ORIGINAL RESEARCH

Social Mobility Under Mutual Index View: The Vicious Circle and the Virtuous Circle of Inequality. A Comparison Between Latin American and European Countries

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Abstract

This paper analyses trends in both the structural and relative dimensions of the relationship between origins and destinations in social mobility across ten countries, five from Latin America and five from Europe, proposing an alternative measure. We employ the Mutual Information Index, a measure that allows us to simultaneously observe and differentiate between structural and relative effects. Two hypotheses are proposed and tested. The first posits that countries with late industrialization (in our case, the Latin American countries) exhibit lower social fluidity compared to early industrialized nations. Early-late countries, such as Italy and Spain, are expected to align more closely with late-industrializing nations. The results support this hypothesis, though they nuance Italy's behaviour, as it aligns more with early industrialized countries. The second hypothesis suggests that early-industrialized countries reduce inequality gaps in comparison to late-industrialized countries when considering the M-Index, particularly regarding the marginal effect. However, this hypothesis is not corroborated; instead, we observe an inverse effect. In Latin American countries, the marginal effect exacerbates inequality, whereas in European countries, it reduces class barriers. The Mutual Information Index thus reveals a mechanism explaining the "vicious cycle" of late-industrializing nations and the "virtuous cycle" of early-industrialized ones. This study demonstrates the advantages of incorporating the decomposition between structural and relative dimension in methodological approaches alongside traditional analyses based on last ones.

Keywords Social inequalities · Social mobility · Modernization · Unidiff · FJH hypothesis · Mutual information index

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1 Introduction

The principal aim of this paper is to make a contribution to the comparative analysis of social inequalities on the basis of an examination of intergenerational social mobility between the countries that are members of the INCASI (International Network for Comparative Analysis of Social Inequalities). This represents a continuation of the comparative effort, building upon previous hypotheses and employing more sophisticated analytical tools for the examination of comparative inequality.[1]

Almost fifty years ago, Featherman et al. (1975) postulated that there is a transnational similarity in the rates of social mobility in all societies with a nuclear family system and a market economy. These authors (FJH, hereafter) succeeded in refuting the optimistic ideas of liberal theory, according to which the process of modernisation drives urban development, educational expansion, the development of middle classes and unprecedented material and economic progress (Blau & Ducan, 1967).

Later, Erikson and Goldthorpe (1992) tested and modified the FJH hypothesis and partially defended the hypothesis that there was little variation between countries. At the same time, however, they left the door open to variations in social mobility as a function of government intervention. They considered the insignificant cross-national differences found to be idiosyncratic, i.e. a product of each country's unique history and institutions. Bukodi et al. (2020) incorporated the existence of liberal political systems into the market economy and the nuclear family.

The argument will be reviewed in the context of the study of late modernising countries (Ishida & Miwa, 2011). We will commence with absolute mobility, which is fundamental to the reader's ability to comprehend the descriptive aspect that elucidates the disparate transformations in the social structure between parents and children in the countries under examination. The study of relative mobility will concentrate on the examination of the relationship between an individual's social class origins and their social class status at the time of the survey. This will permit an examination of the opportunities for access to different social classes in each country. Subsequently, these opportunities will be examined in a comparative manner, with a view to identifying contrasts in access to different social positions across countries.

The hypothesis proposed by Ishida and Miwa (2011) that there is a relationship between social inequality and the distribution of opportunities is explored. It is argued that societies that joined the industrialisation process late generated greater social inequalities and disparate hoarding of opportunities for social promotion, which are expressed in lower social openness. Therefore, it can be concluded that 'the later and faster the industrial development, the higher the inequality and the lower the social fluidity' (Ishida & Miwa, 2011).

In order to test our hypotheses, we will rely on a new statistical measure. The most common social mobility methodology, the uniform differences model, assumes that nations share the same pattern of association between origin and destination, with differences existing only in strength. Thanks to the margin insensitivity property, compositional changes are not influenced. However, a more effective approach would consider not only the strength of these barriers but also their prevalence. For this reason, we rely on

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the advantages of Theil's (1967, 1972) mutual information index and its decomposition as developed by Seiler and Jann (2019a, 2019b), which allows us to distinguish and combine the effects arising from internal distribution (as in uniform differences) from marginal effects.

The Mutual Index as a synthetic coefficient provides comparative information on the level of association/inequality between origins and destinations. With the decomposition it is possible to reflect the two intrinsic parts of the relationship, marginal and internal, the one that excludes the margins (margin free) as is the internal coefficient, which in all cases provides information on the level of rigidity/fluidity of the societies analysed, as well as the results that arise from the marginal coefficient, an aspect that shows the extent to which class barriers operate in favour or not of social openness.

This paper begins with a concise overview of the theoretical aspects of class social mobility, which establishes the general framework for the ensuing analysis and simultaneously situates the present study within the extensive existing literature on intergenerational mobility. A review of theoretical perspectives and background literature from European and Latin American countries is also provided.

The following section outlines the methodology employed, discusses the techniques utilised, and provides details on the databases used for each country. The third section presents the results. The fourth section summarises the principal findings, presents the most pertinent conclusions of the analysis, and offers a concise reflection on the significance of the novel methodological approach employed, particularly in light of the results. Finally, the bibliographical references used in this chapter and the annexes are presented.

2 Theoretical Perspectives and Background in the EU and LA

2.1 The FJH Hypothesis Revisited

The Featherman, Jones and Hauser (FJH) hypothesis argues that patterns of social mobility in industrialised societies tend to converge towards a common pattern. This hypothesis has always been tested in early or intermediate industrialised countries characterised by high levels of prosperity and institutional stability.

In the context of the studies by Ishida and Miwa (2011), the FJH hypothesis can be revisited from two new angles, concerning the market economy and the nuclear family. The market economy of a country such as the US or Australia cannot be compared with those other market economies where economic growth has suffered recurrent crises. Societies that have had a bumpy road to modernisation have not been studied in depth. Indeed, previous research has focused on core countries where industrialisation was relatively early.

Moreover, there are two additional reasons to believe that the analysis of late-industrialising countries can contribute to enriching the literature on social mobility. First, according to Whelan and Layte (2002), these countries provide a special test of the increasing merit selection (or modernisation hypothesis), as it is possible to collect information before and after the relevant changes. It should be noted that when the first data on social mobility were collected for the most advanced countries, industrialisation had already had a major impact. This is not the case for the late industrialisers, whose older cohorts in the first surveys present a picture of modernisation that is still very fragmentary.

On the other hand, as noted above, Ishida and Miwa (2011) noted that 'the later and faster the industrial development, the greater the social inequality and the lower the social fluidity' (2011: 9).The authors were influenced by Gerschenkron (1962), who argued that capitalism had historically developed not in a linear but in a disruptive way, in which the state played an essential role (Selwyn, 2011), and pointed to the 'advantage of backwardness' in that governments could shorten the period of industrialisation by saving on the costs of innovation that had previously been borne by other countries. While in northern and central Europe the agricultural revolution preceded the industrial revolution, in southern Europe the pace of economic growth was slowed by poor agricultural conditions (Tortella, 1994). Partly, as a result of a late industrialisation process (Vaccaro, 1980), the semi-peripheral countries have specialised in a mix of labour-intensive and skill-intensive production processes, preserving vibrant sectors that have disappeared in more industrialised countries.

On the basis of these contributions, we develop the following hypotheses:

Hypothesis 1: Late industrialisers show less fluidity than early industrialisers. Intermediate countries, such as Italy and Spain, will tend to move closer to late industrialisers.

Hypothesis 2: Early industrialisers reduce the inequality gap with late industrialisers, taking into account the M-index and especially the marginal effect.

2.2 The Analysis of Social Mobility in Industrialised Countries

Since the end of the Second World War, research on economic growth has been closely linked to social mobility. Improving living standards became an internationally shared value, although the means to achieve this were debated as two competing models of social organisation—capitalism and communism -. However, social mobility and public investment in education emerged as common foci of importance in this context. Social mobility is seen as the result of beneficial macro-social changes, both economic and cultural, and is presented as an indicator of improved life chances and personal achievement. More generally, social mobility has been visualised as a counterweight to inequality.

For several decades, Erikson and Goldthorpe (1992) have contributed to the discussion on social mobility. These authors identified three theoretical perspectives on mobility, although today it can be argued that two of them remain dominant. These macro perspectives are centred on the tradition of modernisation theory and the invariance hypothesis, known as FJH (Featherman, Jones and Hauser). The work of authors such as Parsons (1951), Kuznets (1955), Kerr et al. (1960) and Treiman (1970) argued that, in the medium to long run, the operation of the social market economy as an allocator of resources and opportunities, together with adequate and moderate formative incentives for labour, would lead to open and unconstrained intergenerational social mobility and distributional justice based on meritocracy and the remuneration of factors of production. These contributions cemented the so-called modernisation theory.

On the other hand, the perspective of Featherman et al. (1975) proposed that societies with market economies and nuclear family structures have similar relative mobility regimes in which inequalities tend to persist over time. Initially, national studies by Goldthorpe (2003) and Goldthorpe et al. (1987) shaped the field of social class mobility studies and developed the debate on social class mobility in industrial and post-industrial societies. This debate naturally had implications for developmental styles at the national level,

Table 1 EGP scheme in seven classes used in the comparative analysis. Source: own elaboration based on Solís and Boado (2016)

Clase (EGP)	Description	Examples	Employment relationship
I + II	Type of services	Employers, professionals, managers, high-level technicians	Employers, employees, positions of control
IIIa + b	Non-routine manual	Clerks, sales workers	Employees
IVa + b	'Petty bourgeoisie'	Shopkeepers, micro-employers	Own account and small employers
V + VI	Skilled manual workers	Skilled labourers, craftsmen, factory foremen	Employees
VIIa	Low-skilled manual workers	Factory labourers, unskilled service workers (cleaning, etc.)	Wage earners (own account: disguised employees in LA)
IVc	Small agricultural proprietors	Peasants, farm owners, micro-employers	Own account, small employers
VIIb	Agricultural wage labourers	Day labourers, agricultural labour	Employee

drawing a counterpoint between the stability or instability of intergenerational social class mobility as a consequence of industrial developmental modes.

