Educational Expansion and Decline in the 'Mobility Returns' of Higher Education: The Case of Brazil and Mexico*

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1. Introduction. Mexico and Brazil are interesting cases for the study of intergenerational mobility for several reasons. First, very little is known about mobility in Latin America, and in general, in the developing world. Second, both countries have experienced pervasive economic crisis since 1980, and Mexico underwent deep market reform in the last two decades. These conditions make Mexico and Brazil depart from the industrialized world in relevant ways that may affect social fluidity. Researchers have shown that social fluidity has increased or remained constant since the 1970s in Europe and the US (Erikson and Goldthorpe 1992, Breen 2004, Hout 1988). The only country in which the origin-destination association has been found to increase in the recent past is Russia, as individuals "returned to their social origins" in a context of deep recession and market reform in the 1990s (Gerber and Hout 2004). Similar economic transformations render Brazil, and particularly Mexico, interesting cases to test whether, as in the Russian case, social fluidity may have declined.

Furthermore, Mexico and Brazil provide the opportunity to explore the role of education in the mobility process. Education is claimed to be the most important factor in the stratification process. This is particularly so in Latin America, where income inequality is tightly linked to disparities in the distribution and returns to schooling (Birdsall and Londono 1997, Cragg and Epelbaum 1996, Birdsall and Sabot 1996). As highlighted by the status attainment model, education plays a double role in the process of stratification. On the one hand, it is a vehicle of social reproduction, as parental resources determine the quantity and quality of offspring's education, which in turn determines socioeconomic attainment. On the other hand, education affects class position net of the effect of social background, thereby opening opportunities for mobility. The status attainment approach also shows that social origin has a direct influence on destinations, unmediated by education, through, for example,

the transfer of property or the use of social networks. Examination of these avenues of influence will inform our understanding of the factors driving changes in social fluidity. In this paper we analyze trends in social mobility of Mexican and Brazilian men over the last four decades. We examine also the role of education in the mobility process, and its change over time. In particular, we evaluate changes in the association between social origins and educational attainment, the association between education and destination, and the direct influence of origins on destinations net of education.

Finally, we use the Mexican and Brazilian cases to test the "declining mobility returns to higher education" hypothesis. The hypothesis emerges from the finding that the origin-destination association is weaker among individuals with higher education. Hout (1988) finds that college graduation cancels the influence of social background on destination status in the U.S, and a much weaker origin-destination association among those with advanced education was also found in France and Korea (Vallet 2004, Park 2006). A corollary of this finding is that, as education expands and more individuals reach advanced schooling, the overall association between origin and destination should decline, driven by a compositional effect (Hout forthcoming, Beller and Hout 2006). This prediction is based on the key assumption that the role of higher education in erasing the influences of origin will remain constant as more and more members of a cohort reach advanced schooling. However, this assumption may be unrealistic. As college education expands, it may become less selective, so that college graduates with different social backgrounds will become more similar in unobserved characteristics (ability, motivation, etc.), and the credential will be a less powerful signal of these unobserved qualities to employers. This would result in the *strengthening* of the influence of social origins on socioeconomic attainment among college graduates, preventing, therefore, an increase in overall social fluidity.

The "declining mobility returns to higher education" (DMR) hypothesis combines the notion of changing selectivity on unobservables (Mare 1980, 1981) with the signaling theory claim that education is rewarded in the labor market because it is a signal of individual desirable attributes rather than a mechanism to increase productivity (Weiss 1995)[1]. Note that DMR has three testable components:

- The origin-destination association is weaker among those members of the cohort with higher educational attainment than among those with lower educational credentials.
- The proportion of members of the cohort who access higher education increases over time as education expands.
- The role of higher education in canceling the influence of social background declines across cohorts, as higher education becomes more widespread and therefore less selective.

The DMR hypothesis offers a specific mechanism for the increase in fluidity among those who reach post-secondary schooling: The influence of class origin on destination will strengthen if the relative scarcity and selectivity of this educational level declines. This hypothesis assumes a social reproduction process based on an inverse correlation between expansion of higher education and its ability to cancel the influence of social origins on class destination. As with the *maximally maintained inequality* hypothesis (Raftery and Hout 1993), DMR does not make universal claims. We claim that the role of higher education in canceling the effect of social origins on destinations is historically specific, depending on: 1) how widespread advanced education is, 2) how rapidly it expands across cohorts, and 3) to what extent its selection criteria are based on social background characteristics in different national contexts. For instance, in a country where higher education expands rapidly based

[1] An alternative mechanism would emerge if the rapid expansion of higher education results in sharp decline in its quality, i.e. a decline in the ability of post-secondary institutions to produce human capital valuable in the labor market. The predicted outcomes of this process are similar to those outlined above.

on open admissions-type policies, we should expect a substantial decline of its role at canceling the O-D association. In contrast, if enrollment at the post-secondary level remains low over time, and selection criteria are detached from social background characteristics, higher education's role at canceling the influence of social background should not decline.

In order to test these hypotheses, this paper is organized as follows. Section 2 describes the Mexican and Brazilian economic context, educational system, and the recent market reform. Section 3 introduces the data and methods. Section 4 presents the analysis of trends in intergenerational mobility, the changing role of education in the mobility process in the two countries, and tests the "declining mobility returns to higher education" hypothesis. Section 5 discusses the findings and concludes.

2. Economic Context: Mexico and Brazil.

2.1. Mexico: Economic Crisis and Deep Market Reform: Mexico is a middle-income country with a current per capita income of $7,310, which compares with an average of $4,008 in Latin America, and $43,740 in the US (World Bank 2006). Mexico experienced significant industrialization and urbanization in the second half of the 20th century, with the urbanization rate expanding from 51% in 1960 to 74% in 2000, and the percent of employment in services rising from 22% to 53% in the same period (Oxford Latin American Economic History Database).

Between the 1940s and the 1970s, Mexico benefited from sustained economic growth driven by an import-substitution industrialization (ISI) strategy based on a strong role for the state and a relatively closed economy. Economic growth was so substantial that this period is known as the "Mexican miracle" (Middlebrook and Zepeda 2003). This economic model started to show its limitations in the 1970s as Mexico increased its external debt to unmanageable levels (Middlebrook 1995, Lustig 1998). In the early 1980s Mexico endured a

severe debt-led crisis, followed by partial resurgence and a new devaluation crisis in 1995, from which the country is still recovering (Boltvinik 2003, Salas and Zepeda 2003, Vega and de la Mora 2003).

Figure 1 about here

Figure 1 plots the Mexican GDP per capita since 1960 (red line), and it shows the significant decline and fluctuation throughout the 1980s and 1990s. In face of the debt crisis, and under strong pressure from international financial institutions, Mexican authorities implemented an economic reform package that shifted away from state-led, inward-oriented development. Embracing a market-based model, reformers liberalized trade, deregulated foreign direct investment and financial markets, and aggressively privatized state-owned enterprises (Stalling and Peres 2000: 40-42). The scope and speed of the market reform was unprecedented. By 1993 only 210 of the 1,155 Mexican state-owned companies existing in 1982 had not been privatized, merged or liquidated (Teichman 1996), and by 2000 Mexico had become Latin America's largest exporter of manufactures (Middlebrook and Zepeda 2003).

