deletion of tables with nonestimable mobility parameters gave identical results, indicating that exclusion of incomplete tables does not induce bias. The total number of observations is 56,276 across 633 mobility tables from 62 municipalities.

A potential source of bias in marriage register data is that permanently single persons are omitted, and these may have differed from married individuals in their chances for class mobility. According to Hajnal's (1953, 1965) estimates, the number of males who were single at the ages of 45–49 ranged between 5 and 6 per cent in Hungary. Marriage records in Hungary therefore cover around 94–95 per cent of the total male adult population. Even though we cannot assess to what extent those who never married differed from their married counterparts, because the overwhelming majority of the population did marry at some point, the missing data on the never-married is very unlikely to lead to distortions.

The marriage certificates give a father's particulars at a moment his career was likely approaching its end, whereas only the first part of his son's career was completed. This is however true for all municipalities, social classes, and periods. If, however, bridegrooms in later periods were older (or younger), career mobility could confound the estimates of temporal change in the social fluidity. Similarly, if marital age changed over time for some classes only, this might cause bias in period comparisons of social fluidity. We assessed if this is the case for our Hungarian data. We found that average age at marriage was ∼26 and neither average age nor the variation in age (measured by the standard deviation) changed across periods. Furthermore, the average age at marriage of different classes of origin was largely similar, and apart from small fluctuations did not vary across time (Lippényi, Maas and van Leeuwen, 2013b).

Population size is defined as the number of inhabitants of a municipality, linearly interpolated to the year when the cohort married by using the two nearest censuses. Censuses were taken in 1869, 1880, 1890, 1900, 1910, 1920, 1930, 1941, and 1949 (Klinger and Kepecs, 1990).

Educational opportunities were measured as the number of teachers in primary education (HISCO minor group 1–3) present in the municipality in the period when the average-aged member of the marriage cohort was between 6 and 16. This period is chosen to correspond with the life period when the members of the marriage cohort potentially received schooling. We assumed that teachers taught for 30 years; based on their age at marriage teachers were counted for more tables to cover the 30-year period.

Geographical mobility opportunities were measured as the number of transport-related workers, e.g. conductors or locomotive engineers, who married in the municipality in the period when the average-aged member of the marriage cohort was between 15 and 25.[3] This period was chosen to correspond with the period when cohort members entered the labor market. We again assumed that transport workers were active on the labor market for 30 years.

Industrialization is measured by the relative size of the *nonagrarian manual class* among men who married in a municipality in the period when the average aged member of the marriage cohort was between 15 and 25, estimated from the marriages.[4]

We assessed the validity of the indicators of geographic mobility and education opportunities. We estimated the correlation between our indicator of transport and a dummy indicating if there was a passenger train station in the municipality.[5] The tetrachoric correlation coefficient–which shows the association between the latent continuous 'geographic mobility opportunity' variables, expressed through the two dichotomous indicators—is 0.688 ($P < 0.000$) showing moderate to strong degree of correspondence. We replicated our analyses with the train indicator, which resulted in the same substantial conclusions. The number of secondary school students in each municipality was available before 1915 for validating our measure of educational opportunities for the period 1870–1915. The Pearson correlation of the number of pupils with our measure is 0.661 ($P < 0.000$), evidencing a moderate to strong degree of correspondence. We wanted to perform a similar validation for primary schools but the number of elementary school pupils was not available on the municipal level. However, the validation for secondary education suggests that our way of measuring educational opportunities performs well.

To control for war and political changes, we added a dummy for WW I and its aftermath (cohorts 1915–1919 and 1920–1924) and for WW II and its aftermath (cohorts 1940–1944 and 1945–1950). We added the proportion of cases per cohort who were not born in the municipality of marriage as a control for migration.