Sociologists supporting modernisation theory argue that there is a cumulative secular trend towards development and equality of opportunity (Treiman, 1970). Erikson and Goldthorpe (1992) proposed Constant Social Fluidity theory (CnSF) to address change over time, introducing the common model of social fluidity, which argues that relative mobility rates are similar when comparing different countries. This theory is based on the association between origins and destinations, with two analytical variants. First, the OD effect by country is examined on the basis of global social fluidity by identifying the 'uniform differences model' (Unidiff). Second, the 'core model' of social fluidity is presented, which emphasises class relations in relation to inheritance, class boundaries, sectoral shifts and short-distance movements between social classes.

More recently, new contributions have challenged the notion of constant fluidity without adhering to the modernisation tradition. Breen (2020) and Breen & Müeller (2020) have found evidence of changes in relative mobility and a general decline in the strength of inequalities by analysing eleven European countries over the last 30 years of the twentieth century.

Breen (2010) advanced classical mobility work by incorporating counterfactual modelling, an innovation he developed in 2010, which highlights the crucial role of education in intergenerational social mobility trends. Using these techniques, he concludes that the expansion of educational provision and its more equitable distribution across social origins are the most important determinants of increased social fluidity. Breen argues that modernisation theory is strengthened for cohorts born in the first half of the twentieth century, while reproduction theory is better suited to the behaviour of cohorts born in the second half of the century. On the basis of these findings, Breen casts doubt on the accuracy of the two competing theories of mobility and proposes the development of a long-term perspective on intergenerational mobility (Table 1).

Ishida and Miwa (2011) broadened the comparative context between countries at different stages of industrial development, which was the motivation for the present analysis. They developed a typology that distinguishes between early and late industrialisers countries. A study coordinated by Ishida (2008) examined six late industrialisers: Japan, Taiwan, South Korea, China, Brazil and Chile. A subsequent study, the results of which were reported in an unpublished paper by Ishida and Miwa in 2011, expanded the comparative scope to include the countries studied by Breen (that also shows convergence in 2005), as well as Israel, Mexico, Italy, Hungary, Ireland, Poland and the United States, for a total of 19 countries, and focused on men aged 30–64. The results of these studies show that there is no historical convergence in social mobility, that there is a common pattern of fluidity across countries, and that there is convergence in absolute mobility rates. These studies provide a solid framework for the comparative analysis presented in this article.

2.3 Latin America and Social Mobility Analysis

Social mobility in Latin America has been a central theme in sociological research on development and growth since the early days of the discipline. However, as Solís and Boado (2016) point out, this line of research suffered an interruption between the 1970s and 1990s due to the political conflicts that affected many societies in the region during that period.

One of the pioneering works in this area was that of Gino Germani (1963), in Argentina, as an appendix to the Spanish translation of Lipset and Bendix's (1963) work.

Germani believed in the transformative power of education to support general social mobility, not only as a mechanism for equipping people with knowledge, but also as a means of fostering the new mentalities necessary to achieve modernity.

In Argentina past research has not produced clear findings (Jorrat et al. 2024b). Analyses of birth cohorts in groups of surveys found somewhat complementary results: constant fluidity (Jorrat, 2000; Jorrat & Benza, 2016); and an increase in the mobility barriers between the working class and the service class in a context of a general trend of constant fluidity (Fachelli et al., 2021). However, over a longer period of time, some degree of social fluidity seems to have been detected, at least in urban Argentina (Dalle, 2016). According to research conducted on the whole country and for the Buenos Aires Metropolitan Area in particular (Jorrat, 2016), education does not seem to have favoured intergenerational class mobility when considering short-term cohorts. In the long term (Jorrat et al. 2024a) the trend is a reduction of the direct effect between class of origin and class of destination, and there is no evidence of educational expansion or equalisation effects.

In Brazil, Torche and Ribeiro (2010) find a substantial increase in social fluidity over time, which emerges from period transformation, rather than cohort replacement. This growing fluidity in Brazil are a combination of the decline in the "economic returns to schooling", and the weakening of the direct influence of class origins on class destination, net of education. Later analysis with six birth cohorts of individuals born between 1921 and 1981 confirm a historical trend of increasing social mobility across birth cohorts, being the most important mechanism the educational expansion (Costa Ribeiro, 2023).

In Uruguay, Labbens and Solari (1966) studied class social mobility in Montevideo and concluded that Montevideo society had also experienced significant overall social mobility. However, due to the stagnation of economic growth based on the export of raw materials since the late 1950s, the authors hypothesised that upward mobility would be blocked and that social mobility in general would be reduced. Solari et al., (1967) studied the role of education in intergenerational social mobility in Montevideo. They pointed out that the relationship between growth and education was ambiguous and that, depending on the geographical context of socialisation, education did not always lead to occupations of a similar level. More recently, Boado and Fachelli (2020) explored the different effects on the origin–destination relationship mediated by education, the return of classes to education and the compositional effect of education, they confirm the persistence of inequalities.

Solís and Boado (2016) led a comparative study of class stratification and mobility in Latin America, involving researchers from Argentina, Brazil, Chile, Mexico, Peru and Uruguay.[2] This work revealed several important findings:

- The heterogeneity of class structures among the countries studied, with Peru being the most predominantly agrarian, in contrast to the others, which showed greater urbanisation and industrial expansion.
- A common feature was the limited expansion of the service, non-manual routine and highly skilled manual classes, and the greater presence of unskilled manual and agricultural workers.

[2] The book includes country chapters for Argentina (Raúl Jorrat and Gabriela Benza), Brazil (Carlos Costa Ribeiro and Patricio Solís), Chile (Vicente Espinoza), Mexico (Patricio Solís), Peru (Martín Benavides and Manuel Etesse) and Uruguay (Marcelo Boado).

- There were high rates of absolute mobility, similar even to European countries.
- In terms of relative mobility, it was concluded that overall levels of social mobility were not significantly different from those observed in the early industrialising countries. However, Argentina, Chile and Mexico showed greater rigidity, while Brazil and Peru showed higher levels of social fluidity.
- Latin America is characterised by a hierarchical pattern of social mobility, with greater distance between classes and polarisation of social mobility, aspects that would be more gradual and less pronounced in Europe.

The findings of these authors represent a very relevant step forward, the first, for the Latin American region, which, as we have said, had ceased to carry out studies on mobility. Not only does it represent a great contribution, but also the comparative effort made to carry it out is noteworthy because, as is well known, most of the countries in the region lack routine sources carried out by statistical institutes to analyse social mobility, as well as a supranational body that carries out the homogenisation of the different surveys, so that, unlike several European surveys, the work of homogenising the data takes up a large part of the total work of the comparison.

A recent comparative study that examines intergenerational class mobility trends in Argentina, Chile, and Uruguay, focusing on the impact of education across different birth cohorts (Jorrat et al., 2024) find that intergenerational mobility was observed only among men in Argentina and Chile, while educational inequality trends affected women. Class returns to education were noted for men in Chile and Uruguay, as well as for women in Argentina. However, the relationship between social fluidity and education was inconsistent, and their data do not support the idea that educational expansion has enhanced intergenerational mobility opportunities.

3 Definitions, Data and Methodology

3.1 Definition of Social Classes

For all countries we have agreed to apply the Erikson, Goldthorpe and Portocarrero (EGP) social class scheme. The main change is to reclassify self-employed workers without employees in low-skilled occupations from class IVb to class VIIa. This adjustment is based on the fact that, in the labour markets of Latin American countries, many of these workers declare themselves to be self-employed, but in reality, they are subject to subordinate labour relations, selling their labour to one or more employers at the same time, in conditions of high precariousness and low job stability (Solís & Boado, 2016). For the European countries, we followed the classic proposal of Ganzeboon et al. (), which in turn was considered the most comparable with the data previously processed for the Latin American countries presented in this study. The scheme used is presented below.

3.2 Data

For Latin America, we have used data standardised by several Latin American colleagues who contributed to the work of Solís and Boado (2016). In the European case, we have worked with data from the European Social Survey (ESS) for all countries except Italy, since the variables needed to construct the EGP category were not available. The

Table 2 Sample used. Source: own elaboration for Europe; Solís and Boado (2016) for Latin America	Country	Males	Females	Total
	Argentina	3320	2171	5491
	Brazil	2631	2113	4744
	Chile	1777	1053	2830
	Mexico	3938	1732	5670
	Uruguay	4325	3415	7740
	Spain	2299	2094	4393
	France	1980	2048	4028
	Great Britain	2903	2235	5138
	Italy	9199	8565	17,764
	Finland	2166	2141	4307
	Total	34,538	27,567	62,105

specifications of Ganzeboon et al., (1992) were followed to harmonise the classes using ISCO-88. In the case of Italy, the survey on living conditions (*Indagine sul Reddito e le Condizioni di Vita*) carried out by the National Institute of Statistics was used and the classification was constructed according to the same criteria as the ESE, making the necessary adjustments to ISCO-08 for this purpose.