Economic recession and market transformation have had substantial costs in terms of the population's economic wellbeing, including sharp declines in real wages, and poverty increases in the 1980s and 1990s (Laurell 2003, Solis and Villagomez 1999, Boltvinik 2003). The economic reform resulted also in an increase in income inequality. The Gini coefficient jumped from .43 to .48 between 1984 and 2000 (Boltvinik 2003; table 11.1) and Mexico currently ranks as the 15th most unequal country in the world (United Nations 2005). Interestingly, this major economic decline did not result in a substantial increase in unemployment or in a massive alteration of the occupational structure (Stallings and Peres 2000: 120, Portes and Hoffman 2003, table 3)[2]. Because unemployment insurance does not

[2] More detailed analysis is however necessary to ascertain reform-driven changes in the Mexican occupational structure. Unfortunately the Mexican 1980 Census tapes were damaged, canceling the possibility of using this important source of information.

exist in Mexico, unemployment is a "luxury that few can afford" (Salas and Zepeda 2003). Instead, the crisis resulted in the increase of precarious and unprotected economic activities in the informal sector, which accounted for almost half of the total employment after the 1995 crisis (Lustig 1998, Boltvinik 2003, Salas and Zepeda 2003). Even if the economic transformation did not result in a redefinition of the Mexican class structure, it may have resulted in reduced social fluidity if, for instance, a process similar to the Russian "returns to origins" (Gerber and Hout 2004) took place in the context of recession and market reform.

Figure 2 about here

Mexico experienced significant educational expansion throughout the second half of the 20th century, particularly at the lower educational levels. However, enrollments stagnated during the economic crisis of the 1980s (Binder 1999, Behrman, Duryea and Szekely 1999), driven by rising household liquidity constraints and declines in government educational spending (Reimers 1991, Binder 1998). Figure 2 reports the gross secondary and tertiary enrollment rates between 1960 and 2000 and show that sharp expansion between 1960 and 1980 was followed by stagnation during the 1980s-90s. Stagnation was more pronounced at the post-secondary level than at lower levels, which partly explains the growing college premium since the 1980s (Cragg and Epelbaum 1996). Stagnation in the context of an economic crisis may also have resulted in bottleneck in the transition to college, which in turn may have led to an increase in the effect of social background on the transition to higher education, as found in Russia (Gerber and Hout 1995, Gerber 2000, 2007).

Intergenerational Mobility in Mexico: No national study of intergenerational mobility exists to date in Mexico. Binder and Woodruff (2002) found that growing intergenerational educational mobility halted during the 1980s, which they attribute to the economic crisis of

this period. Along the same lines, using the 1998 National Retrospective Demographic survey Parrado (2005) found that occupational opportunities failed to keep pace with rising human capital in Mexico during the "neoliberal transformation" of the 1980s. Intra-generational mobility into good jobs decreased, and downward mobility increased even for educated workers. These studies suggest a reduction of intergenerational fluidity in the context of crisis and market reform, but they do not measure it directly. Two studies do so using urban samples, and find that the origin-destination association indeed may have strengthened for the cohorts most affected by the economic crisis and the market reform of the 1980s (Cortes and Escobar 2005, Zenteno and Solis 2006) [3]. The restriction of these studies to urban samples prevents generalizations to the Mexican population, however. The question about intergenerational class mobility in Mexico is therefore still open.

2.2. Brazil: Economic Stagnation and Limited Market Reform: Brazil provides an interesting contrast to Mexico. This South American nation experienced a strikingly similar process of economic expansion during the 1960s and 1970s, followed by recession in the 1980s and 1990s, but market reform was much more limited and gradual. Two distinct periods can be distinguished in Brazilian economic history since the 1940s. From 1940 to 1980 the country experienced industrialization, urbanization and extraordinary economic growth, which placed it as the 8th richest economy in the world in 1980 (Bresser-Pereira, 2003, Abreu e Verner, 1997; Adelman, 2001). The fastest economic growth took place between 1964 and 1982, a period that, as in Mexico, was labeled the "Brazilian miracle" (Abreu, 1990). As in Mexico, economic expansion was driven by import-substitution industrialization conducted by the government. The economic expansion was paralleled by a rapid rate of urbanization. In 1960 around 60% of the population was living in rural areas,

[3] Cortes and Escobar (2005) use a module of the 1994 Encuesta Nacional de Empleo Urbano (National Urban Employment Survey) conducted in 6 cities: Mexico City, Guadalajara, Monterrey, Veracruz, Cordoba-Orizaba and Merida which represent about one-third of the urban population, in turn about 75% of the country. With some caution this sample is said to represent the urban Mexican population. Zenteno and Solis (2006) use an urban subsample of the 1998 Encuesta Demografic Retrospectiva EDER (Retrospective Demographic Survey).

and 75% of those entering the labor market had fathers who were rural workers; in 1980 the rural population had dropped to around 30%, and 50% of those entering the labor market had fathers who were rural workers (Costa-Ribeiro, 2007; Bacha and Klein, 1989).

Economic development came to a halt in 1980, as a result of the debt crisis, and a mixture of stagnation and persistent inflationary crises came to define a new economic context (Bresser-Pereira, 2003, Abreu, 1990). As figure 1 indicates, economic growth has been virtually null since 1980. The country started implementing liberalization and privatization policies only in the early 1990s (Bresser-Pereira, 2003), but these market reforms have been much less pronounced and gradual than in the Mexican case (Stalling and Peres 2000, Amann 2004).

In addition to these economic changes, three characteristics of the Brazilian economic structure may frame the intergenerational mobility pattern in the country. First, given the massive urbanization through the second half of the century, as much as two-thirds of urban Brazilians have rural origins, either as rural migrants themselves or as offspring of those migrants. The long-lasting tradition of plantation and land concentration in the countryside led to high levels of rural poverty and inequality. As a consequence, most Brazilians with rural origins are very poor and do not bring any sort of economic resource when migrating to the cities and to industrial or urban service work. This factor contributes to the persistently high economic inequality in the country (Goodman, 1986). Even if economic disparities have somewhat declined since 1995 (Soares, 2006), Brazil ranks currently as the 7th most unequal country in the world (United Nations 2005).

A second relevant characteristic of Brazilian society is its significant labor market segmentation (Tavares and Serra, 1971). While the modern sector provides good wages and social insurance to a minority of the population, a more voluminous “informal” sector

characterized by small-scale and low-productivity economic activities provides low-wage and unprotected jobs for the majority of the population (Bacha and Taylor, 1976; Barros et al., 2000). As in the Mexican case, the informal sector grew in size during the 1990s, reaching more than one-half of the working population (Cardoso 2002).

Substantial economic inequality is also a result of the disparities in the access to education, which brings us to a third relevant characteristic of the Brazilian context. Educational expansion has historically favored higher education rather than more basic levels. During the 1960s and 1970s primary education grew very slowly, while the secondary and post-secondary levels were expanding rapidly. For example, during the 1970s the annual growth rate of post-secondary education was 11.6% per year and that of secondary education was 11.4%, while at the primary level it was only 3.6% (Castro, 1986). Unequal rates of expansion are largely due to the Brazilian educational finance system. While basic education is financed by municipal governments, secondary schools are financed by states, and most universities are funded by the federal government. Given that municipal governments have very limited resources, and the federal government is the richest part of the public sector, financial constraints were more relevant for primary schooling expansion. This situation began to change only in the late 1990s, when the federal government started to directly fund primary schools. As figure 2 indicates, educational expansion trends at the secondary and tertiary levels are quite similar to those in Mexico. In both cases there is stagnation in the 1980s and a growing secondary/tertiary gap (starting in the mid 1980s in Brazil and in the early 1990s in Mexico), which may have resulted in a bottleneck in the transition to post-secondary education.

In sum, this analysis suggests that overall economic and educational trends are rather similar in Mexico and Brazil. The main point of departure between the two countries is the depth and pace of the market transformation: limited and gradual in Brazil, vertiginous and deep in Mexico. In what follows we examine recent trends in social mobility in both

countries since the 1960s --with a focus on the role that educational attainment plays in the mobility process -- in order to determine whether Brazil and Mexico display similar patterns.