Descriptive statistics of the independent variables are shown in Table 1. Figure 1 plots over time trends in modernization and intergenerational class mobility. The trend in industrialization follows what is generally known from the historical literature (Berend, 1998, 2003) about the economic development in Hungary. Hungary remained a predominantly agrarian nation. The economic boom in the late 19th century in West-

Table 1. Descriptive statistics—independent variables and controls

	Mean	St.d.	Min	Max
Urbanization				
Population size (10,000)	5.55	21.94	0.07	171.11
Educational opportunities				
Number of elementary school teachers who work in the municipality during formative period	3.47	4.44	0	30
Geographic mobility opportunities				
Number of transport workers who work in the municipality when entering the labor market	13.53	23.18	0	134
Industrialization				
Proportion nonagrarian manual labor force in cohort	0.34	0.22	0	1
Migrants				
Proportion of cohort members born outside of municipality	0.10	0.13	0	0.94
Proportion farmers within agrarian classes	0.66	0.29	0	1
Proportion skilled workers within manual classes	0.50	0.27	0	1
Proportion higher managers/professionals within nonmanual classes	0.13	0.20	0	1
WWI cohort	0.06		0	1
WWII cohort	0.17		0	1

Notes. $n = 633$ (municipalities × cohorts).

Europe increased demand for food products, leading to the growth of food and milling industry in Hungary and helping Hungarian farmers sustain their livelihood[6] (Berend, Ránki and Pálmai, 1982). Thus, early industrialization did not lead to dramatic shifts in the occupational distribution. There still was a considerable increase of the share of grooms working in manual occupations outside agriculture from about 30 per cent in the 1870s to 40–43 per cent before and during WW I. The percentage of nonagricultural workers dropped after the war, due to a long economic crisis which lasted until the Great Depression; and then increased as the economy recuperated in the late 1930s.

The substantial increase between 1870 and 1885 in the proportion of the municipalities enjoying educational opportunities reflects the effect of an educational reform in 1867 (Kövér and Gyáni, 1998), which financed the establishment of a large number of primary schools. Geographic mobility opportunities increased in the decades before WW I, as capital investments from the more developed part of the monarchy brought an impetus for the development of the railway system (Berend and Ránki, 1974).

Preceding our main analyses, we present developments in class-specific relative mobility in Figure 1. The diagonal association declined in all classes over time. The steepest decline occurred in the nonmanual classes: the odds of being immobile declined from 5.5 ($e^{1.7}$) to 1.9 ($e^{0.6}$), while there was only a minor overall decline in the odds of immobility in the agrarian classes (from 15.9 to 14.8).

Methods

To measure relative mobility in each mobility table, we specified a quasi-perfect mobility model (Goodman, 1965). This log-linear model includes origin and destination parameters controlling for changes in the class distribution across generations, and diagonal association parameters for the agrarian, manual, and nonmanual classes, which measure the extent of class inheritance.[7] The inheritance of the agrarian classes is probably higher if these classes contain relatively many farmers and few farm workers. A similar assumption can be made with respect to the manual and nonmanual classes. In the second-stage regressions, we therefore control for the (table-specific) proportion of farmers within agrarian classes, the proportion of higher managers and professionals within nonmanual classes, and the proportion of skilled manual workers within manual classes.

To estimate the effect of modernization processes on social fluidity, we took a two-stage approach. First, we estimated association parameters in each table, and in the second step, those parameters of relative mobility were regressed on explanatory variables. We used multivariate mixed-effects meta-regression analyses (White, 2009) to distinguish between-table variance—i.e. the 'true' variance in the magnitude of association, which we sought to explain using our covariates—from 'noise' coming from sampling variance in our first-stage social fluidity estimates.