The age range selected in the European surveys were similar and close to those worked on in Latin America, and the samples were relatively similar. Although efforts have been made to homologate, this first approach to comparative analysis can certainly be improved. The characteristics of the surveys used for each country and the main features of the treatment of information on mobility are presented in Annex 1. The following table shows the sample by gender (Table 2).

3.3 Models and Techniques

We used three types of analysis. First, for absolute mobility, we used transition matrices. For relative mobility, log-multiplicative models in the classical tradition of social mobility studies. These are measures that specify the net relative change beyond any marginal transformation. Finally, we consider a measure of entropy, the Mutual Index, which takes into account compositional changes. Following Seiler and Jann (2019a, 2019b), we would like to go one step further and go beyond the observation of internal barriers in the OD (Origin–Destination) relationship through "no-margin" measures (odds ratios) by looking at the marginal distribution and thus being able to simultaneously account for structural changes affecting OD associations. The ability to disaggregate both types of trends helps to take this work beyond the analyses carried out so far with these countries.

3.3.1 Absolute Mobility

Absolute mobility rates are understood as mobility directly observed from the frequencies in the table. They are considered as a transition matrix that reflects both the forces of global expansion and contraction of certain classes and the propensity for inheritance and mobility between them (Hout, 1983; Erikson & Goldthorpe, 1992; Breen 2004; Fachelli & López-Roldán, 2013; Solís & Boado, 2016). Under the label of absolute mobility can be counted both people who have a higher status or who improve with respect to their origin

(upward mobility) and those who have a lower status than their parents or who have not yet reached it (downward mobility). Reproduction, inheritance or immobility identifies the fact that parents and children have the same social position, due to a transmission of occupational position from parents to children or simply by coinciding in a transitory situation in that position.

3.3.2 Relative Mobility: Rigidity and Fluidity

In relative mobility analyses, the concern is different, with more attention paid to the stability or change that can be observed as a result of the association between origins and destinations. It is a more precise way of responding to the concern introduced by Glass (1954) about social mobility and its plausibility. All the authors' efforts have been directed towards overcoming the weakness of perfect mobility and towards generating hypotheses and models that capture the effects of inheritance and opportunity, in order to provide a more plausible explanation. Two perspectives of such models are used here. On the one hand, those that capture the fluidity or rigidity of societies. On the other hand, those that allow us to compare the distances and boundaries between classes and their effects on reproduction and mobility between classes.

The fluidity or rigidity of societies is measured by contrasting the social mobility between the class of origin and the class of destination experienced by individuals from each country in the sample. Two hypotheses are used, one of constant fluidity and the other of increasing fluidity. In an open society there will be greater opportunities for social mobility (more fluidity), whereas in a society where there is a lot of social reproduction and where class origins (parents) strongly influence the destiny of their children, greater social rigidity (limited movement and high heritability) will prevail. Thus, *odds ratios* would indicate independence, non-association or no influence of origin if their value is 1, and if they increase more than 1 or decrease (between 1 and 0) they would indicate association. Carabaña (1999) calls this type of mobility "doubly relative" because it is based on a measure that takes into account a double relationship: the child in a category who comes from a given class in relation to another child who comes from a given class that is taken as a reference.

A widely used statistical model to make cross-country comparisons and to find out how a pattern of association works is the log-multiplicative layered effects model, better known as the 'unidiff' model (Erikson & Goldthorpe, 1992; Xie, 1992). The Unidiff model is useful for identifying in which contexts there is more or less social fluidity, given a previously elaborated fixed pattern of association (Solís & Boado, 2016).

The common social fluidity hypothesis (CsF) postulates that relative social mobility rates are similar across countries. Specifically, it assumes that such rates remain constant across different countries, with variations being too small to alter this stability. It is a model of homogeneous association which means that the relationship between origin and destination remains the same for each country (Fachelli & López-Roldán, 2015).

We start from the accepted results on constant fluidity in Latin American countries reported by Solís and Boado and their team (2016), and we have elements from European countries, as proposed by Breen (2004), Vallet (2015), Gil-Hernandez et al. (2017), Fachelli et al. (2023) and Marqués-Perales et al. (2023), to standardise the use of powerful and proven goodness-of-fit models, such as constant association models (which support the constant fluidity hypothesis) and uniform variance models (which support the tendency

towards intergenerational fluidity or rigidity hypothesis), to proceed to the cross-country community test on the volume of mobility.

3.3.3 Mutual Index

The Mutual Information Index (hereafter referred to as the Mutal Index or M-Index) is an analytical tool that allows the study of inequalities over time and space by simultaneously considering changes in the internal and marginal distribution, in particular the relationship between social origin and social destination. Our aim is to determine whether an analysis based on the M-Index leads to different conclusions than an analysis based on the unidiff model, i.e. whether the consideration of marginal distributions matters. This index was developed by Theil (1967, 1972) and is based on information theory and the notion of entropy. Seiler and Jann's (2019a, 2019b) breakthrough allows for a more comprehensive assessment of inequality dynamics by simultaneously reflecting both structural or demographic changes (the margins of the table) and relative or internal changes (the internal distribution of the table) when analysing, for example, different moments in time or different territories.

The internal component is the result of a counterfactual exercise in which, while preserving the odds ratios from country, the margins are adjusted to match those of country using Iterative Proportional Fitting (IPF). The marginal component, on the other hand, is the result of a counterfactual exercise in which, while prevailing the margins from country a, the odds ratios are adjusted to match those of country b using Iterative Proportional Fitting (IPF). Both components are calculated as the difference between the real and the counterfactual indices.

Thus, the index is split into two main components by analysing the relationship between social origin and destination:

(a) Marginal (demographic or structural) changes: these reflect changes in the marginal distribution of origin and destination social classes. They focus on how the number of people in destination positions has changed as a function of social composition.
(b) Internal changes: these refer to changes in the joint distribution of origin and destination social classes. They capture how the association relationships between the respondent's social origin and destination have evolved, without taking into account marginals.

Figure 1 presents these effects, marginal and internal, in an OD contingency table (Marqués-Perales et al. 2023).

Using counterfactual decomposition, we will discover the contribution of both internal and marginal changes. It should be noted that the Mutual Information Index is not a composite measure of absolute and relative mobility. Rather, it is a tool designed to calculate social fluidity, not only accounting for internal changes as traditional measures do, but also the magnitude of the flux.

The logic of the index goes back to the approaches of information theory (Shannon, 1948), introduced in the social sciences by Theil (1967, 1972). Entropy can be used to measure the amount of information shared; hence, the higher the entropy is, the lower the amount of information is. Thus, we contrast the difference between the information gained a posteriori by introducing a certain measure, X, regarding an a priori unconditional initial situation, Y, which lacks that information. What we gain or learn about

Fig. 1 Contingency Table. OD effects (marginal and internal). *Source* own elaboration

the initial situation is a measure of the importance of X in knowing Y that allows us to analyse the relationship between the two variables. This can be achieved by comparing two distributions: the first corresponds to how much information we have about the destination class (D) achieved by a group of people, i.e. its unconditional distribution, obtained a priori; the second, obtained a posteriori, corresponds to how much information is obtained if the conditional distribution of class destination over class origin (O) is known.

The general formula for the Mutual Information Index is expressed as the difference between the entropy of the target class before, $E(P_D)$, and after, $E(P_{D|O})$, knowing the distribution of the source class:

$$M = E(P_D) - E(P_{D|O}) = \sum_{i=1}^{I} \sum_{j=1}^{J} p(O_i, D_j) ln\left(\frac{p(D_j|O_i)}{p(D_j)}\right)$$

If the difference is substantial, it may be observed that the social class of origin exerts a subsequent strong influence on destination class.

Obtaining internal barriers in the OD relationship through 'margin-free' measures (odds ratios) each OD combination only concern pairs of categories/cells. That is fine for one-to-one comparisons but not for comparisons between countries or cohorts as a whole. Each OD combination, when relative changes are measured excluding marginal changes, is not appropriate for showing existing dependencies between variables, and to generalise relative changes, because it is necessary to consider different weights of marginal distribution (how many people the relative change affects: a relative social change, or a barrier in a specific cell, which affects a small proportion of individuals is not the same as a relative change that affects a large part of the population), that is, changes in marginal distributions impact OD associations (Seiler & Jann, 2019a: 8).

The M-Index can be expressed as a simple average of the components specific to each observed case *c*, considering variables *O* and D:

$$E(M_c) = M = \frac{1}{n} \sum_{c=1}^{n} \ln \left(\frac{p(D_c|O_c)}{p(D_c)} \right)$$

Thus, the M-Index can be compared across categories of third variables such as countries, in our case.

The important aspect of this measure is that it can be decomposed into two effects. Comparing acroos countries or cohorts over time, the difference in the Mutual Information Index between two countries or cohorts (c1 and c2) is the result of two contributions.[3]:

(1) The effect arising from internal changes, which are expressed in the joint or conditional distribution and the OD association intensity, and the patterns taken changes across countries or cohorts over time. That is, how pronounced the class barriers are, as the odds ratio also measured.
(2) The effect of marginal changes, which are expressed in marginal distribution: class destination (D) and class origin (O) across countries or cohorts over time. That is, how prevalent the barriers are: the effect of changes in class structure in origin and destination.

The M-Index between the two countries or cohorts (c1 and c2, etc.) is the result of these two contributions:

$M_{c1} - M_{c2} = \Delta M$ (Δmarginals, Δinternal) = Marginal   Contribution + Internal Contribution.

4 Result

4.1 Absolute Mobility

First, we present the results obtained so far on the change in the socio-occupational structure of parents and children in each country, taking into account the seven classes defined in this study. We then analyse upward and downward vertical social mobility in order to provide an analysis of the subsets of countries and their main recent trends.