3. Data, Variables and Methods:

3.1. Data. Mexican data come from the 2006 Mexican Social Mobility Survey (MSMS). The MSMS is a probability, stratified, multistage survey of Mexican households, representative of the national population. The sampling frame is based on a roster of AGEBs (Areas Geoestadisticas Basicas-- Geostatistical Basic Areas) for urban areas, and a roster of rural localities (localidades rurales) for rural areas. The PSUs are municipalities, except for the metropolitan areas of Mexico City, Guadalajara and Monterrey, where they are AGEBs/rural localities. PSUs were stratified by size and socio-economic status, and selected with probability proportional to size. SSUs are AGEBs/localities, TSUs are blocks or groups of adjacent households in urban areas, from which households were randomly selected. Respondents within the 25-64 age range were selected at random, and no replacement of household or respondent was allowed. The sample frame used information provided by the Instituto Nacional de Estadistica, Geografia e Informatica (INEGI), based on projections from the 2000 Census. The sample size is 7,288 and the response rate excluding households without respondents 25-64 years old was 88.9 percent.

The Brazilian data come from the 1996 National Household Survey (Pesquisa Nacional por Amostragem Domicíliar, PNAD) collected by the Brazilian Bureau of the Census (Instituto Brasileiro de Geografia e Estatística). PNAD is a probability, stratified, multistage survey of Brazilian households, representative of the national population, with the exception of the rural area of the North region (the rainforest of Amazônia, which accounts for only 2.3% of the Brazilian population according to 2000 census). The sampling is based on the 1991 Census distribution of municipalities and "census sectors" and follows a three-step probabilistic procedure: First, counties are selected, then "census sectors" within

counties were chosen, and finally households within sectors were selected. Information on father's occupation necessary for mobility analysis is collected only for head of household and spouse. The total sample size is 331,263. Given significantly different patterns of labor market participation and occupational attainment across gender, we restrict this preliminary analysis to males in both countries.

3.2. Variables: We use information on current socioeconomic standing of the respondent and retrospective information on parental characteristics to construct a mobility table cross-classifying respondents' class of origin and class of destination. Class of origin measures the position of the respondent's father (or head of household if father was permanently absent) when respondent was 14 years old. Class of destination is the respondent's class position at time of survey or the last class position if the respondent was unemployed or otherwise not in the labor force at the time of the survey. The class classification utilized is a collapsed version of the 11-fold CASMIN class schema (Erikson and Goldthorpe 1992: 35-47), which distinguishes the following classes: Professionals and managers (I+II), clerical (III), employers (Iva), self-employed (IVb), skilled manual (V+VI), unskilled manual (VIIb) and agricultural workers (IVc+VIIb). We measure educational attainment using three ordinal categories: Primary education, some secondary schooling, and secondary graduate or more[4].

3.3. Methods. In order to assess temporal change we use a cohort analysis, distinguishing the following birth cohorts: C1= 1942-50, C2=1951-61, C3= 1962-68 and C4=

[4] In Mexico primary education comprises up to 6 years of schooling; some secondary schooling includes 7-12 years of schooling and no high school diploma, and higher education includes high school graduates and any type of post-secondary schooling. Categories are the same in Brazil, with the exception that primary includes up to 8 years of schooling. This accounts for differences in the educational systems between the two countries.

1969-76[5]. Given that the Brazilian sample was collected 10 years earlier than the Mexican sample we do not include the youngest cohort in Brazil. Cohort 1 reached occupational maturity in the 1970s, a period of high economic growth and the final stage of the ISI model of development in both countries. Cohorts 2 and 3 settled in their class of destination during the turbulent 1980s and 1990s, characterized by stagnation, crisis, and deep market transition in the Mexican case. Cohort 4 (observed only for Mexico) reached occupational maturity in the late 1990s and 2000s, a period of further economic turbulence as a result of the 1995 devaluation crisis, and consolidation of the new market regime. The main objective of this analysis is to identify period effects, i.e., changes in mobility opportunities over time. As is well known, cohort analysis confounds period, cohort, and age effects. We control for age effects by selecting respondents 30 years old and older, who have arguably reached "occupational maturity" and are unlikely to experience class mobility throughout their life-cycles. However, we cannot rule out at the moment a cohort interpretation of change. Incidentally, note that while in the industrialized world occupational maturity is claimed to be reached at age 35 (Goldthorpe 1980, Heath and Payne 1999), we selected 30 years old under the assumption that occupational maturity occurs at a lower age in Latin America due to lower overall educational attainment. In fact, our samples indicate that the mean age of labor market entry after finishing education is 15.5 in Mexico, ranging from 14.9 in the oldest cohort to 16 in the youngest one; and 12.7 in Brazil, ranging from 12.5 in the oldest cohort to 13.2 in the youngest.

The analysis utilizes log-linear and log-multiplicative models for the mobility table to assess changes in the O-D association across cohorts and educational levels, net of changes in the class structure. We use a full-interaction specification, which includes a unique parameter for each cell, to model the origin-destination association, and test several

[5] Age at time of survey of cohort members in Mexico are: C1=56-64 years old, C2=45-55 years old, C3=28-44 years old, and C4=3037 years old. In Brazil, they are C1=46-54 years old, C2=38-45 years old, C3=30-37 years old.

constraints to the parameters accounting for variation across cohorts and educational level. Model selection is based on the BIC statistic, which takes into account accuracy and parsimony of the compared models. Our analytical plan proceeds as follows. As a first step, we analyze change in the overall O-D association across cohorts. Then we analyze the role of education in the mobility process and its change over time. In particular, we explore trends in the origin-education association, in the education-destination association, and in the association between origin and destination net of education. As a final step we estimate models for the 4-way origin-destination-cohort-education interaction, which allow us to test the "declining mobility returns to higher education" (DMR) hypothesis.

4. Analysis.

4.1. Mexico: Trends in Social Fluidity. We start analyzing the three-way origins by destination by cohort table, in order to assess temporal change in social fluidity. The first model in table 1 is the independence model, which postulates no O-D association once the marginals have been controlled. As expected, model 1 fits the data poorly and it is only used as baseline for comparison. Model 2 assumes unconstrained O-D association (i.e. one parameter for each O-D cell), invariant across cohorts. Model 3 relaxes the temporal constancy assumption, and fits the log-multiplicative layer effect model, also known as UNIDIFF (Xie 1992, Erikson and Goldthorpe 1992). This model assumes a constant pattern of association, and accounts for changes in the strength of association across cohorts. Model 3 does not fit better than constant fluidity. However, examination of the cohort-specific parameters suggests that the intergenerational association substantially strengthened from C1 to C2, did not change between C2 and C3, and grew again in C4[6]. Thus, model 4 models a linear increase across cohorts, with no change from C2 to C3. Model 4 saves two degrees of

[6] The first of these parameters is normalized to be 1. Higher values indicate stronger association.

freedom without significant worsening of fit, and it has the best fit according to the L^2 and BIC statistic. Therefore model 4 is our preferred model[7].

This model indicates that, in sharp departure from what has been found in the industrialized world, *the intergenerational O-D association increased* in Mexico from C1 to C2 and C3, the two cohorts most affected by the economic crisis and market reform of the 1980s. Furthermore, the O-D association increased again for members of the youngest cohort, who were born between 1969-76 and reached occupational maturity in the late 1990s and early 2000s, during a new devaluation crisis and the consolidation of the market-oriented economic regime.

