

The educational homogamy gap between married and cohabiting couples in Latin America

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Abstract

The explosive expansion of non-marital cohabitation in Latin America since the 1970s has led to the narrowing of the gap in educational homogamy between married and cohabiting couples (what we call “homogamy gap”) as shown by our analysis of 29 census samples encompassing eight countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, México and Panama ($N = 2,295,160$ young couples). Most research on the homogamy gap is limited to a single decade and a small group of developed countries (the United States, Canada, and Europe). We take a historical and cross-national perspective and expand the research to a range of developing countries, where since early colonial times traditional forms of cohabitation among the poor, uneducated sectors of society have coexisted with marriage, although to widely varying degrees from country to country. In recent decades, modern forms of cohabitation are emerging in all sectors of society. We find that among married couples educational homogamy continues to be higher than for those who cohabit, but in recent decades the difference has narrowed substantially in all countries. Our results can be directly linked to the emerging debate about the nature of cohabitation as it establishes itself as a common, if not dominant, form of union in the region and beyond. We argue that had the increase of cohabitation been mainly an intensification of traditional forms, the homogamy gap would have remained stable instead of almost vanishing.

1. Introduction

Non-marital cohabitation has spread dramatically in Latin America during the last four decades. In the 1970s, cohabiting couples were more likely to form among lower social strata, among indigenous and African-descent populations, and in remote rural areas. By the 2000s, cohabitation had spread among higher social and educational groups and in urban areas (Castro 2002; De Vos 1998). Consequently, marriage rates have been declining throughout the region. Despite this decline and other social transformations (e.g., educational expansion, women's rising labor force participation, fertility decline), age at union formation has remained remarkably stable (Fussell & Palloni, 2004; Mensch, Singh & Casterline 2005; United Nations 1990). This stability implies a process in which young cohorts are increasingly likely to substitute non-marital cohabitation for marriage without substantially modifying the timing of union formation. There are many diverse explanations for this progressive intergenerational substitution. Some authors emphasize the strength of familism in times of economic hardship (Fussell & Palloni, 2004), while other scholars question whether cultural transformations and value changes according to the postulates of a second demographic transition explain this dramatic shift (Quilodrán, 1999). One potential consequence of these trends is the blurring of differences between marital and non-marital unions.

In this paper, we examine the differences between marital and non-marital cohabitation (hereafter called "marriage" and "cohabitation", respectively) through the lens of educational homogamy using census microdata from eight Latin American countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico and Panama) from 1970 to 2000. Homogamy

refers to the tendency of individuals to marry or cohabit with someone of the same educational group. First, we examine whether levels of educational homogamy differ between married and cohabiting couples. We refer to the difference between the two types of unions as the *homogamy gap*. Second, we examine variation in the size of the homogamy gap across countries and over time to determine whether the gap is correlated with the spread of cohabitation (measured as the proportion of cohabiting couples over the total number of unions).

The paper presents original findings with regard to research on assortative mating differences between marriage and cohabitation. First, we present evidence from a large and diverse set of Latin American countries concerning the historical presence and recent spread of non-marital cohabitation. To date, most contributions on this topic are limited to the United States (Blackwell & Lichter, 2000, 2004; Schoen & Weinick, 1993), Canada and a few European countries (Hamplova, 2009; Hamplova & Le Bourdais, 2008). Second, we explore the issue of marriage and cohabitation from a historical perspective. Existing research has examined this issue for specific cohorts entering into unions within a single historical context (e.g., Blackwell & Lichter, 2000, 2004; Schoen & Weinick, 1993) and has compared regions and countries at a single point in time (e.g., Hamplova, 2009). Although the use of cross-sectional data from censuses has the obvious limitations of not capturing precise causality for the transition into and out of cohabitation and marriage (Schwartz, 2010), the availability of cohabitation data in Latin American censuses from 1970 to 2000 allows us to conduct a natural experiment on the relationship between the homogamy gap and the spread of cohabitation over three decades in Latin America.