Structural change (marginal changes) is a contrast between the proportions of respondents' class positions (sons/daughters) and their class positions of origin (father). At first glance, Fig. 2 shows that the changes have been more similar in the European countries and more divergent in Latin America. Next, there is a general increase in the service classes in both continents, but more marked in Europe than in Latin America. Then there is a process of decline in the agricultural classes due to the transformation of rural activities. In Latin America, Brazil stands out due to the high transformation of the number of days labourers migrating from the countryside to the city in a relatively short period of time. This contrasts with several European countries, where the main change has been a reduction in the number of skilled and low-skilled workers. Finally, it can be seen that the number of small agricultural landowners is decreasing in all countries (except Brazil),

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[3] In Stata, the command for men is `mindex son i.father if sex == 1, over(country) decompose vce(boot, reps(100))´ for women `mindex daughter i.father if sex == 2, over(country) decompose vce(boot, reps(100))´
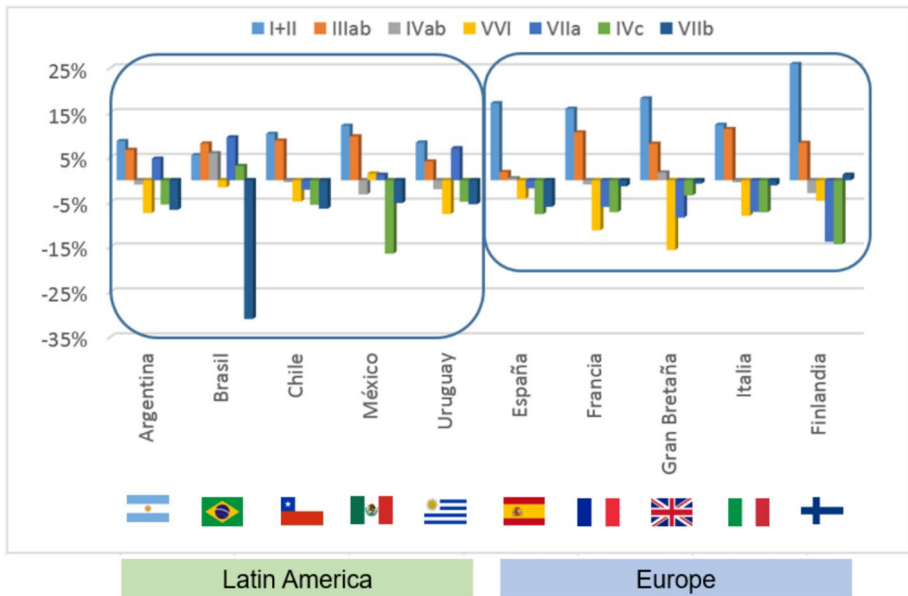
Fig. 2 Structural change between parents and children. *Source* own elaboration based on Fachelli et al. (2021).
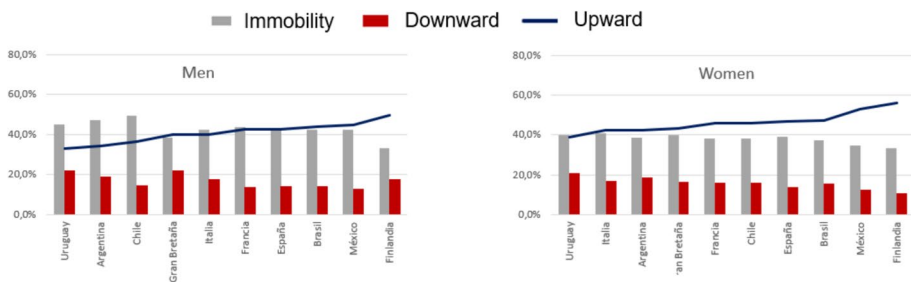

Fig. 3 Vertical Mobility *Source* own elaboration based on Fachelli et al. (2021).

while the petty bourgeoisie (IVab) shows hardly any change, the biggest change being the increase in the number of children relative to parents in Brazil.

Another way of looking globally and comparatively is to consider absolute mobility in terms of vertical mobility by looking at upward and downward mobility (Fig. 3). Following Erikson and Goldthorpe, we group the seven classes of the original scheme into four macro-classes: the first considers only the service class (I+II), the second consists of the routine non-manual class up to the skilled and semi-skilled manual wage earners (IIIa+b, IVa+b and V+VI), the third includes only the low-skilled non-agricultural manual workers (VIIa) and the fourth the agricultural classes (IVc and VIIb).

First, the importance of reproduction or immobility is highlighted to a greater extent for men in Latin American countries than in European countries. In turn, in the latter

countries, upward vertical mobility is more predominant than reproduction and downward mobility. For men in Latin American countries, we see two trends: those where reproduction outweighs upward mobility (Argentina, Chile and Uruguay), and those where upward mobility is the dominant feature (Brazil and Mexico).

A striking feature is the mix of European and Latin American countries when sorted by upward mobility, as is the case here. Reflecting this pattern, there are not so many differences in absolute rates, except as mentioned for Uruguay, Argentina and Chile, and the opposite in Finland (high mobility and less inheritance than in the rest) for men.

Women in Latin America and Europe show a different pattern. Vertical upward mobility is always higher than reproduction in all Latin American countries except Uruguay. Immobility and upward mobility have similar values, except México and Finland where women have less percentage of immobility.

4.2 Relative Mobility: Rigidity and Fluidity

The analysis of relative mobility, as mentioned above, takes into account possible changes between origin and destination when we isolate the effect of margins, i.e. when absolute changes in mobility are not taken into account. We want to answer the question of the extent to which children's chances of reaching a certain position are conditioned by their parents' origin, and whether this pattern of behaviour varies over time or across countries. And which are more socially fluid and which are more rigid.

The following table presents the results of the application of the constant fluency and Unidiff models for comparison across all the countries studied. In the case of the application of the Unidiff model, Argentina is taken as the starting point.

First of all, constant or common fluidity is preferable to Unidiff for males (higher negative value of the BIC). However, according to the L^2 comparison, the unidiff model fits better than the CSF.

The results allow us to confirm that European countries are more fluid than Argentina (the country used as a reference) and Latin American countries in general. This tendency is generally most pronounced among women, see Table 3 and Fig. 4.

Uruguay is slightly more fluid than Argentina for both men and women. Chile is not for either sex, and Mexico is more so for women than for men. Brazil is an exception among Latin American countries, mainly because of its massive de-ruralisation.

On the other hand, the European countries that are more mobile are clearly more female-dominated, and this is more pronounced in the United Kingdom and Finland.

4.3 Mutual Index

This section represents a departure from the conventional approach to the analysis of social mobility, as it employs the Mutual Index to examine the countries under consideration. In line with the approach taken by Seiler and Jann (2019a, 2019b), who employ the measure to evaluate the relationship between two categorical variables, taking into account both the internal patterns within the table and the marginal effect, in this case between the social class of origin and the current social position of destination. This index is particularly useful as it allows for the decomposition and analysis of social mobility, considering both
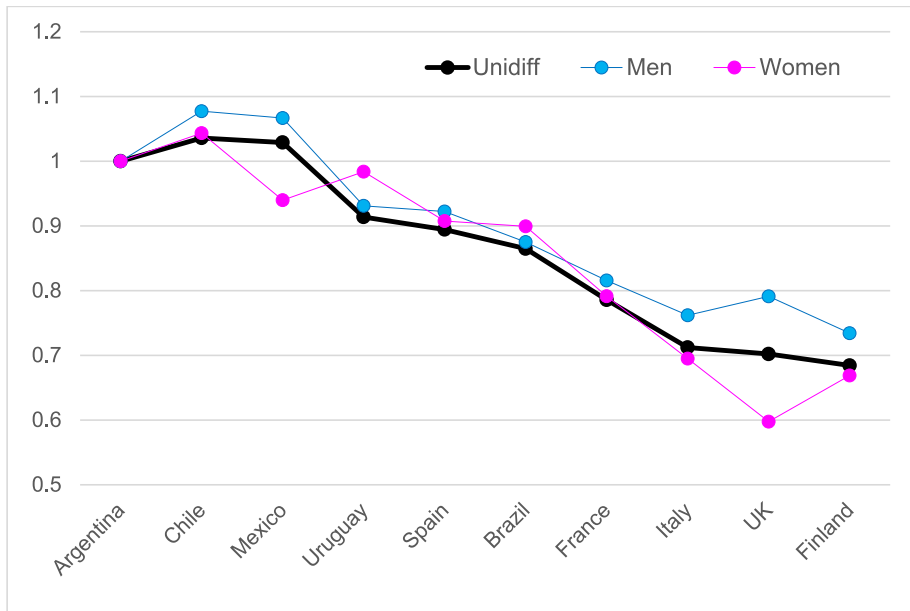
Table 3 Trends in social fluidity. Origin–Destination by country. Source: own elaboration

OD by country (Trends in social fluidity)

Models	L2	d.f	Sig	BIC	D.I	L2 diff	d.f. diff	Sig		
Three way	WOMEN (n=27,567)									
Comon [OC] [DC] [OD]	942.53	324	0.000	−2370.15	5.87					
Unidiff	870.15	315	0.000	−2350.51	5.71	72.38	9	0.000		
Country	Argentina	Brazil	Chile	Mexico	Uruguay	Spain	France	G.Britain	Italy	Finland
Unidiff Parameters [OD-C]	1.000	0.8994	1,0434	0.9398	0.9837	0.9075	0.7914	0.5976	0.695	0.6689
Three way	MEN (n=34,538)									
Comon [OC] [DC] [OD]	1001.98	324	0.000	−2383.72	5.68					
Unidiff	896.98	315	0.000	−2394.68	5.4	105	9	0.000		
Country	Argentina	Brazil	Chile	Mexico	Uruguay	Spain	France	G.Britain	Italy	Finland
Unidiff Parameters [OD-C]	1.000	0.875	1,0773	1,0667	0.9311	0.9223	0.8156	0.7911	0.7618	0.7343
Three way	MEN and WOMEN (n=62,105)									
Comon [OC] [DC] [OD]	1364.84	324	0.000	−2211.02	4.96					
Unidiff	1171.43	315	0.000	−2305.1	4.65	193.41	9	0.000		
Country	Argentina	Brazil	Chile	Mexico	Uruguay	Spain	France	G.Britain	Italy	Finland
Unidiff Parameters [OD-C]	1.000	0.8648	1,0358	1,0289	0.9137	0.8944	0.7857	0.7021	0.7121	0.6844

Fig. 4 Social Fluidity. Unidiff measure by country & gender (Argentina as reference = 1) *Source* own elaboration

marginal effects (demographic, class composition changes) and internal interactions. This provides a more complete and nuanced view of social dynamics. This measure is distinguished by its capacity to address non-linear and complex relationships, offering a robust alternative to more traditional approaches to the study of intergenerational social mobility.