Table 1 about here

4.2. Accounting for Changes in Fluidity in Mexico: The Role of Education. The status attainment approach suggests that social origins indirectly influence social status through the influence of parental resources on educational attainment and the subsequent effect of education on class destination, and also directly, net of the mediating role of education. Therefore any change in the origin-destination association can be driven by one or more of the following factors: A change in the association between social background and education (conventionally called inequality of educational opportunity -- IEO), a change in the association between schooling and destination (i.e. returns to education), and a change in the influences of social background net of schooling. Furthermore, the overall association may be affected by a compositional effect if the strength of the intergenerational association varies across educational levels, and the educational distribution significantly changes over time.

[7] Given that the BIC statistic tends to favor simpler models with more degrees of freedom, particularly in moderately -sized samples (Raftery 1988, Wong 1994), BIC is a demanding test for the hypothesis of OD change across cohorts.

In what follows we provide a general test of these paths. We start with changes in equality of educational opportunity (IEO) across cohorts. International research has found that IEO has remained constant or has declined over the last few decades (Shavit and Blossfeld 1993, Breen et al. 2005). The only exceptions are Russia and Chile, where IEO has been found to increase. In Russia, the increase in the effect of social origin is related to the political chaos and economic crisis that harmed the educational system, and a bottleneck resulting from university-level squeeze (Gerber and Hout 1995, Gerber 2000, 2007). In the Chilean case, growing inequality appears to be driven by advantages of those attending private-voucher schools after the privatization of education in the 1980s, and by a deep economic recession (Torche 2005a). In the Mexican case, circumstances were similar to those found in Russia and Chile: economic depression and stagnation in post-secondary enrollment may have resulted in substantial family liquidity constraints or growing selectivity, which may have disproportionately affected less advantaged families[8]. If this was the case, we should observe the strengthening of the influence of parental resources on educational outcomes among members of the two youngest cohorts, who experienced their educational careers in the 1980s and early 1990s.

Table 2 about here

Table 2 presents models similar to those presented in table 1 to account for the change across cohorts in the association between origin and educational attainment. Model 3, assuming that the strength of the O-E association changes across cohort in UNIDIFF fashion does not fit better than Model 2, which postulates temporal stability in the O-E association. The cohort-specific parameters in model 3 indicate, however, that the association remained relatively stable across the first three cohorts, and then increased for the youngest cohort.

[8] An alternative hypothesis is that the economic crisis had a "substitution effect" on education, which may have resulted in a decline in the opportunity cost of education for the less advantaged as labor market opportunities became less available, and a consequent equalization of educational opportunities

Model 4 therefore constrains the association to be the same in cohorts 1, 2 and 3, and significantly improves the fit. The difference in BIC with model 2 is -2.5 (-244.1-241.6) which is positive but weak, and may not be conclusive in moderately-sized samples (Raftery 1996, Wong 1994). With this qualification, we select model 4 as our preferred model, indicating an increase in the influence of parental resources on educational attainment for the youngest cohort, whose educational career took place mostly from the mid-1980s to the mid-1990s in the midst of the economic restructuring. In sum, we have found weak evidence of an increase in inequality of educational opportunity, a finding that places Mexico among the few countries in the world where educational opportunity has become more unequal over time.

Now we assess the extent to which education mediates the origin-destination association and whether the mediating role of education has changed across cohorts. To do so, we estimate a series of models for four-way tables (origins by destination by education by cohort). Model 4 allows for the O-D and O-E associations, and it fits significantly better than models 1-3, which constrain both or either O-D and O-E association to be null. Models 5-8 allow the strength of OD and ED association to change across cohorts. Model 5 lets the strength of the OD association vary across cohort in a UNIDIFF-manner. Model 5 does not improve the fit over constant association, but the cohort-specific parameters suggest a sharp increase in the effects of origin on destinations from c1 to c2 and stability thereafter.

Table 3 about here

Therefore, model 6 tests a more parsimonious specification of change in the O-D net association, which constrains the association in cohorts 2-4 to be constant, and different from C1. BIC is substantially more negative, indicating that this model fits the data much better. The cohort-specific UNIDIFF parameters indicate a substantial *increase* in the influence of social origins on destinations, net of education, from the oldest to the second cohort, without

further change thereafter. Models 7 and 8 evaluate the possibility that ED association changes across cohorts in unconstrained (model 7) and constrained (model 8) fashion. These models fit worse than model 4, so we conclude that there is no change in the influence of educational attainment on class destination over time. So far, our preferred specification is model 6, from which we conclude that the direct effect of social origin on class position, net of the mediating role of education, significantly grew from C1 to C2, driving up the overall O-D association.

We have not accounted yet for the fact that the strength of the O-D association may vary across educational levels. This possibility is tested in model 10, which specifies a unique O-D association parameter for each educational level*cohort combination (3 educational levels *4 cohorts=12 parameters). Substantively, we are assuming that the trend in the O-D association is not homogeneous within the population, but varies across individuals with different levels of educational attainment. Even though this model is not sufficiently parsimonious and has a poorer fit than model 6, the cohort-by-educational level parameters show a clear pattern. For all cohorts, the strength of the association is similar among those with primary and some secondary schooling, and weaker among those with a high school degree or more. This confirms the findings by Hout (1988) and Vallet (2004) in the sense that higher education plays a powerful role at canceling the influence of social origins. There is an exception to this pattern, however: Among members of the youngest cohort, the association for those with advanced educational credentials is *not* weaker than at lower educational levels (compare parameter estimate of 1.37 among high school graduates vs. 1.17 among those with incomplete secondary and 1.06 for primary education)[9]. We therefore impose equality constraints in the parameters to attain a parsimonious yet accurate model, and produce model 11, with constraints specified in table 3. Model 11 is a significant

[9] Changes in the OD association across cohorts are not immediately evident from eyeballing these 12 parameters -- they are the weighted average of association across different educational levels within each cohort, where the weights are the proportion of members of each cohort completing each level.

improvement over model 6 (BIC difference= -3011.4 - 3004.9= -6.5), and is our preferred model[10].

Figure 3 about here

To facilitate interpretation of Model 11, figure 3 plots the parameter estimates obtained from the model, which capture changes in the strength of the OD association. Figure 3 is consistent with the finding that OD association is weaker among those who have reached advanced schooling levels. It also shows interesting temporal patterns: Among those with primary and some secondary education, the OD association grows from the oldest to the second cohort, and remains stable thereafter. This trend sharply contrasts with the changes at the higher educational level. The origin-destination association among those with advanced schooling qualifications is very weak in the oldest cohort, and it monotonically rises across cohorts. In other words, higher education virtually cancels the "advantages [or disadvantages] of birth" in the oldest cohort, but this role decreases for C2 and C3, and it disappears completely for the youngest cohort. Indeed, the OD association is *the same* for all educational levels for members of the youngest cohort. The "meritocratic" effect of higher education has completely disappeared in the recent past in Mexico.

On initial consideration, this finding is consistent with the DMR hypothesis: As more members of the cohort graduate high school and pursue post-secondary training over time, this level becomes less selective and its ability to ensure mobility declines. Careful analysis, however, indicates that not all three empirical components of this hypothesis hold. The DMR hypothesis claims that the meritocratic role of higher education weakens *as this*

[10] Note that this model departs from assumptions of model 6 in one respect. Model 6 postulates constant OD association across C2-C4. Here instead, association for those with higher education in C4 is stronger than C2 and C3, so the overall association in C4 should be stronger too. This departure cannot be explained by a change from C3 to C4 in the proportion of those with higher education (in a context of enrollment stagnation, the change was very small), nor it can be explained by change in the proportion of those with primary and incomplete secondary education because the OD association is the same in these two educational groups. Further analysis of this departure is needed.

educational level becomes more widespread. However, as indicated in figure 2, secondary and tertiary educational enrollment stagnated during the 1980s and early 1990s, the period when the young cohorts experienced their secondary and post-secondary educational careers. Therefore, the decline in the ability of advanced education to weaken ascriptive effects appears to have taken place in Mexico *in spite of the fact that* education did not continue to expand. Thus, while these overall findings are consistent with the "declining mobility returns to higher education" hypothesis, we should explore other potential factors affecting the decline in the meritocratic function of higher education.