2. Background

2.1. Non-marital cohabitation in Latin America

One of the most salient aspects of Latin American nuptiality lies in the historical importance of cohabitation. Non-marital cohabitation has coexisted with traditional marriage in Latin America at least since early colonial times. A blend of cultural, historical, economic and political factors explains this phenomenon (Rodríguez, 2005). Colonial religious authorities were stymied in their efforts to impose marriage as the only type of union between men and women primarily because of weak institutions and the conflicts and cultural barriers that existed between the colonizers and natives (Quilodrán, 1999). Miscegenation, which was encouraged by the high male-to-female sex ratio among European settlers, and gender and ethnic power favored non-marital cohabitation (Bernard & Gruzinski, 1996; De Vos, 1998; McCaa, 1994). Extreme economic inequalities, poverty, the costs of formalizing unions (e.g., marriage fees and celebrations), and the legal advantage obtained by protecting wealth from “spurious” claims (Castro, 2002) further promoted informal unions. With the establishment of independent states, political instability arose partly as a result of church-state struggles, including struggles with regard to the issue of civil versus religious unions, and this instability favored the spread of cohabitation (Rodríguez, 2005). Both liberal and conservative states stripped women of their power to force suitors who had enjoyed prenuptial liberties to marry by increasing the age of majority for men to twenty-six years and declaring that only notarized promises of marriage were legally binding. Tender vows and pretty ribbons led to marriage only if a groom’s father or legal guardians also consented (McCaa, 1994).

Despite these similarities, Latin America is not a homogeneous region. Quilodrán (2003) distinguishes three main groups based on cross-country differences (low, middle and high levels

of cohabitation). The group with the lowest levels, in which cohabitation accounts for less than one-fifth of all unions, includes Argentina, Chile, Uruguay, Costa Rica and Mexico. The middle group, in which one- to two-fifths of all unions are cohabiting couples, includes the remaining South American countries – Brazil, Colombia, Ecuador, Bolivia, Paraguay, Uruguay and Peru. Finally, the group with the highest rates of cohabitation includes the Caribbean and Central American regions (e.g., Panama, Nicaragua, Cuba, Dominican Republic, and Haiti), where cohabitation accounts for two-fifths or more of all unions. The low prevalence of cohabitation in the Cone of South America is due to the relatively small indigenous and Afro-American populations; the influence of European immigration at the beginning of the twentieth century; relatively higher income and higher levels of social development compared with other Latin American countries; and the existence of stronger and more organized states (Rodríguez, 2005). In contrast, higher levels of cohabitation in the Caribbean and Central America are associated with poor living conditions; a large indigenous, mestizo, or Afro-American population (whose origin is marked by the importation of African slaves to work on Spanish, French, Dutch and English plantations (Charbit, 1987); and the existence of weak and less organized states (Rodríguez, 2005, p. 20).

During recent decades, cross-national differences in the degree of cohabitation have narrowed due to the spread of this type of union. There has been an increase in cohabitation in countries where levels were formerly the lowest, and the levels have remained constant or increased slightly in countries whose levels were previously the highest (Castro, 2002; De Vos, 1998; Quilodrán, 1999; Rodríguez, 2005). In all countries in this region, the poorest people are more likely to cohabit, but in recent decades, cohabitation has spread in all social classes, especially

among the more highly educated (Castro & Martín, 2008; López, Esteve & Cabré, 2009; Rodríguez, 2005).

The above explanations describe a particular historical, economic, political and cultural context and suggest that non-marital cohabitation in Latin America cannot be compared to that in developed countries, where cohabitation is understood as a sign of women's independence and of ideological rebuke against institutional intrusion in private life (Castro & Martín, 2008; Manting, 1996; Van de Kaa, 1988). Furthermore, evidence suggests that Latin American cohabitation (unlike those observed in industrialized countries) remain common at later stages of the life cycle and that cohabiting couples regularly bear and rear children together (Castro & Martín, 2008; Quilodran, 1992; Rosero-Bixby, 1996) even though some of these unions are eventually legalized at older ages.

Given both the historical presence and recent spread of non-marital cohabitation, it seems reasonable to assume that this type of union may have manifold underlying meanings depending on class and country. Some cohabiting unions may resemble the unions that we observe in high-income countries, whereas other unions bear the traditional marks of poverty and gender oppression. This duality is rooted in the dynamics of the economic, political and social modernization processes that occurred in different countries of the region. Some of the relevant elements in these modernization processes have not fully developed; thus, only a small fraction of the population has gained access to social and material benefits. Likewise, many modern transformations have occurred only partially and have not included the modern cultural and identity elements that are characteristic of such changes (Arriagada, 2002, p. 148).