Figure 5 presents the results of the Mutual Index measure and its decomposition for each of the countries under study. The initial focus is on the overall M-Index, represented by the blue bar in the graph. The values obtained from the measure are interpreted as follows: values above zero indicate a greater degree of inequality in the relationship between origin and destination (OD) with respect to the reference country, Argentina, while values below zero indicate a lesser degree of class inequality. A comparative analysis of the data reveals two general trends. Firstly, Latin American countries demonstrate positive scores, indicating higher levels of inequality. Secondly, European countries exhibit negative scores, indicating higher levels of equality and a reduced influence of social origin on the social class attained by sons and daughters. Uruguay represents an exception, with a value closely aligned with that of Spain.

A detailed examination of the global M-Index decomposition reveals a persistent divergence between Latin American and European countries. Firstly, in the values that correspond to the internal association, which reflect equality of opportunities without taking into account the marginal ones (the one that resembles the Unidiff, in red in graph 4), we observe that Latin American countries show higher values (greater inequality) than European countries, with greater rigidity in the cases of Mexico and Chile, while Argentina, Brazil and Uruguay show greater fluidity. Conversely, the marginal coefficient (depicted
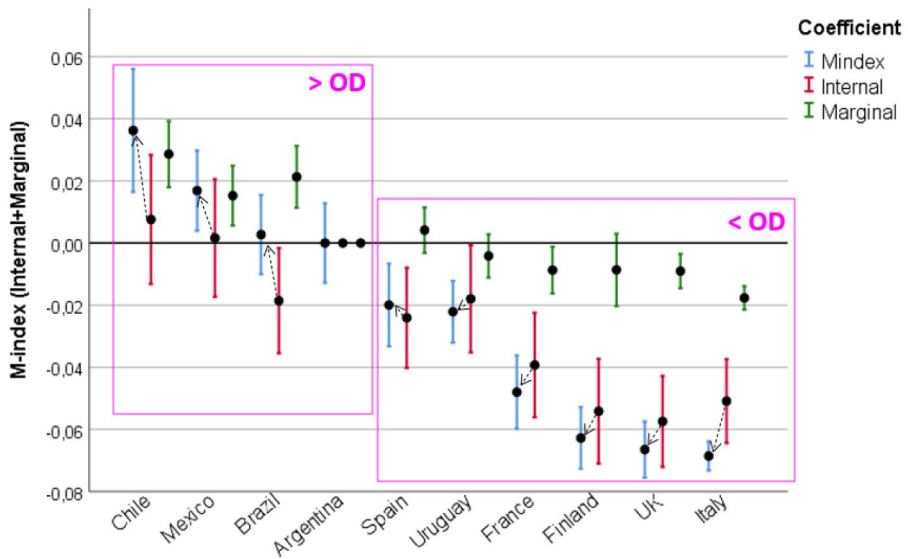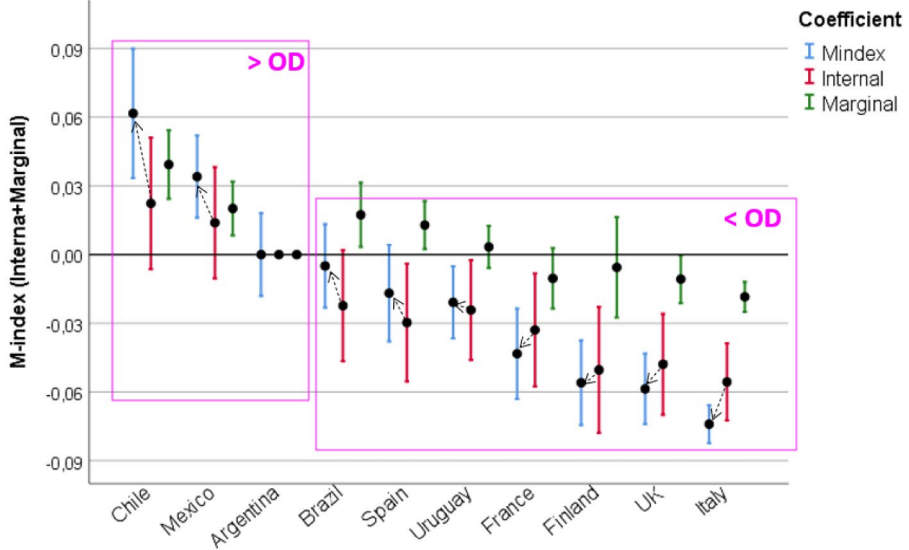
Ordered by M-Index: Total population.

Fig. 5 M-Index and decomposition: internal + marginal (Argentina as reference = 0). *Ordered by M-Index: Total population. Source* own elaboration

Ordered by M-Index: Men.

Source: own elaboration

Fig. 6 M-Index and decomposition: internal + marginal (Argentina as reference = 0). *Ordered by M-Index: Men. Source* own elaboration

in green in Fig. 5), which incorporates demographic shifts in the class structure, serves to intensify inequality across all Latin American countries, as they exhibit positive values (illustrated by the upward arrow in the graph). Conversely, in European countries, the marginal effect serves to reduce inequality, with values remaining below zero (as indicated by the downward arrow in the graph). This behaviour reaches its limit in the cases of Spain and Uruguay, where the marginal effect values are small and in the opposite direction, but not significant. The preceding analysis can now be subjected to a gender-specific examination.

An examination of the aggregate M-Index value for males (Fig. 6) substantiates the presence of analogous trends to those delineated for the overall population, with Brazil occupying a comparable borderline position to Argentina. Brazil, Uruguay and the remaining European countries demonstrate an internal fluidity effect. However, the marginal effect is positive or null for these two countries and for Spain, which attenuates the equality effect of the relative or internal measure. In all Latin American countries, together with Spain, the marginal coefficient contributes to higher inequality for males. In contrast, males in France, Finland, the UK and Italy show more fluid trends, and, unlike in the Latin American countries, both the marginal and internal coefficients work in favour of lowering inequality, which indicates the existence of minimal class barriers.

The situation of women (Fig. 7) exhibits a relatively similar behavioural pattern to that observed in men, although the M-Index indicator reverses the positions of Brazil and Mexico. In the latter case, the values are equivalent to those of Argentina. Uruguay continues to demonstrate an overall effect of greater equality, and together with Mexico, and in contrast to previous analyses, shows a significant change towards equality in the marginal and internal coefficients, indicating lower levels of overall association between OD and aligning itself with the behaviour of European countries. Chile and Brazil, taking Argentina as a reference, show higher values of inequality.
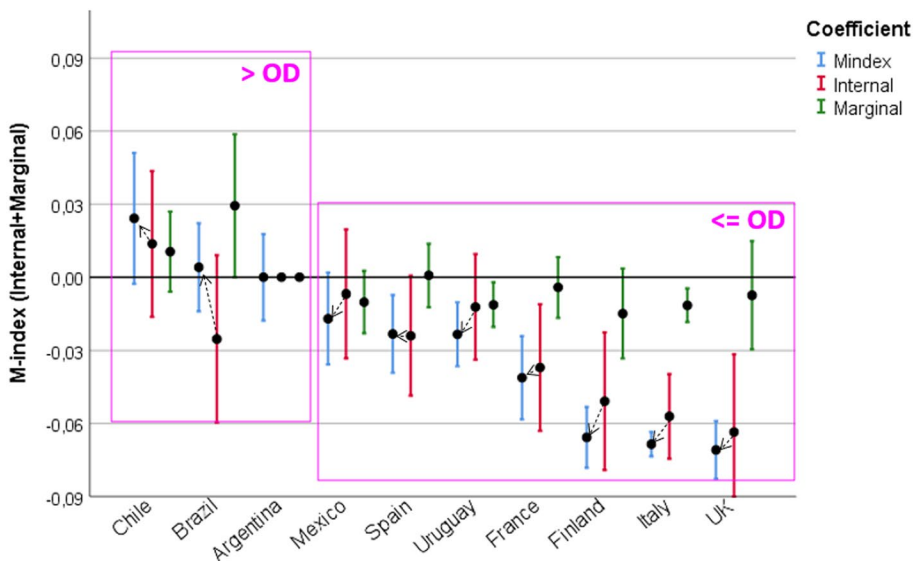

Fig. 7 M-Index and decomposition: internal + marginal (Argentina as reference = 0). *Ordered by M-Index: Women. Source* own elaboration

In conclusion, the Mutual Information Index enhances the analysis of social mobility by providing a synthetic coefficient that provides comparative information on the level of association/inequality between origins and destinations.. Its decomposition into two parts—marginal and internal—, the one that excludes the margins (margin free) as is the internal coefficient, which in all cases provides information on the level of rigidity/fluidity of the societies analysed, as well as the results that arise from the Marginal coefficient, an aspect that shows the extent to which class barriers operate in favour or not of social openness.