4.3. Are Mexican Trends Unique? Social Fluidity in Brazil. We now conduct a similar analysis for the Brazilian case, in order to determine the extent to which mobility trends are consistent with those found in Mexico. We follow the same analytical strategy, first estimating models for trends in overall social fluidity, then exploring the role of education in the mobility process. Table 4 fits models for the three-way origin by destination by cohort table. Based on the BIC statistic, the best-fitting model is the "constant social fluidity" specification (model 2), which assumes no significant change across cohorts. Thus, in contrast to Mexico, Brazil appears not to have experienced a decline in social fluidity over the last few decades. Given that data was collected in 1996, however, we cannot analyze the mobility experiences of Brazilians who reached occupational maturity in the late 1990s, a period of market reform expansion and persistent economic stagnation.

Table 4 about here

4.4. The Role of Education in the Brazilian Mobility Process: Even if there is no overall variation in Brazilian social fluidity, we may still find substantial changes in its component paths, which may offset each other to produce overall temporal constancy. Table 5 explores the trends in the association between origins and educational attainment by

comparing a series of log-linear models to the table cross-classifying origin by education by birth cohort. Although substantial educational expansion suggests that the association between origin and education may decrease, the stagnation at the post-secondary level during the 1980s and early 1990s suggests a bottleneck phenomenon similar to the one found in Russia. Indeed, a recent study indicates that inequality of educational opportunity in the transition to post-secondary education increased for the most recent cohorts (Costa-Ribeiro, 2007).

Table 5 about here

The preferred model is one assuming no significant change across cohorts in the association between social origins and educational attainment (model 2). Even though models 3 and 4, which allow for change in inequality of educational opportunity across cohorts, suggest a decline in the O-D association for C2 and C3, this decline is not large enough to be statistically significant (the BIC statistic is the most negative for model 2). Thus, as in the case of overall fluidity, we cannot reject the null hypothesis of no change over time.

Table 6 about here

In order to explore whether trends in social fluidity vary across educational levels, we now estimate a series of models for the four way table (origins by education by cohort by destination), and report fit statistics for these models and parameter estimates in table 6. Model 4 allows for the O-D and E-D associations to exist, but constrains them to be constant across cohorts. This is the first specification to fit the data better than the saturated model, according to the BIC statistic. Models 5 and 6 test the change in the strength of the OD association across cohorts in an unconstrained (model 5) and constrained (model 6) manner. Neither of them fit the data significantly better than model 4. Models 7 and 8 investigate the change in the association between educational attainment and class destination (ED) over

time. Model 8, constraining the strength of this association to linearly decline over time, fits marginally better than model 4. However, the difference in BIC is only 4 points, which is indeterminate given the extremely large Brazilian sample (Wong 1994). Therefore, we will interpret it as providing weak evidence of a decline in the role of educational attainment for class position across cohorts.

Finally, model 9 allows the strength of the O-D association to vary across cohorts and educational levels in unconstrained fashion, fitting one parameter for each cohort*educational level combination. This model lacks parsimony and fits worse than model 4 assuming no change over time. However, the UNIDIFF parameters provide information about trends in the association across different educational levels. They suggest constant OD association among those with only primary education, growth and decline in the association for those with secondary education, and a substantial increase for the youngest cohort among those with higher education. Model 10 imposes these constraints, and provides the best fit according to the BIC statistic. In order to interpret the results of model 10, figure 4 presents the UNIDIFF parameter estimates for the change in social fluidity across cohorts for individuals with different levels of education.

Figure 4 about here

The trends displayed in figure 4 indicate that the O-D association for men with primary education remains stable across cohorts. For those with some secondary education, there is an increase in the O-D association from C1 to C2, which is reversed in C3. In contrast, among those with higher education, there is an increase in the O-D association for the younger cohort. This increase is similar to the one observed in Mexico, and it is consistent with the "declining mobility returns to higher education" hypothesis, although given that it concerns only one cohort, it does not provide conclusive evidence about trends.

Note that the offsetting effects of these changes combined with a compositional effect with a much larger weight given to primary education combine to produce constant overall fluidity over time.

In sum, the Brazilian displays a pattern of constant social fluidity over time. This pattern significantly departs from the Mexican case, where a substantial decline in social fluidity was found. The detailed analysis of change in the association within different educational levels displays, however, interesting variation. These changes indicate an increase in the OD association for members of the youngest observed cohort with higher education. As in the Mexican case however, this decline in fluidity took place in a context of stagnation in secondary, and particularly post-secondary, enrollments, as shown in figure 2. Therefore, these findings highlight the need to consider other factors -- change in higher education selectivity criteria, strengthened ability of wealthier parents to secure the class position of their offspring after they attained a post-secondary credential, diminishing quality of higher education institutions in a context of economic crisis -- that may have strengthened the influence of social origins on class destinations among those who gain access to higher education.

5. Summary and conclusions. This paper analyzes intergenerational mobility trends in Mexico and Brazil, as well as the role that education plays in the mobility process in these two countries. Figure 5 summarizes the main findings from this analysis for the two countries. For Mexico, the overall origin-destination association significantly strengthens across cohorts. This decline in fluidity is driven by two different mechanisms: An earlier decline from the oldest cohort to cohort 2 is explained by an increase in the effect of social origins on socioeconomic attainment net of education. In contrast, a more recent decline from cohort 3 to the youngest cohort is accounted for by a growing influence of social origins on educational attainment, and a decline in the ability of higher education to cancel the

effect of social background. Whereas the former decline in fluidity points to mechanisms other than access to and returns from human capital accumulation -- for instance, use of social networks, or the direct transfer of property -- the latter, education-driven, reduction of fluidity highlights the growing advantages of birth in a context of severe economic constraints and a bottleneck at the higher educational level. The Brazilian case, in contrast, shows constancy over time, with no significant alteration in any of the studied associations.

Figure 5 about here

Interestingly, both processes leading to a reduction in fluidity in Mexico are contemporaneous with the deep market transformation and economic stagnation facing the country in the 1980s-1990s. Members of cohort 2, who experienced the increase in the influence of social origins on class destination net of education, reached occupational maturity during the 1980s, during the worst of the economic dislocation. Similarly, members of the youngest cohort, who experienced growing inequality of educational opportunity, experienced most of their educational career during the 1980s. In particular, they were in the risk pool for high school graduation and post-secondary entry in during the mid/late 1980s and early 1990s -- the midst of the crisis.

These findings sharply depart from the industrialized world, where a pattern of stable or growing fluidity has been found. They highlight that these trends are not universal, and that the interaction between economic and institutional forces may significantly alter mobility opportunities. The evidence adds to the Russian case to suggest a potential influence of deep and fast market reform, withdrawal of state regulations, and economic crisis on inequality of opportunity. These findings sharply contrast with the Brazilian case, where constancy in social fluidity was embedded in a context of economic stagnation but only mild

and very gradual market transformation.[11] The Mexican findings contrast also with the Chinese case, where gradual economic reform since 1978 in a context of sustained economic growth did not result in changes in mobility opportunities (Wu 2006) or the Chilean case, where the "shock market therapy" led to major short-term recession, but was quickly followed by sustained economic growth, and as in Brazil and China, no change in the fluidity regime is observed (Torche 2005b).