We calculated a useful meta-analytical measure, I^2, which is the ratio of between-table and total variance in the association parameters. This measure can be used to

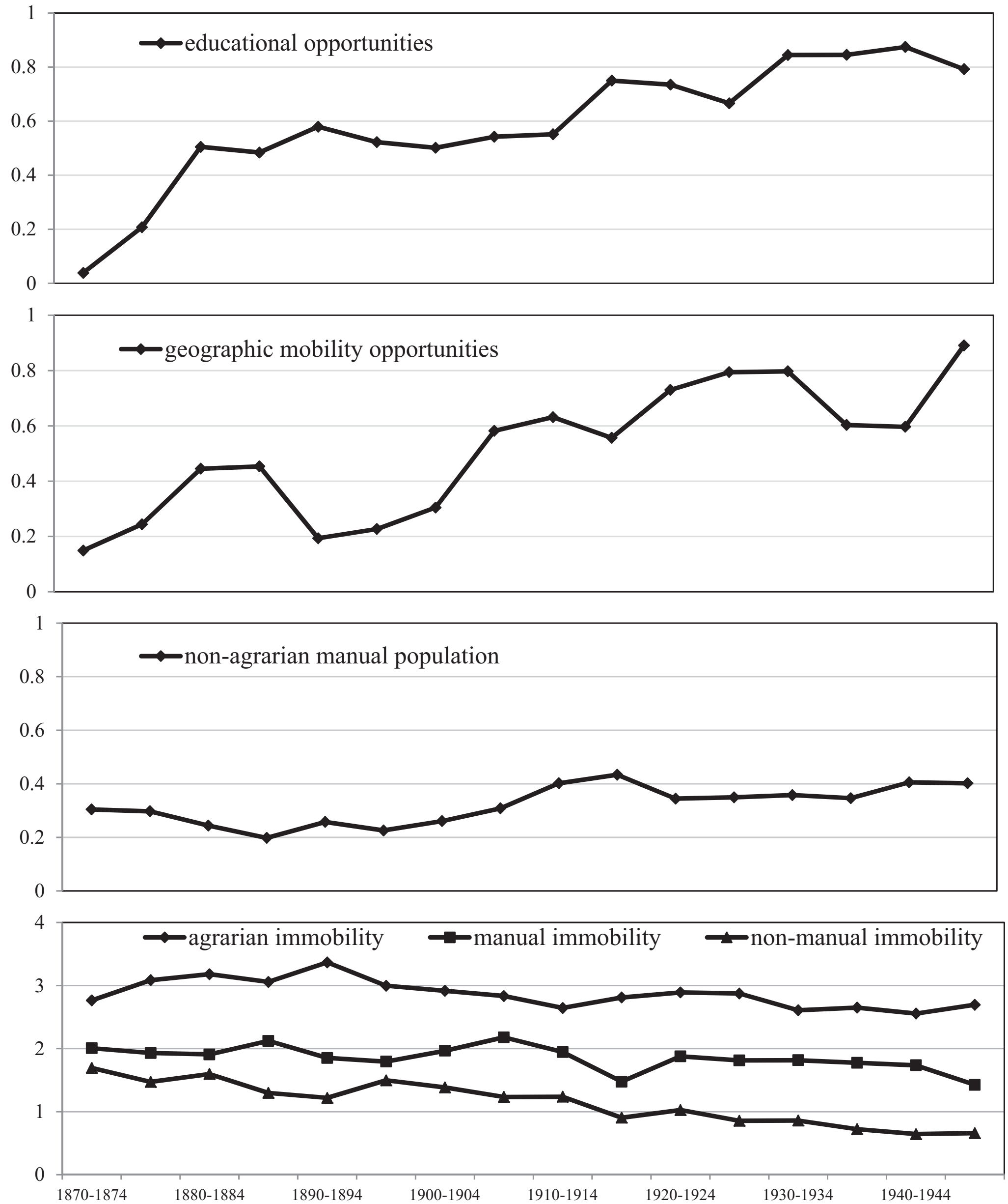

Figure 1. Changes in educational and geographic mobility opportunities, industrialization, and class immobility in Hungary

Notes. Data on industrial population weighted by population in municipal types and Hungarian regions. Educational and transport opportunities show temporal changes in the proportion of municipalities that have a teacher in their labor force. Class immobility parameters are in log (odds), estimated for each cohort by pooling municipalities and controlling for HISCLASS origin and destination main effects in log-linear models.