This provides information on the rigidity or fluidity of the analysed societies, as well as the results of the marginal coefficient, which show the extent to which class barriers affect social openness. In general, our findings indicate that Latin American societies are more rigid, and that this rigidity is reinforced by the combined effect of marginal and internal factors. In contrast, European societies are distinguished by their fluidity, which can be attributed to the additive influence of two key forces. The internal effect, in particular, is enhanced by a reduction in class barriers, as evidenced by the marginal coefficient (which is consistently negative), which helps to constrain class barriers.

5 Conclusions and Discussion

The general objective of this article was to contribute to the comparative analysis of social inequalities based on the analysis of intergenerational social mobility among the 10 countries of the INCASI network. We have used data previously standardised by Latin American researchers and done the same with European sources, trying to make the treatment of the surveys used as comparable as possible.

We have used the classic method of analysis in this type of study, looking at both absolute and relative mobility, studying social fluidity or rigidity, but we have innovated by using a new way of analysing social mobility, applying the Mutual Information Index, which allows us to go beyond the classic models and qualify the conclusions of this type of study. The results obtained are summarised below and the section ends with an analysis of their implications, limitations and future analysis.

We have presented the analysis of absolute mobility as an important and mostly descriptive element in order to move on to the remaining relative analyses. In this sense, we have been able to show that structural change has been very important in both Latin American and European countries. There is a greater similarity in the movement of classes in Europe, and we see that these changes are more abrupt in Latin America. The sharp decline of the agricultural classes in these countries at the same time as the sharp decline of the industrial classes in Europe shows us two different stages in the industrialisation process according to Ishida and Miwa (2011), which can be summarised as high rates of de-ruralisation, higher among day labourers in the late industrialised countries, and a more accentuated process of de-industrialisation in the European countries. The growth of the service class shows the accentuation of the post-industrial phase in Europe, but this process is also visible in Latin American countries as a whole, with greater nuances and less accentuation than in Europe.

If we analyse absolute social mobility in a more compact form, taking the 7 EGP classes into 4 macro-classes, we observe the importance of immobility, a relevant issue in this field of study, as it is an indicator of the strength or inertia of social reproduction. More than

40% of people are in this situation in all the countries analysed, with Latin American countries differing from European countries by just over one point.

However, if we go down from this total of 40% to the individual countries, we see that it is the men in Uruguay, Chile and Argentina who have the highest levels of reproduction, and the women who have the lowest, with a drop of almost 5 points more for European women. It is also women who have experienced the highest upward mobility (46%), while Latin American women are at 43% and upward mobility as a whole in all the countries analysed is 41%, i.e. equal to total reproduction (42%). Finally, the overall reproduction rate is close to 17%, with only one point of difference between Latin American and European countries. If we leave aside the structure, the margins of the table, and begin to assess the relative mobility provided by Unidiff, we find that the European countries are more fluid than the Latin American countries, with the exception of Brazil, as already mentioned, which is linked to the strong process of de-ruralisation in that country, an issue studied in detail by Costa Ribeiro (2012, 2014). Conversely, Chile, Mexico and Argentina, with the exception of Uruguay, stand out as the most rigid compared to the other countries, and the Europeans as the most fluid, with Finland standing out as the most fluid. The fluidity of these countries is driven more by women.

The results obtained through M-Index provide an innovative perspective on the analysis of social mobility trends, offering a synthetic coefficient that integrates crucial comparative information on the link between origins and destinations. This statistically sound methodological approach allows the relationship to be broken down into its intrinsic components, revealing significant, consistent and nuanced patterns across the societies analysed. The internal coefficient, independent of the Margins, provides an accurate and reliable measure, similar to the Unidiff Coefficient, of the degree of social rigidity or fluidity in each context. Complementarily, the marginal coefficient quantifies, by weighting, the influence of class barriers on social openness. The synthesis of these indicators in the M-Index provides a comprehensive assessment of the dynamics of intergenerational social mobility. The empirical results of this analysis are compelling: Latin American societies consistently exhibit greater social rigidity, exacerbated by the influence of marginal effects (which take into account demographic shifts between classes) in addition to internal effects. This reveals a vicious circle of inequality in which both components combine to reinforce the patterns of association between origin and destination that explain the high persistence of inequality in the region, albeit with some specific nuances, as in the case of Uruguay.

By contrast, European societies are characterised by social fluidity. This fluidity is explained by the convergence of two forces: a double relative mobility, which demonstrates the non-invariance of the OD ratio, characterised by the internal coefficient (free of margin), which in turn is reinforced by a significant reduction in class barriers, characterised by systematically negative marginal coefficients, which also contribute to the formation of the negative global M-Index value. Spain is the country that shows nuances to this generalised European behaviour. In this sense, it can be affirmed that both mechanisms combine in such a way as to promote the virtuous circle that reduces the inequality of the origin–destination association.

These results, supported by consistent and innovative statistical analysis, provide a solid basis for a better understanding of the absolute and relative differences in intergenerational social mobility between territories. They provide a sound empirical basis for future research, help to refine theoretical explanatory models of social mobility and contribute to the definition of policy formulations aimed at tackling persistent social inequalities.

In light of these results, we revisit our hypothesis, which was originally proposed by Ishida and Miwa (2011). This hypothesis argued that countries that undergo late industrialisation (in our case, Latin American countries) exhibit lower fluidity than countries that undergo early industrialisation. In general terms, the hypothesis has been validated. However, further analysis reveals nuances to this initial hypothesis. We proposed that countries at an intermediate level of development, such as Italy and Spain, would tend to move closer to late industrialising countries. The data, when considered alongside the results of the relative mobility analysis and the M-Index, indicate that this is not wholly accurate in the case of Spain. Conversely, the evidence supports this hypothesis in the context of Italy.

In contrast, the second hypothesis posited that early industrialised countries would narrow the gap in terms of inequality with respect to late industrialised countries when M-Index and its decomposition were taken into account, specifically through the marginal effect. This hypothesis has not been corroborated, and in fact, an inverse effect to the expected greater equality has been observed. In Latin American countries, the marginal effect accentuates inequality, while in European countries, there is a reduction in class barriers.

The implementation of this novel analytical strategy has revealed a striking contrast in social circumstances between the two types of countries, with the observed disparities proving to be more pronounced than initially anticipated. M-Index enables us to comprehend the manner in which the vicious circle of inequality operates in Latin American countries. This is explained by the conjunction of low equality of opportunities endorsed by an occupational structure where patterns of social reproduction or downward mobility prevail. This contrasts with the virtuous circle observed in European societies, where there is greater equality of opportunities, accompanied by a movement in the social structure that has favoured the prevalence of higher-level occupations at the destination.

Appendix

See Tables 4, 5, 6, 7, 8

Table 4 Características de la muestra utilizada y tasas de ocupación por país y año de la muestra Latin America (Solís and Boado, 2016), for Europe it is own elaboration

Countries	Argentina	Brazil	Chile	Mexico	Uruguay	Spain	France	Great Britain	Finland	Italy
Reference years	2003–2010–2011	2008	2009	2011	2012–2013	2008–2010 2012–2014	2008–2010 2012–2014	2008–2010 2012–2014	2008–2010 2012–2014	2011
Survey name	(Various names)	Pesquisa Dimensões Sociais das Desigualdades	Encuesta Nacional de Estratificación Social	Encuesta de Movilidad Social en México	Encuesta Longitudinal de Protección Social (primera ola)	European Social Survey	European Social Survey	European Social Survey	European Social Survey	Indagine sul reddito e le condizioni di vita
Coverage	The whole country	The whole country	The whole country	The whole country	The whole country	The whole country	The whole country	The whole country	The whole country	The whole country
Target population	Employed persons between 20 and 64 years old	Heads of household and employed spouses between 20 and 64	Employed persons between 20 and 64	Employed persons between 25 and 64	Employed persons between 25 and 64	Economically active population between 25 and 64	Economically active population between 25 and 64	Economically active population between 25 and 64	Economically active population between 25 and 64	Economically active population between 25 and 64
Type of survey	Face-to-face household survey	Face-to-face household survey	Face-to-face household survey	Face-to-face household survey	Face-to-face household survey	Face-to-face household survey	Face-to-face household survey	Face-to-face household survey	Face-to-face household survey	Face-to-face household survey
Analytical sample size	5491	4744	2830	5670	7740	4393	4028	5138	4307	17,764
Responsible institution	Centro de Estudios de Opinión Pública, Universidad de Buenos Aires	Instituto de Estudos Sociais e Políticos da Universidade do Estado do Rio de Janeiro	Proyecto Desigualdades (Anillos-CONICYT)	Centro de Estudios Espinosa Yglesias	Banco de Previsión Social	Universidad Pompeu Fabra	Cevipof (Science Po)	Center for Comparative Social Surveys	University of Turku	National Institute for Statistics (ISTAT)
Inputs for class construction (origins)	CUIO 88, Position, size, supervision	CUIO 88, Position, size, supervision	CUIO 88, Position, size, supervision	CUIO 88, Position, size, supervision	CUIO 88, occupational category	ISCO 88, Position, size, supervision	ISCO 88, Position, size, supervision	ISCO 88, Position, size, supervision	ISCO 88, Position, size, supervision	ISCO88, Position, size, supervision