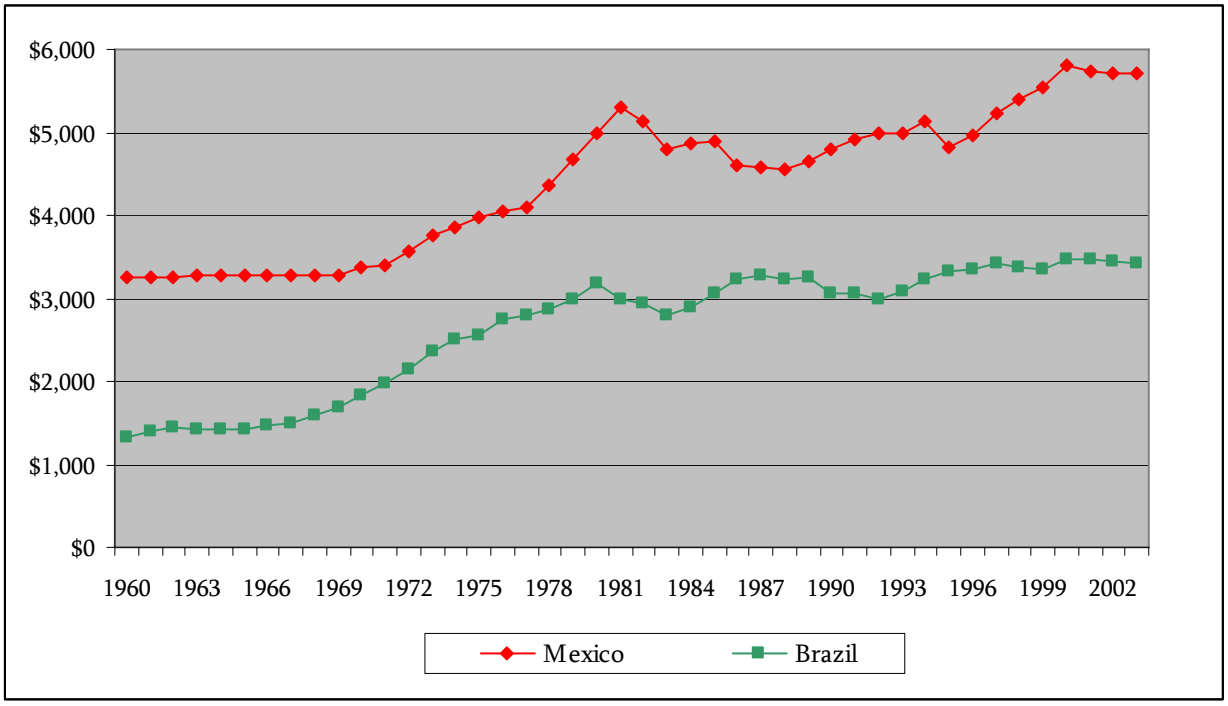
Naturally, the Mexican case does not provide conclusive evidence about the association between market reform and economic crisis on the one hand, and mobility chances on the other. As highlighted by Gerber (2002), the nature, timing, sequence, and outcomes of market transitions are highly contingent, and cannot be reduced to an ideal-typical path. However, the evidence shown here suggests that the combination of persistent crisis and market transformation may be *both* necessary (although perhaps not sufficient) for a decline in social fluidity to materialize. Furthermore, the evidence presented here provides an initial, macro-level assessment of trends, but it does not explore the mechanisms driving mobility trends. In particular, future work needs to examine which specific barriers in the class structure become more rigid, and which educational transitions were more affected by family resources during the market-transformation. Also, future work will disentangle cohort replacement from period effects associated with the economic transformation as potential explanations of mobility changes.

Finally, we used the Mexican and Brazilian case to test the "declining mobility returns to higher education" hypothesis. DMR suggests that as higher education expands it loses its ability to cancel the influence of social origins on destination position among those who reach this level. Trends in Brazil and Mexico are consistent with this hypothesis -- the

[11] Given that market reform in Brazil started later than in Mexico, only in the 1990s, if market transformation has an influence on social fluidity, it is possible that analysis of younger cohorts will capture such influence.

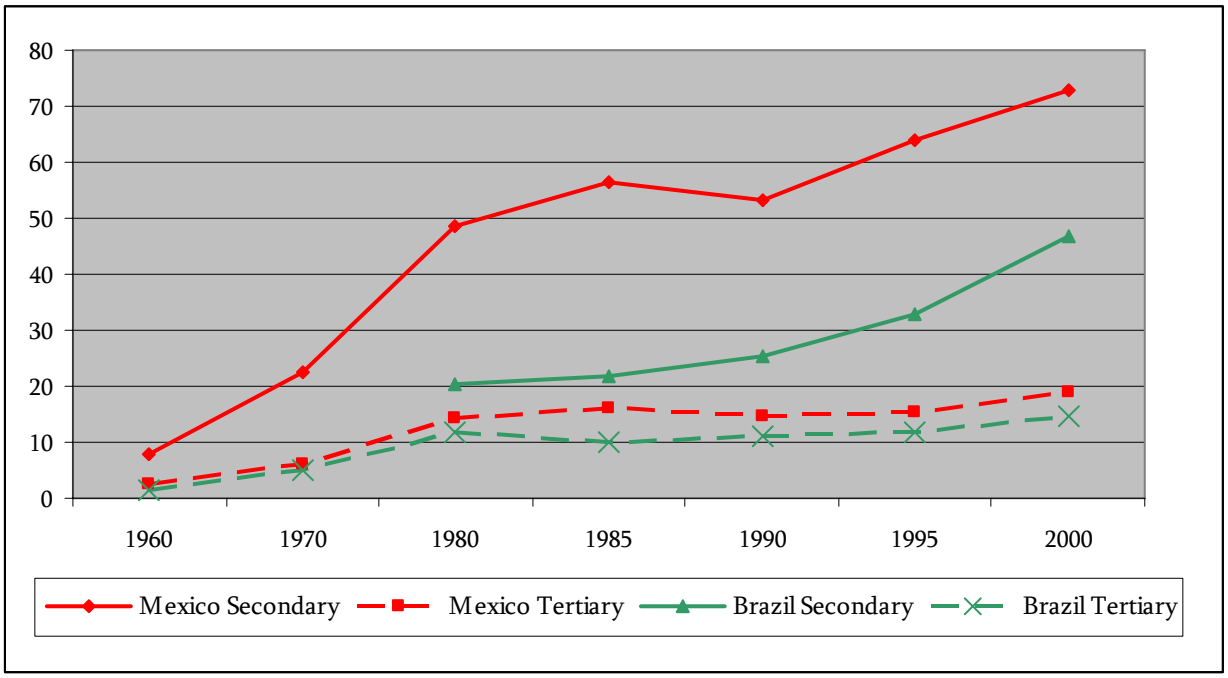
O-D association among those who attain advanced credentials significantly increases over time. However, this increase was most pronounced as higher education enrollments remained stagnant, contradicting one basic premise of the hypothesis. This finding urges us to further explore other factors -- change in higher education selectivity criteria, strengthened ability of wealthier parents to secure the class position of their offspring after they attained a post-secondary credential, diminishing quality of higher education institutions in a context of economic crisis -- that may explain the "regression to social origins" among those with higher education.

Figure 1. Real GDP per capita Mexico (U$ 2000) and Brazil (U$ 2003). 1960-2003.



Source: 1960-1969: Oxford Historical Latin American database (http://oxlad.qeh.ox.ac.uk) 1969-2005: ERS International Macroeconomic dataset (1969-2005) (http://www.ers.usda.gov/Data/Macroeconomics/) & IMF dataset.