Source. Hungarian Historical Social Mobility file, 1870–1950

quantify variation in social fluidity across tables, as it shows the amount of 'true' variance in social fluidity between cohorts, relative to the total variance, which also includes sampling variance. The I^2 has similar interpretation and statistical properties to those of the intra-class correlation in hierarchical models (Higgins and Thompson, 2002). As social fluidity lacks a natural scale to guide assessment of the strength of effects, I^2 is

Table 2. Descriptive statistics-dependent variables

Association parameters	Mean	SD	I^2	CI
Diagonal association—agrarian classes	2.41	0.56	0.46	0.39–0.52
Diagonal association—nonagrarian manual classes	0.88	0.40	0.38	0.30–0.46
Diagonal association—nonmanual classes	1.81	0.44	0.18	0.11–0.25

Notes. $n = 633$.

I^2 and confidence intervals are estimates from multivariate random effects meta-analysis, without covariates, restricted log-likelihood = −3,517.74, df = 6

useful in demonstrating the merit of each modernization process for explaining social fluidity.

We estimated fixed effect models by including a dummy variable for each municipality. In this way, hypotheses on the effects of modernization processes are tested in a strict way, because all measured and unmeasured stable differences between municipalities are taken into account. The estimated parameters thus reflect the effects of a change in an aspect of modernization within a municipality on a change in social fluidity in the same municipality.

Results

Turning to the results, we see in Table 2 the mean estimate for each diagonal association parameter from the first estimation stage, the estimated between-table standard deviations, and the estimated proportions and 95 per cent confidence intervals of the 'true' variance (I^2).

All diagonal association parameters are positive and different from zero, thus, all classes have a higher propensity for immobility than what we would expect if sons had been randomly allocated across destination classes. As expected, agrarian classes show the highest propensity of immobility (the mean log-odds is 2.41), followed by the nonmanual classes. The nonagrarian manual classes were the most 'fluid' in Hungary, as found in other mobility studies (e.g. Grusky and Hauser, 1984).

The agrarian classes have the largest total variance in diagonal association across tables (SD = 0.56), as well as the largest proportion of between-table ('true') variance ($I^2 = 0.46$). The manual and nonmanual classes show similar amount of variation in diagonal association across tables, but the nonmanual classes have much smaller between-table variance ($I^2 = 0.18$), indicating smaller 'true' cohort and municipal variation in the propensity of immobility in these classes, compared with the other classes.

Table 3 shows results from multivariate mixed-effects regression analyses. To exclude the possibility that unmeasured cross-sectional variation across municipalities influenced our results, we added dummy variables for each municipality to our regression model. With fixed municipality effects included, the estimated effects in the models reflect how within-municipality temporal variation in schooling opportunities, industrialization, and urbanization influences changes in social fluidity. Table 3 shows that educational opportunities are negatively associated with the diagonal association in the nonagrarian classes. If schooling opportunities in a municipality become better, we witness a reduction of the propensity of social reproduction among nonagrarian manual workers and among nonmanual workers, which confirms our first hypothesis. The odds of being immobile for members of the industrial working class are 12 per cent lower in cohorts that scored one standard deviation (i.e. 4.4) higher on our measure of schooling opportunities ($e^{-0.03 \times 4.4} = 0.88$). The effect is somewhat smaller for the nonmanual classes (8% for one standard deviation) and not significant for the agrarian classes.

The hypothesis on urban population growth does not find support. We expected social fluidity to be greater in places with larger population size, but population size is not associated with relative mobility. The hypothesis on the association between geographic mobility opportunities and greater social fluidity is not supported either. We expected more fluidity in places with more opportunities for geographic mobility. However, we find no statistically significant relationship between geographic mobility opportunities and levels of diagonal association for the three classes.