Table 4 (continued)

Countries	Argentina	Brazil	Chile	Mexico	Uruguay	Spain	France	Great Britain	Finland	Italy
Inputs for class construction (destinations)	CUIO 88, Position, size, supervision	CUIO 88, Position, size, supervision	CUIO 88, Position, size, supervision	CUIO 88, Position, size, supervision	CUIO 88, ocupational category	ISCO 88, Position, size, supervision	ISCO 88, Position, size, supervision	ISCO 88, Position, size, supervision	ISCO 88, Position, size, supervision	ISCO 88, Position, size, supervision

Sources of the samples: Latin America (Solís and Boado, 2016), for Europe it is own elaboratio

Table 5 M-Index, Contrast, Internal and Marginal: Men and Women

Country	M-Index Coef	[95% Conf. Interval]	
Chile	0.1543900	0.1345827	0.1741973
Mexico	0.1350400	0.1221015	0.1479786
Brazil	0.1208974	0.1081418	0.1336530
Argentina	0.1181822	0.1053718	0.1309926
Spain	0.0982380	0.0849279	0.1115482
Uruguay	0.0960653	0.0861450	0.1059855
France	0.0701776	0.0584163	0.0819388
Finland	0.0554132	0.0454798	0.0653466
UK	0.0517113	0.0426659	0.0607568
Italy	0.0496179	0.0449469	0.0542889
Country	Internal Coef	[95% Conf. Interval]	
Chile	0.0075896	−0.13188	0.0283673
Mexico	0.0016063	−0.0173494	0.020562
Argentina	0		
Uruguay	−0.0179631	−0.0351977	−0.0007284
Brazil	−0.0185722	−0.0355321	−0.0016123
Spain	−0.0240811	−0.0402203	−0.0079418
France	−0.0392737	−0.0560963	−0.0224511
Italy	−0.0508940	−0.0644100	−0.0373781
Finland	−0.0541389	−0.0709904	−0.0372873
UK	−0.0574356	−0.0721207	−0.0427504
Country	Marginal Coef	[95% Conf. Interval]	
Chile	0.0286182	0.0179551	0.0392813
Brazil	0.0212874	0.0113374	0.0312374
Mexico	0.0152515	0.0055968	0.0249063
Spain	0.0041369	−0.0031997	0.0114736
Argentina	0		
Uruguay	−0.0041538	−0.0111421	0.0028344
Finland	−0.0086301	−0.0202624	0.0030022
France	−0.0087309	−0.0162718	−0.00119000
Gran	−0.0090353	−0.0145708	−0.0034999
Italy	−0.0176703	−0.0214324	−0.0139081

Table 6 M-Index, Contrast Internal and Marginal: Men

Country	M-Index Coef	[95% Conf. Interval]	
Chile	0.2001741	0.1719283	0.2284199
Mexico	0.1725506	0.1545701	0.1905312
Argentina	0.1385416	0.1204433	0.1566399
Brazil	0.1335648	0.1153068	0.1518227
Spain	0.1216750	0.1005912	0.1427588
Uruguay	0.1176475	0.1019500	0.1333451
France	0.0952115	0.0754796	0.1149434
Finland	0.0825664	0.0640762	0.1010566
UK	0.0798877	0.0645362	0.0952393
Italy	0.0644670	0.0561878	0.0727461
Country	Internal Coef	[95% Conf. Interval]	
Chile	0.0223357	−0.0063993	0.0510707
Mexico	0.0138936	−0.0103839	0.0381711
Argentina	0		
Brazil	−0.0223367	−0.046567	0.0018937
Uruguay	−0.0242255	−0.0460136	−0.0024374
Spain	−0.0297109	−0.0554342	−0.0039876
France	−0.0329276	−0.0575858	−0.0082695
UK	−0.0479086	−0.0700014	−0.0258158
Finland	−0.0503648	−0.0778689	−0.0228607
Italy	−0.0556232	−0.0724249	−0.0388215
Country	Marginal Coef	[95% Conf. Interval]	
Chile	0.0392968	0.0243425	0.0542512
Mexico	0.0201155	0.0083331	0.0318978
Brazil	0.0173598	0.0032703	0.0314494
Spain	0.0128443	0.0023382	0.0233504
Uruguay	0.0033314	-0.0058760	0.0125388
Argentina	0		
Finland	−0.0056104	−0.027525	0.0163041
France	−0.0104025	−0.0236201	0.0028152
UK	−0.0107453	−0.0212388	−0.0002517
Italy	−0.0184514	−0.0249987	−0.0119041

Table 7 M-Index, Contrast, Internal and Marginal: Women

Country	M-Index Coef	[95% Conf. Interval]	
Chile	0.1318620	0.1049589	0.1587652
Brazil	0.1117553	0.0937093	0.1298012
Argentina	0.1076775	0.0899472	0.1254079
Mexico	0.0907331	0.0719557	0.1095104
Spain	0.0844673	0.0685334	0.1004012
Uruguay	0.0843268	0.0712146	0.0974389
France	0.0665026	0.0493848	0.0836205
Finland	0.0419884	0.0294339	0.0545430
Italy	0.0391678	0.0341600	0.0441755
UK	0.0368272	0.0249570	0.0486975
Country	Internal Coef	[95% Conf. Interval]	
Chile	0.0137128	−0.0161412	0.0435667
Argentina	0		
Mexico	−0.0068170	−0.0332365	0.0196025
Uruguay	−0.0121391	−0.0337976	0.0095194
Spain	−0.0239683	−0.0485292	0.0005927
Brazil	−0.0252905	−0.0595961	0.0090152
France	−0.0370061	−0.0630422	−0.0109700
Finland	−0.0508373	−0.0791261	−0.0225486
Italy	−0.0570621	−0.0745019	−0.0396224
UK	−0.0634869	-0.0953967	−0.0315771
Country	Marginal Coef	[95% Conf. Interval]	
Brazil	0.0293682	0.0000287	0.0587076
Chile	0.0104717	−0.005948	0.0268914
Spain	0.000758	−0.0122247	0.0137407
Argentina	0		
France	−0.0041688	−0.0166069	0.0082693
UK	−0.0073634	−0.0295379	0.0148111
Mexico	−0.0101275	−0.0229126	0.0026576
Uruguay	−0.0112117	−0.0203403	−0.0020832
Italy	−0.0114476	−0.0182967	−0.0045986
Finland	−0.0148518	−0.0332297	0.0035261

Table 8 Summary of indicators for country and sex

Country Men	Absolute mobility			Rel. mobility Unidiff	M-Index Coef	Internal Coef	Marginal Coef
	Ascending	Immobility	Descending				
Argentina	0.34	0.47	0.19	1	0.1385416	0	0
Brazil	0.44	0.42	0.14	0.8750	0.1335648	−0.0223367	.0173598
Chile	0.36	0.49	0.14	1.0773	0.2001741	0.0223357	.0392968
Finland	0.50	0.33	0.17	0.7343	0.0825664	−0.0503648	−.0056104
France	0.43	0.44	0.14	0.8156	0.0952115	−0.0329276	−.0104025
G.Britain	0.40	0.38	0.22	0.7911	0.0798877	−0.0479086	−.0184514
Italy	0.40	0.42	0.18	0.7618	0.064467	−0.0556232	.0201155
Mexico	0.45	0.43	0.13	1.0667	0.1725506	0.0138936	.0128443
Spain	0.43	0.43	0.14	0.9223	0.121675	−0.0297109	−.0107453
Uruguay	0.33	0.45	0.22	0.9311	0.1176475	−0.0242255	.0033314
Average	0.40	0.43	0.17				
Country Women	**Absolute mobility**			**Rel. Mobility Unidiff**	**M-Index Coef**	**Internal Coef**	**Marginal Coef**
	Ascending	Immobility	Descending				
Argentina	0.42	0.39	0.19	1	0.1076775	0	0
Brazil	0.47	0.37	0.16	0.8994	0.1117553	−0.0252905	.0293682
Chile	0.46	0.38	0.16	1.0434	0.131862	0.0137128	.0104717
Finland	0.56	0.33	0.10	0.6689	0.0419884	−0.0508373	−.0148518
France	0.41	0.45	0.14	0.7914	0.0665026	−0.0370061	−.0041688
G.Britain	0.36	0.45	0.19	0.5976	0.0368272	−0.0634869	−.0073634
Italy	0.43	0.40	0.17	0.6950	0.0391678	−0.0570621	−.0114476
Mexico	0.53	0.34	0.12	0.9398	0.0907331	−0.006817	−.0101275
Spain	0.41	0.45	0.14	0.9075	0.0844673	−0.0239683	.0007580
Uruguay	0.39	0.40	0.21	0.9837	0.0843268	−0.0121391	−.0112117
Average	0.44	0.40	0.17				

Declarations

Conflict of interest The authors declare that they have no competing interests.

References

Blau, P., & Duncan, O. (1967). *The American occupational structure*. Glencoe.

Boado, M., & Fachelli, S. (2020). Un contraste sobre la movilidad social intergeneracional en Buenos Aires y Montevideo. *Estudios Sociológicos, 38*(114), 723–761. https://doi.org/10.24201/es.2020v38n114.1867

Breen, R. (2004). Social Mobility in Europe (Oxford, 2004; online edn, Oxford Academic, 16 Nov. 2004). https://doi.org/10.1093/0199258457.001.0001

Breen, R. (2020). Educación y movilidad social en Europa. In O. Salido & S. Fachelli (Eds.), *Perspectivas y fronteras en el estudio de la desigualdad social: movilidad social y clases sociales en tiempos de cambio*. Centro de Investigaciones Sociológicas.