Figure 2. Gross Secondary and Tertiary Enrollment Rates Mexico and Brazil 1950-2000.



Source: UNESCO Statistical Yearbook, selected years.

Table 1. Models for Total Intergenerational Class Mobility. Mexican Men 2006.

Model	L^2	df	BIC	
1. Independence	2021.2	144	793.4	
2. Constant fluidity	173.1	108	-747.8	
3. UNIDIFF change	151.8	105	-743.5	
	C1	C2	C3	C4
Unidiff parameters	1	1.35	1.33	1.45
4. Constr. UNIDIFF change	154.2	107	-758.1	
	C1	C2	C3	C4
UNIDIFF parameters	1	1.218	1.218	1.436

Table 2. Models for the Association between Origins and Education, Mexican Men 2006.

Model	L^2	df	BIC	
1. Independence	1116.5	48	707.3	
2. CSF	65.0	36	-241.6	
3. UNIDIFF change	53.6	33	-227.7	
	C1	C2	C3	C4
UNIDIFF parameters	1	.93	.93	1.22
4. Constr UNIDIFF change	54.3	35	-244.1	
	C1	C2	C3	C4
UNIDIFF parameters	1	1	1	1.29

Table 3. Results of models fitted to 4-way table Origin by Destination by Education by Cohort (men aged 30-64).

Model	L^2	Df	BIC
1 Independence {OEC} {DC}	3666.8	480	-428.3
2.Constant {OD} association {OET} {DT} {OD}	1844.3	444	-1943.7
3. {ED} association constant across cohorts	1802.7	468	-2190.1
4. {OD} & {ED} association constant across cohorts	689.8	432	-2995.8
5. Only {OD} changes across cohorts (UNIDIFF)	671.7	429	-2988.3
Unidiff parameters	C1	C2	C3 C4
	1	1.48	1.39 1.42
6. Only {OD} changes across cohorts (UNIDIFF constrained)	672,1	431	-3004.9
Unidiff parameters	C1	C2	C3 C4
	1	1.44	1.44 1.44
7. Only {ED} changes over time (UNIDIFF)	686.4	429	-2973.6
Unidiff parameters	C1	C2	C3 C4
	1	1.05	1.18 1.12
8. Only {ED} changes across cohorts (UNIDIFF constrained)	686.8	431	-2990.2
Unidiff parameters	C1	C2	C3 C4
	1	1	1.12 1.12
10. {OD} changes across C and E (UNIDIFF)	641.07	421	-2950.7
Unidiff parameters	C1	C2	C3 C4
	E1 E2 E3	E1 E2 E3	E1 E2 E3 E1 E2 E3
	1 .82 .15	1.34 1.30 .98	1.18 1.41 .81 1.06 1.17 1.37
11. {OD} changes across E & C (UNIDIFF constrained)	648.6	429	-3011.4
Unidiff parameters	C1	C2	C3 C4
	E1 E2 E3	E1 E2 E3	E1 E2 E3 E1 E2 E3
	1 1 .14	1.30 1.30 .89	1.30 1.30 .89 1.30 1.30 1.30

Figure 3. Trends in the Origin-Destination Association Across Birth Cohorts and Educational Levels. Mexican Men 2006.

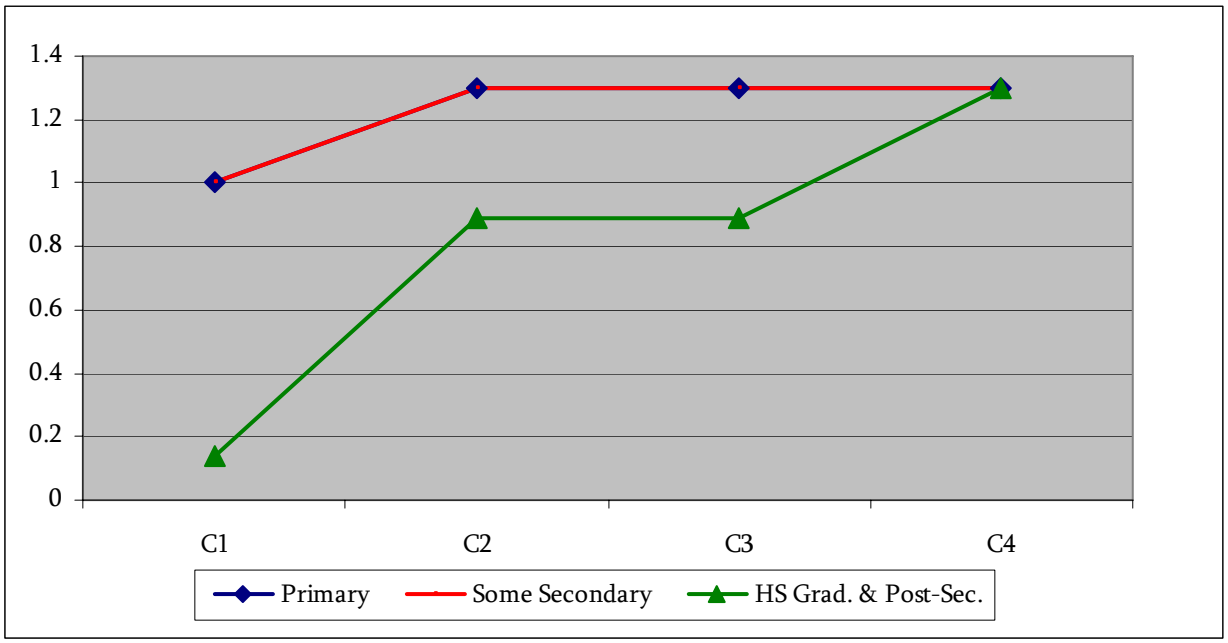


Table 4. Models for Total Intergenerational Class Mobility. Brazilian Men 1996.

Model	L^2	df	BIC	
1. Independence	8549.7	108	7375.2	
2. Constant fluidity	130.1	72	-609.7	
3. UNIDIFF change	129.0	70	-590.2	
	C1	C2	C3	C4
Unidiff parameters	1	.99	.97	NA
4. Constr. UNIDIFF change	129.0	71	-600.5	
	C1	C2	C3	C4
UNIDIFF parameters	1	.97	.97	NA

Table 5. Models for the Association between Origins and Education, Brazilian Men 1996.

Model	L^2	df	BIC	
1. Independence	6794.6	36	6422.58	
2. CSF	28.7	24	-219.4	
3. UNIDIFF change	19.7	22	-207.6	
	C1	C2	C3	C4
UNIDIFF parameters	1	.93	.91	NA
4. Constr UNIDIFF change	20.1	23	-217.5	
	C1	C2	C3	C4
UNIDIFF parameters	1	.91	.91	NA

Table 6. Results of models fitted to 4-way table Origin by Destination by Education by Cohort, Brazilian Men 1996.