We find support for our hypothesis on the relation between industrialization and social fluidity, but only among the nonagrarian manual classes. The size of the effect of industrialization on the relative mobility of these classes is comparable with that of schooling: the odds of being immobile decrease by 14 per cent with a 22 per cent (i.e. one standard deviation) increase in the nonagrarian manual population measured at the time the cohort entered the labor market.

To evaluate how well our model explains the variance in social fluidity, we look at the change in I^2

Table 3. Multivariate mixed-effects meta-regression of diagonal association parameters

Independent variables	Agrarian class immobility		Manual class immobility		Non-manual class immobility	
Population size (10,000 inhabitants)	0.01	(0.01)	0.00	(0.00)	0.00	(0.00)
Educational opportunities	−0.02	(0.01)	−0.03	(0.01)***	−0.02	(0.01)
Geographic mobility opportunities	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Industrialization	0.36	(0.32)	−0.66	(0.26)*	−0.48	(0.46)
WW I cohort	−0.29	(0.12)*	−0.20	(0.10)*	−0.42	(0.17)
WW II cohort	−0.19*	(0.09)	−0.14	(0.07)*	−0.15	(0.10)
% Born elsewhere	−0.84	(0.79)	−0.96	(0.51)	−0.46	(0.83)
Proportion farmers in agrarian classes	0.87	(0.19)***				
Proportion skilled workers in nonagrarian manual classes			0.45	(0.18)*		
Proportion higher managers and professionals in nonmanual classes					1.01	(0.46)
I^2	0.16		0.03		0.01	
CI	0.06–0.25		0.00–0.11		0.00–0.13	
I^2 (controls and fixed effects only)	*0.16*		*0.08*		*0.01*	

Notes. $n = 633$; $^*P < 0.05$, $^{**}P < 0.01$, $^{***}P < 0.001$ (2-sided). Models include fixed effects for each municipality. Method of moments estimates.

between the model with only controls included and the model with all variables (Table 3). The model hardly does explain any variation in the fluidity of agrarian and nonmanual classes. For the nonmanual classes, the inclusion of municipal fixed effects and other controls already reduced the variance across tables to almost zero; most of the variation in nonmanual fluidity is explained by the effect of the WW I (decreasing the association between father and son), the proportion of higher managers and professionals in the nonmanual classes (increasing this association), and municipal heterogeneity. Fluidity in the agrarian classes is larger during and immediately after the WW I, and also during and immediately after WW II. As could be expected, the higher the ratio between farmers and farm workers within the agrarian classes, the stronger the association between father and son. The remaining variation in fluidity of the agrarian classes between cohorts, however, cannot be explained by our indicators of changes in modernization processes. Increased schooling opportunities and industrialization do explain 62 per cent of variation in fluidity among the nonagrarian manual classes (I^2 decreases from 8 to 3 per cent). Among these classes too fluidity is larger during and the years after both World Wars, and it decreases with the proportion of skilled workers within these classes.

Conclusions

We tested the notion that modernization processes are related to greater social openness in a late industrializing country, Hungary between 1870 and 1950. A large-scale historical data set served as basis to construct mobility tables for marriage cohorts within 62 municipalities. We specified parsimonious association models to estimate relative mobility, taking into account the changes in the structure of labor across cohorts, and tested our hypotheses in a subsequent step, using multivariate fixed-effect regression models.

We found, in line with our expectations, that educational opportunities in elementary schooling are associated with greater fluidity for the nonagrarian manual and, to a lesser extent, the nonmanual classes. Our finding on the effect of elementary education confirms the conclusion from earlier studies (e.g. Breen and Jonsson, 2007) that increasing educational opportunity is an important driving force behind decreasing inequality of occupational opportunity.