2.2. Why we expect a homogamy gap? Existing hypotheses

Education is an important structuring dimension of modern marriage markets. Individuals tend to marry or partner within their own same educational groups, and this pattern is more clearly observed at both ends of the educational hierarchy. First, education is considered the most important determinant of varying degrees of success in the occupational structures of industrialized societies; second, education reflects the influence of cultural resources in partner selection (Blossfeld & Timm, 2003). Societies that have experienced strong educational expansion processes are more likely to present higher levels of homogamy. A significant amount of empirical evidence from various social contexts sustains this hypothesis (Blossfeld & Timm, 2003; Mare, 1991; Schwartz & Mare, 2005; Smits, Ultee & Lammers, 1998). Research from Latin America also substantiates this pattern (Esteve & López-Ruiz, 2010; Esteve & McCaa, 2007; Torche, 2010).

Few studies have examined the difference in educational homogamy between marital and non-marital cohabitation (Blackwell & Lichter, 2000; Blackwell & Licther, 2004; Hamplova, 2009; Hamplova & Le Bourdais, 2008; Schoen & Weinick, 1993; Schwartz, 2010). Recent research has identified three main hypotheses: *looser bonds*, *winnowing* and *institutionalization*.

The *looser bonds* hypothesis (Schoen & Weinick, 1993) argues that educational homogamy will differ by type of union and that cohabitation shows greater homogamy than marriage with respect to achieved characteristics, such as education, and less homogamy for ascribed traits (e.g., ethnicity and religion) (Schwartz, 2010, p. 409). The *looser bonds* hypothesis offers the view that cohabitation is a distinct institutional form of union with its own norms, goals, and behaviors. Cohabitation differs from marriage because it is associated with a weaker sense of

commitment and greater personal autonomy. Potential cohabitants are faced with certain challenges that stimulate interactions that are largely based on gender equality (Brines & Joyner, 1999). A high degree of uncertainty, the lack of long-term horizons and the absence of legal contracts that may discourage the dissolution of unions (England & Farkas, 1986) make cohabitants more likely to emphasize achieved statuses (such educational attainment) rather than ascribed traits.

Conversely, the double selection or *winnowing hypothesis* asserts that cohabitation is a part of the courtship process (Blackwell & Lichter, 2000; Blackwell & Lichter, 2004), a transitional stage between singlehood and marriage. A winnowing process occurs throughout this transition period, in which couples with higher affinity are more likely to marry (Rindfuss & Vanden Heuvel, 1990). Under this premise, a suitable match is less relevant in short-term relationships, such as cohabitation, than in long-term relationships, such as marriage. As a result, the winnowing hypothesis argues that unmarried partners will be less homogamous than married couples with respect to both achieved and ascribed characteristics (Blackwell & Lichter, 2000, p. 279).

Schwartz (2010) provides additional insight on the specific mechanisms by which cohabiting unions are less likely to be educationally homogamous than married couples. Using data from the United States' National Longitudinal Survey of Youth, Schwartz identifies the effect of transitions into and out of cohabitation and marriage and concludes that "the small and statistically insignificant tendency for homogamous cohabiters to exit their unions combined with the more pronounced tendency for dissimilar married couples to split up largely account for differences in the odds of homogamy by type of union" (Schwartz, 2010, p. 749). Although this conclusion was consistent with the winnowing hypothesis, Schwartz's results did not support the

assumption that the partner selection practices of cohabiters and married people differed. Rather, no statistical differences in partner choices were found at the time that cohabiting and marital unions were formed.

In all of the main studies cited here (Blackwell & Lichter ,2000; Blackwell & Lichter, 2004; Schoen & Weinick, 1993; Schwartz, 2010), hypotheses were drawn from and tested on specific cohorts entering the marriage market in the same historical period. Kiernan (2002) suggests that the differences between marriage and cohabitation may change as the degree of institutionalization of cohabitation shifts in society. Following Cherlin (2004), Soons and Kalmijn define institutionalization "as the development and strengthening of social norms that define people's behavior in a social institution" (Soons & Kalmijn, 2009, p. 1149). Measures of institutionalization range from raw percentages of cohabiting unions to more nuanced indicators based on the social acceptance of this type of union.

When applied to assortative mating, the *institutionalization hypothesis* predicts that in countries where non-marital cohabitation is low or where there are high levels of disapproval for such unions, cohabiting unions will tend to be more homogamous than marriages (Hamplova, 2009; Hamplova & Le Bourdais, 2008). In societies with intermediate levels of institutionalization, many couples regard non-marital cohabitation as a trial period before marriage. In such a context, cohabiting unions are more likely to be less homogamous than married couples with regard to education. Finally, in those contexts in which informal cohabitation is widely accepted, educational homogamy patterns for both types of unions will tend to converge.