Model	L^2	df	BIC
1 Independence {OEC} {DC}	15999.7	360	12300.34
2.Constant {OD} association {OET} {DT} {OD}	7651.7	324	4322.3
3. {ED} association constant across cohorts	4630.4	348	1054.36
4. {OD} & {ED} association constant across cohorts	421.9	312	-2784.19
5. Only {OD} changes across cohorts (UNIDIFF)	418.2	310	-2767.32
Unidiff parameters	C1	C2	C3 C4
	1	1.082	1.085 NA
6. Only {OD} changes across cohorts (UNIDIFF constrained)	418.3	311	-2777.59
Unidiff parameters	C1	C2	C3 C4
	1	1.084	1.084 NA
7. Only {ED} changes over time (UNIDIFF)	407.4	310	-2778.12
Unidiff parameters	C1	C2	C3 C4
	1	.95	.88 NA
8. Only {ED} changes across cohorts (UNIDIFF constrained)	407.6	311	-2788.25
Unidiff parameters	C1	C2	C3 C4
	1	.94	.88 NA
9. {OD} changes across C and E (UNIDIFF)	402.1	304	-2721.85
Unidiff parameters	C1	C2	C3 C4
	E1 E2 E3	E1 E2 E3	E1 E2 E3 E1 E2 E3
	1 .85 .78	1.05 1.08 .87	1.08 .90 1.09 NA
10. {OD} changes across C and E (UNIDIFF constrained)	405.1	311	-2790.7
Unidiff parameters	C1	C2	C3 C4
	E1 E2 E3	E1 E2 E3	E1 E2 E3 E1 E2 E3
	1 .80 .80	1 1 .80	1 .80 1 NA

Figure 4. Trends in the Origin-Destination Association Across Birth Cohorts and Educational Levels. Brazilian Men 1996.

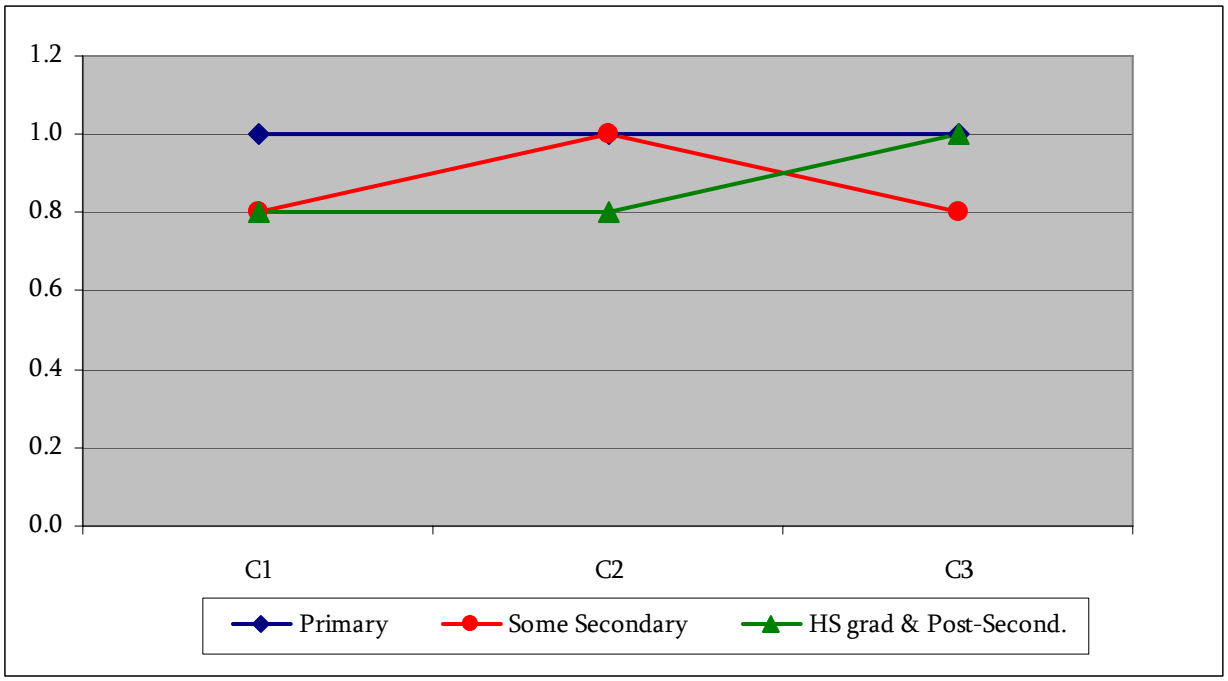
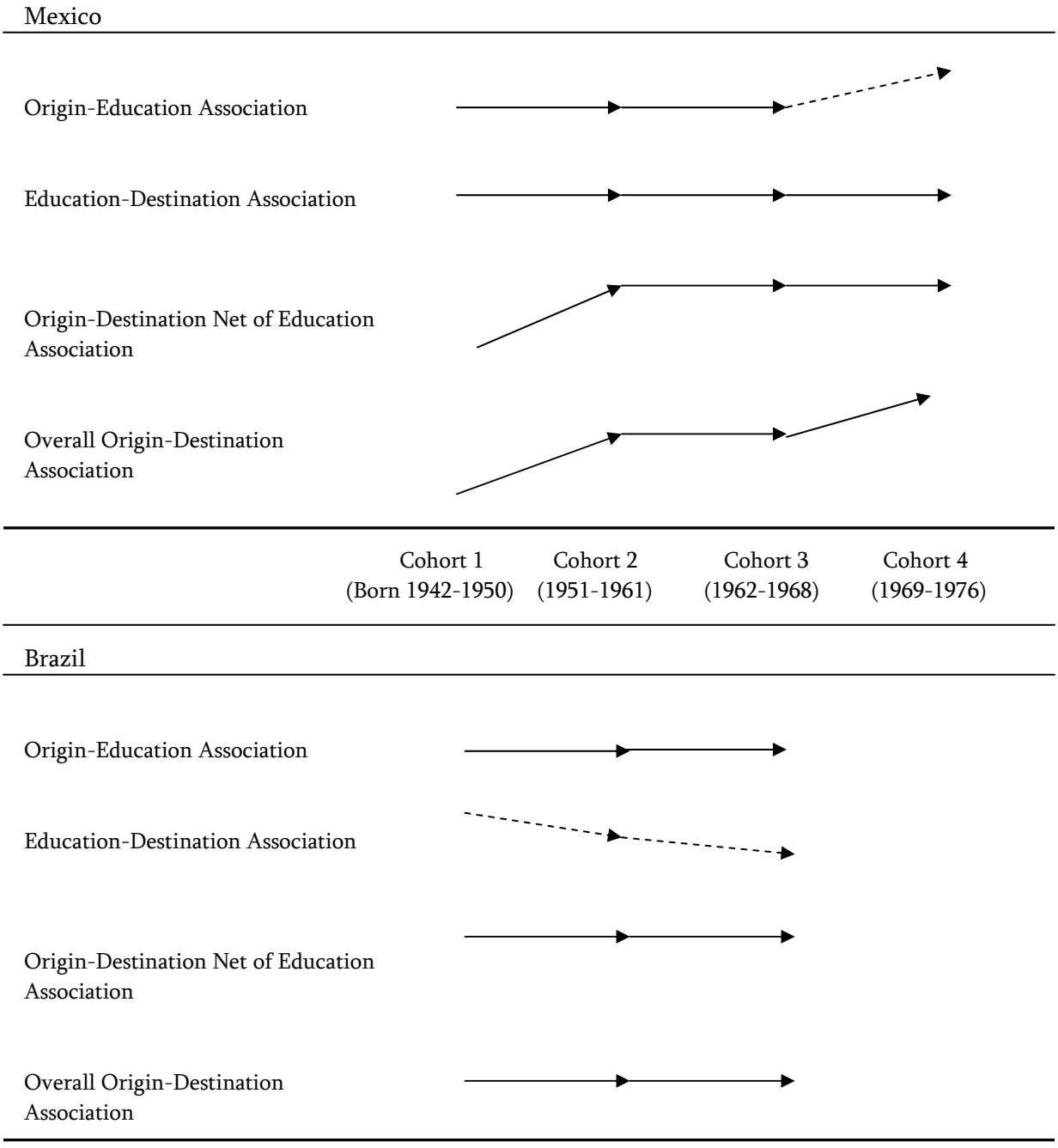


Figure 5. Trends in components of intergenerational mobility. Mexico and Brazil.



Note: Dotted line indicates weak evidence of change (see text for details).

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