Breen, R. (2010). Educational expansion and social mobility in the 20th century. *Social Forces, 89*(2), 365–388.

Breen, R., & Müller, W. (2020). *Education and intergenerational social mobility in Europe and the United States*. Stanford University Press.

Bukodi, E., Paskov, M., & Nolan, B. (2020). Intergenerational class mobility in Europe: A new account. *Social Forces, 98*(3), 941–972.

Carabaña, J. (1999). *Dos estudios sobre movilidad intergeneracional*. Fundación Argentaria: Visor.

Costa Ribeiro, C. A. (2023). *Educational expansion and class mobility trends in Brazil*. Santiago: CLACSO.

Costa Ribeiro, C. A. (2012). Quatro décadas de mobilidade social no Brasil. *DADOS Revista De Ciências Sociais, 55*(3), 641–679.

Costa Ribeiro, C. A. (2014). Mobilidade e estrutura de classes no Brasil contemporâneo. *Sociologias, 16*(37), 178–217.

Dalle, P. (2016). Movilidad social desde las clases populares. CLACSO: Buenos Aires.

Erikson, R., & Goldthorpe, J. H. (1992). *The constant flux: A study of class mobility in industrial societies*. Oxford University Press.

Fachelli, S., Jorrat, R., & López-Roldán, P. (2021). Intergenerational class mobility over birth cohorts in Argentina and Spain. *Revista Española De Sociología, 30*, 1–20.

Fachelli, S., & López-Roldán, P. (2013). Análisis de movilidad social. Dipòsit Digital de Documents, Universitat Autònoma de Barcelona. https://ddd.uab.cat/record/88747

Fachelli, S., López-Roldán, P. (2015). ¿Somos más móviles incluyendo a la mitad invisible? Análisis de la movilidad social intergeneracional en España en 2011. *Revista Española de Investigaciones Sociológicas* (150) 41–70. https://doi.org/10.5477/cis/reis.150.41

Fachelli, S., López-Roldán, P., & Segura-Carrillo, C. (2023). La incidencia de la experiencia laboral en la movilidad social intergeneracional en España. *Revista Internacional de Sociología*, *81*(2), e226. https://doi.org/10.3989/ris.2023.81.2.M22b-005

Fachelli, S., Marqués-Perales, I., Boado, M., & Solís, P. (2021). Social Mobility from a Comparative Perspective Between Europe and Latin America. In P. López-Roldán and S. Fachelli (eds), Towards a Comparative Analysis of Social Inequalities between Europe and Latin America. Springer, Cham. 203-234. https://doi.org/10.1007/978-3-030-48442-2_7

Featherman, D., Jones, F., & Hauser, R. (1975). Assumptions of mobility research in the US: The case of occupational status. *Social Science Research, 4*, 329–360.

Ganzeboom, H. B. G., De Graaf, P. M., & Treiman, D. J. (1992). A standard international socio-economic index of occupational status. *Social Science Research, 21*(1), 1–56.

Ganzeboom, H. B. G., Treiman, D. J., & Ultee, W. C. (1991). Comparative intergenerational stratification research: Generations and beyond. *Annual Review of Sociology, 17*, 277–302.

Germani, G. (1963). La movilidad social en la Argentina. In S. M. Lipset & R. Bendix (Eds.), *Movilidad social en la sociedad industrial*. EUDEBA.

Gerschenkron, A. (1962). On the concept of continuity in history. *Proceedings of the American Philosophical Society, 106*(3), 195–209.

Gil-Hernández, C.J., Marqués-Perales, I., & Fachelli, S. (2017). Intergenerational social mobility in Spain between 1956 and 2011: The role of educational expansion and economic modernisation in a late industrialised country. *Research in Social Stratification and Mobility 51*, 14–27. https://doi.org/10.1016/j.rssm.2017.06.002

Glass, D. V. (1954). *Social mobility in Britain*. Routledge.

Goldthorpe, J. H. (2003). The myth of education-based meritocracy. *New Economy, 10*(4), 234–239.

Goldthorpe, J. H., Llewelin, C., & Payne, C. (1987). *Social mobility and class structure in modern Britain*. Oxford University Press.

Hout, M. (1983). *Mobility tables*. Sage.

Ishida, H. (2008). Social stratification and social mobility in late-industrializing countries. The 2005 *SSM Research Series*, 14.

Ishida, H., Miwa, S. (2011). *Comparative Social Mobility and Late Industrialization*. Paper presented at Workshop of the Center for Research on Inequalities and the Life Course (CIQLE), Yale University (January 14). Cited with the authors' permission.

Jorrat, J. R. (2016). De tal padre, ¿tal hijo? Estudios sobre Movilidad Social en Argentina. Dunken: Buenos Aires.

Jorrat, J. R. (2000). *Estratificación social y movilidad. Un estudio sobre el Área Metropolitana de Buenos Aires*. Editorial de la Universidad Nacional de Tucumán.

Jorrat, J. R., & Benza, G. (2016). Patrón de asociación entre clase de origen y clase de destino. Modelos de análisis de datos categóricos de dos vías. In Jorrat 2016. *Capítulo, 6*, 127–242.

Jorrat, J. R., Boado, M., & Espinoza, V. (2024). Trends in intergenerational class mobility and education in Argentina, Chile, and Uruguay, over common birth cohorts. *International Sociology, 40*(1), 82–107. https://doi.org/10.1177/02685809241281075

Jorrat, R., Dalle, P., Fachelli, S., & Riveiro, M. (2004). Historical evolution of intergenerational class mobility and educational effects in urban Argentina: 1960–2017. *Research in Social Stratification and Mobility, 89*(100868), 1–15.

Kerr, C., Dunlop, J., Harbison, F., & Myers, C. (1960). *Industrialism and industrial man: The problems of labor and management in economic growth*. Harvard University Press.

Kuznets, S. (1955). Economic growth and income inequality. *The American Economic Review, 45*(1), 1–28.

Labbens, J., & Solari, A. (1966). Movilidad social en Montevideo. In A. Solari (Ed.), *Estudios sobre la estructura social uruguaya*. Arca.

López-Roldán, P., Fachelli, S. (2021). *Towards a Comparative Analysis of Social Inequalities between Europe and Latin America*. Springer International Publishing Cham. https://doi.org/10.1007/978-3-030-48442-2

Lipset, S., & Bendix, R. (1963). Movilidad social en la sociedad industrial (R. Malfé, Trad.). Buenos Aires: Eudeba.

Marqués-Perales, I., Fachelli, S., & López-Roldán, P. (2023). Using the decomposition of the mutual information index as an alternative approach to the study of educational inequality trends in Spain. *Research in Social Stratification and Mobility 87*, 100827. https://doi.org/10.1016/j.rssm.2023.100827

Parsons, T. (1951). *The social system*. The Free Press.

Seiler, S., & Jann, B. (2019a). *Bringing the Margins Back In. Using the M-Index for the Analysis of Social Mobility*. 114th Annual Meeting of the American Sociological Association. New York. 10–13 August. Retrieved from https://boris.unibe.ch/132702/. Accessed July 30, 2022.

Seiler, S., & Jann, B. (2019b). *International Comparison of Social Mobility using the M-Index*. Paper at the ISA RC28 Summer Meeting, Princeton. 15–17 August. Retrieved from: https://boris.unibe.ch/132703/. Accessed July 30, 2022.

Selwyn, B. (2011). Trotsky Gerschenkron and the political economy of late capitalist development. *Economy and Society*, *40*(3), 421–450. https://doi.org/10.1080/03085147.2011.574425

Social Mobility in Europe Oxford University Press, Oxford.

Solari, A., Campiglia, N., & Prates, S. (1967). Education, occupation and development. *International Social Sciences Journal*, 19(3).

Solís, P., & Boado, M. (2016). *Y sin embargo se mueve. Estratificación social y movilidad intergeneracional de clase en América Latina*. El Colegio de México y Centro de Estudios Espinosa Yglesias.

Theil, H. (1967). *Economics and information theory*. North Holland.

Theil, H. (1972). *Statistical decomposition analysis*. North Holland.

Torche, F., & Wormald, G. (2004). *Estratificación y movilidad social en Chile: entre la adscripción y el logro*. Serie Políticas Sociales Nro. 98. CEPAL.

Torche, F., & Ribeiro, C. C. (2010). Pathways of change in social mobility: Industrialization, education and growing fluidity in Brazil. *Research in Social Stratification and Mobility*, *28*(3), 291–307. https://doi.org/10.1016/j.rssm.2010.03.005

Tortella, G. (1994). Patterns of economic retardation and recovery in south-western Europe in the nineteenth and twentieth centuries. *The Economic History Review, 47*(1), 1–21.

Treiman, D. J. (1970). Industrialization and social stratification. In E. O. Laumann (Ed.), *Social stratification: Research and theory for the 1970s*. Bobbs Merrill.

Vaccaro, R. (1980). Industrialization in Spain and Italy 1860–1914. *Journal of European Economic History, 9*, 709–751.

Vallet, L.-A. (2015). *Mobilité observée et fluidité sociale en France au fil des cohortes de naissance et selon l'avancée en âge. In Notions d'âge, de période et de cohorte: Peut-on en démêler les effets?* Institut national de la statistique et des études économiques.

Whelan, C., & Layte, R. (2002). Late industrialization and the increased merit selection hypothesis Ireland as a test case. *European Sociological Review, 18*(1), 35–50.

Xie, Y. (1992). The log-multiplicative layer effect model for comparing mobility tables. *American Journal of Sociology, 57*, 380–395.

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