Increasing exposure of the population to different social contexts and information, which the 'theory of industrialization' predicted to lessen intergenerational inequality, failed to find support in Hungary. Social fluidity did not increase as the population size grew, similar to findings for the Netherlands in the 19th century (Zijdeman, 2009). Our study did not find effect of geographic mobility opportunities either, whereas such effects were found for the Netherlands. Supporting the theory, we found that with increasing industrialization parental class contributed less to the intergenerational persistence of entrance into and exit from the nonagrarian manual classes. In Hungary, manual classes became more 'fluid,' as the municipal labor markets industrialized in the late 19th and early 20th centuries.

The findings on education and industrialization imply that classes unequally benefitted from modernization in Hungary. The degree of change in intergenerational inheritance in the nonagrarian manual classes was clearly smaller in cohorts with greater exposure to modernization processes, and our model explains greater proportions of variation in fluidity in the nonagrarian manual classes. We saw that industrialization had no influence on the fluidity of nonmanual classes, just as an earlier study by Grusky and Hauser (1984) had shown. The persistence of this rigidity could be related to the fact that competition for these class positions increased during industrialization, favouring men with nonmanual parental class origins. Agrarian classes did not open up as industrialization and educational opportunities increased. Industrialization did not eradicate the agrarian dominance in Hungary's economy as it did in classic industrializing countries, such as Great Britain, because of the West-European demand for food products. It is also worth noting that most Hungarian farm businesses remained family based and kept using traditional farming techniques (Swain, 1992) requiring labor of all family members, which could discourage sons from agrarian origins to obtain educational credentials or look for industrial occupations. It is an open question if agrarian classes in other late industrial countries—many of which had a substantial agrarian class—show similar resistance to industrialization, and if this originates from the small size of farms and the low level of agrarian modernization, or if the relative lack of industrial and educational opportunities kept disadvantaged farmers and farm workers in their classes of origins. We leave the investigation of these options to future research.

In Hungary, modernization did not lead to uniformly increasing openness. The various processes of modernization produced a complex pattern of persisting and diminishing social rigidities. Although our study accounted for historical factors in a more comprehensive way than previous studies did, our conclusions pertain to a single country, which may have its own historical path. We encourage research to examine the link between modernization and fluidity in other contexts to assess if, and to what extent, modernization effects are contingent on the historical modernization process.

Notes

1. There is an expected increase in the association between educational assets and social class with greater levels of industrialization, but—as Treiman (1970) argues—we can still expect the total impact of industrialization on relative mobility to be positive.
2. In our data set, we have almost no individual-level information on ethnic background, but we do know that 3 per cent of bridegrooms in our data set married in a Jewish congregation.
3. The full list of the HISCO codes of transport-related occupations can be obtained from the authors on request.
4. Educational opportunities, geographic mobility opportunities, and industrialization are based on the marriage record data, and connected to mobility tables of men who marry around 10 years later. For 27 tables, however, marriage records of 10 years earlier were not available and we therefore could not count the number of teachers and transport workers. For three tables, the proportion in the industrial labor force was unavailable. These cases were imputed with period- and municipal type-specific averages.
5. We collected information on train stations from contemporary Hungarian Municipal Almanacs (Magyarország helységnévtára), and from train schedules. Information on secondary schools was collected from the Hungarian Statistical Yearbooks series (Magyar Statisztikai Évkönyvek) of the Hungarian Bureau of Statistics.
6. The decline in the relative size of the manual class outside agriculture between 1870 and 1885 is paralleled by an increase in the relative size of the agrarian classes. Sons from manual classes probably re-engaged in farming because of favourable economic conditions for farm businesses.
7. The dominant form of mobility in Hungary in this period was intergenerational class inheritance (Lippényi, Maas and van Leeuwen, 2013a). The quasi-perfect mobility model parsimoniously represents this mobility pattern by assuming independence between origin and destination for the off-diagonal cells. We compared the fit of the *quasi–perfect mobility* model with a model with an additional off-diagonal association parameter (Haberman, 1974). In 75 per cent of the tables, the quasi-perfect model produced a better fit. To assess model misspecification bias, we included a dummy for tables where the alternative model fitted better. This dummy was not significant, and its inclusion did not influence other second-stage estimates.

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