Hamplova and Le Bourdais (2008) found no support for this hypothesis when comparing differences between the Quebec province (where cohabitation is widespread) and the other

Canada provinces (where it is less widespread). A later study conducted by Hamplova (2009) found partial support for the institutionalization hypothesis when examining differences across European countries (Hamplova, 2009). The homogamy gap was lower in those countries in which cohabitation was more widespread, but the gap was not observed in the expected direction: cohabiting couples were more likely to be homogamous than married couples at all levels of institutionalization.

2.3. Hypotheses for Latin America

If a homogamy gap exists in Latin America, will the strength of educational homogamy be higher among cohabiting couples than among married couples? We hypothesize that *cohabiting unions will be less homogamous than marriages*. Blackwell and Lichter's *winnowing hypothesis* (2000, 2004) suggests that an increased selectivity in the choices of partners based on their levels of commitment (from dating, cohabiting and married couples) leads to higher homogamy levels among married couples. However, we argue that cohabiting couples will be less likely to be homogamous in the Latin American context because the structuring role of education is less significant in cohabiting partner markets than in marriage markets. In this hypothesis, the argument developed by Schwartz to explain the lack of significant differences in homogamy between married and cohabiting couples in the U.S. is extended to the Latin American context: both marriages and cohabiting unions showed similar levels of educational homogamy because of their access to similar opportunities to meet potential mates in partner markets that were structured by education (Schwartz, 2010, p.750). In Latin America, the context of opportunities in the cohabiting partner market is less structured by education than in the marriage market. Given that cohabiting couples were historically more likely to be found in the lower social

classes, among less educated people and in indigenous populations, education has theoretically had less influence on partner choices. Conversely, marriages are distributed across the educational spectrum and, as result, are more selective with regard to education. As cohabitation spreads into higher social strata and escapes its traditional boundaries, opportunities in partner markets will become similar.

How will the homogamy gap vary with regard to various levels of cohabitation? A straightforward application of the institutionalization hypothesis in Latin American countries should find a smaller homogamy gap in areas in which cohabitation is more widespread. A standard way to measure the institutionalization of cohabitation involves the calculation of the proportion of cohabiting unions among all unions (Hamplova, 2009; Soons & Kalmijn, 2009). When this proportion is larger, the homogamy gap should be smaller. This relationship should be observed both over time and across countries. Nevertheless, a nuanced view of this hypothesis should also consider the differences between countries regarding the importance and historical roots of unmarried cohabitation in the region (as described in Section 2). In contrast with European countries (Soons & Kalmijn, 2009), Latin American countries cannot be ordered on a continuum from traditional to modern societies based on levels of cohabitation. Rather, unmarried cohabitation has long been socially accepted but confined to certain subgroups of the population and to particular regions within Latin America (Castro, 2002; De Vos, 1998). Thus, *we hypothesize that the cross-country correlation between the homogamy gap and the spread of cohabitation will be weaker than the over-time correlation.* This hypothesis is based on our observation in Section 2 that the initial level of cohabiting unions (as measured by 1970 census round microdata) does not correspond to different stages of development.

As a follow-up hypothesis, we predict that *the association between the homogamy gap in assortative mating and the spread of cohabitation will be stronger in those countries where cohabitation was less widespread in the 1970s*. This association will be stronger because cohabitation in these countries should be less mixed between traditional and modern forms than in countries with stronger traditions of cohabitation. In countries such as Argentina or Chile, we should expect a close correlation between the homogamy gap and the spread of cohabitation that is in line with the institutionalization hypothesis.

3. Data and Method

3.1. Census samples

We use Integrated Public Use Microdata Series (IPUMS) samples from the following Latin American countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico and Panama (Minnesota Population Center 2011). Table 1 provides some additional information pertaining to the sample characteristics and years included in the analysis. The samples from the 1960s census rounds cannot be used because person records are not organized by household; therefore, the educational attainment of the spouses cannot be determined. We study prevailing married and cohabiting couples. Prevailing unions are subject to bias because of selective union dissolution, educational upgrading after union formation, and the establishment of new unions (Schwartz & Mare, 2005). New unions are free from this bias. Nevertheless, data pertaining to new unions are not available for the Latin American countries and census years included in our analysis.

To reduce the effect of bias, we selected couples in which both spouses were between 25 and 34 years old. The total number of couples for each sample and the share of individuals in unions at these ages are displayed in Table 1. The use of age limits for the purpose of filtering couples is a common practice for this type of research (Esteve & Lopez, 2010; Torche, 2010). The 10 year age range avoids overlapping cohorts between censuses and ensures that a large portion of the cohort who will eventually enter into a union is observed (Torche, 2010). In addition, most of the population has completed their education by the age of 25. Evidence on the effect of union dissolution selectivity in Latin America is lacking. Thus, age restrictions have been applied based on findings from other contexts (e.g., Mare, 1991).

This analysis includes data from different points in time. It may be argued that changes in the common age of marriage (or union formation) may affect the degree of selectivity (Mare, 1991; Shafer & Zhenchao, 2010). Nevertheless, the timing of union formation in the eight Latin American countries studied here has been remarkably stable during the last three decades (Heaton, Forste & Otterstrom, 2002; Mensch et al., 2005; United Nations, 1990).

The data are arranged in a contingency table, which cross-classifies prevailing couples as a function of their countries of residence, census rounds, types of unions and the educational attainment of spouses. The country and census round variables require no explanation except that the time references within each census round are not identical (see Table 1).

Table 1 about here

Type of union

As mentioned above, cohabitation has been historically widespread in Latin America when compared with other regions of the world. Latin American censuses have historically captured

this phenomenon. The standard approach for identifying a cohabiting person is through the use of the "marital status" question on the census form. "Cohabiting partner" is included among the categories available for this variable. Because this item is an individual question, cohabiting people are easily identified.

Table 1 shows the proportions of cohabitating couples by country and sample. The data confirm the patterns and tendencies observed by previous studies (Castro, 2002; De Vos, 1998; Rosero-Bixby, 1996). Cohabiting unions are fairly well rooted in Latin America, but the levels differ from country to country. In the 1970s, Panama and Chile had the highest and lowest proportions of cohabiting unions (53.8% and 3.2%, respectively). With the sole exception of Panama, cohabitation has increased substantially during the period from 1970 to 2000 in all countries. The largest increases are found in Brazil and Chile, in which cohabitation increases five-fold to 33.2% and 19.7%, respectively.

Educational attainment

The level of education used as a reference is the response given in the census and may not correspond to the education level of the spouses at the time that they married or entered unions. This decision was based on data availability and should not have an important effect on the final results because most unions begin after education is completed. We distinguish four categories of educational attainment: "some primary school", "primary school completed", "secondary school completed", and "university studies completed". This classification corresponds to the major divisions of educational attainment (EDATTAN) as harmonized by IPUMS-International (Esteve & Sobek, 2003). EDATTAN uses the principles and recommendations of United Nations regarding the measurement of educational attainment in population censuses as a reference

(UNESCO, 2006). The UNESCO scheme is based on 4 thresholds: 6 years of primary school, 3 years of lower secondary education, 3 years of higher secondary education and later tertiary education. With some exceptions (see a detailed discussion at www.ipums.org/international), most Latin American countries conform to this scheme (McMeekin, 1998; Torche, 2010). The four categories offer sufficient variance to support comparative analysis.

3.2. Log-linear models and the measurement of the homogamy gap

We use log-linear models to analyze a five-way table of enumerated couples that cross-classifies the following categories: male education (4 categories), female education (4 categories), type of union (2 categories), census round (4 categories) and country (8 categories). We pool the data from all countries to compare the importance of the cross-country variation in the homogamy gap to the over-time variation, as predicted by one of our hypotheses. To compute the log-linear models for the eight countries, we make a number of assumptions regarding countries in which data from only three census rounds are available: Colombia, Costa Rica, and Mexico. In such cases, we simulate a three-way contingency table that cross-classifies the education of males, the education of females and the types of unions. The specification of this distribution has no effect on the final results because our model specification allows for unrestricted associations between the education of partners by country and by census round (further information about this procedure is available from the authors upon request).

A simplified version of our baseline model for a single country and period of time can be written as follows:

$$\ln(F_{ijk}) = \mu + \mu_i^M + \mu_j^F + \mu_k^U + \mu_{ik}^{MU} + \mu_{jk}^{FU} + \mu_{ij}^{MF}, \quad [1]$$

where $\ln(F_{ijk})$ is the log of the expected cell frequency of the cases for cell ijk in the contingency table; i, j , and k refer to the categories within the variables M (male education), F (female education) and U (type of union); μ is the overall mean of the natural log of the expected frequencies; μ_i^M is the effect that male education i has on the cell frequencies (the same for μ_j^F and μ_k^U); μ_{ik}^{MU} and μ_{jk}^{FU} refer to the interaction effect between male education and the type of union (MU) and female education and the type of union (FU); and μ_{ij}^{MF} is the interaction effect between male and female education.

If couples were not classified by type of union, then this model would correspond to a saturated model because it would include all possible one-way and two-way interaction effects in a two-way contingency table. The model assumes unrestricted associations between male and female education but assumes that the pattern for married and cohabiting couples is identical. To test whether this assumption holds true, we examine the following model:

$$\ln(F_{ijk}) = \mu + \mu_i^M + \mu_j^F + \mu_k^U + \mu_{ik}^{MU} + \mu_{jk}^{FU} + \mu_{ij}^{MF} + \gamma_k^U, \quad [2]$$

where $\gamma_k^U = 1$ when male education is equal to female education and 0 otherwise. With regard to [1], this model yields two additional effects that enable variation in educational homogamy according to type of union. This variation is expressed in a single parameter that applies to all homogamous couples. We refer to this parameter as the *homogamy* parameter. The differences between the homogamy parameters for married and cohabiting couples correspond to the *homogamy gap* between married and cohabiting couples: $\Delta\gamma_k^U = \gamma_1^U - \gamma_2^U$, ($k = 1$ for married couples, $k = 2$ for cohabiting couples).

4. Results

4.1. Trends in cohabitation by level of educational attainment

Table 2 shows the proportions of cohabiting couples by their levels of educational attainment, sex, country and census round. Despite differences across countries and over time, a number of general observations can be offered. First, cohabitation is not evenly spread across educational groups. The prevalence of cohabitation decreases as the levels of educational attainment increase. This pattern is repeated in all countries and shows no significant differences between men and women. The differences between educational groups are more pronounced in early periods, including the 1970 and 1980 census rounds. In the 1970s, cohabitation was almost nonexistent among university graduates. In Panama, where more than 50% couples were cohabiting, only 3.4% of college-educated men in a union were cohabiting. In contrast, 75% of men who had not completed primary education were cohabiting. In Chile, in which cohabiting relationships represented only 3.2% of couples, cohabitation was virtually non-existent among college-educated men and women and included 5.8% of the unions among those who had not completed primary education.

Table 2 about here

Second, differences between educational groups have narrowed over time due to the rapid expansion of cohabitation among the higher educational levels. In all countries and for all educational groups, the probability of a man or woman cohabiting is higher in 2000 than in 1970. The odds ratios are systematically larger (results not shown here) for more highly educated people. For example, Table 2 shows that only 1.3% of men who had completed secondary education cohabited in 1970 in Colombia. By 2005 (when the most recent census was

conducted), this percentage had increased to 55.4%. Similarly, in Argentina, the proportion among male college graduates increased from 0.7% in 1970 to 20.3% in 2001.

Third, differences across countries have also diminished over time. This decrease is observed both in overall levels of cohabitation (see Table 2) and in differences related to educational attainment. To illustrate this fact, we compare the range between the minimum and maximum values for the "less than primary" group in 1970 to the range of values observed for 2000. The range of values for men was almost 70 points between Panama and Chile in 1970, whereas the range observed between Panama and Mexico was only 55 points in 2000.

4.2. Log-linear models

To explore whether a gap in educational homogamy between prevailing married and cohabiting couples exists for Latin American countries, we estimate a series of log-linear models using the strategy outlined in the method section. Table 3 provides a description of each of the models and goodness-of-fit statistics. To assess fit, we use the *Likelihood Ratio Chi-squared statistic* (L^2) and the *Bayesian Information Criterion (BIC)*, which is based on the L^2 statistic (Raftery 1986).

Table 3 about here

Model 0 corresponds to the independence model because it lacks interaction between the educational attainment of males and females. This model only controls for the marginal distributions of the contingency table. Model 1 allows for unrestricted associations across countries and over time between the educational attainment of males and females, but it does not allow this association to differ for married and cohabiting couples. This model confirms that there is a strong association between male and female educational attainment. Our aim is to

determine whether this association varies by type of union. Model 3 adds a homogamy parameter for each diagonal cell (*Hom*). We allow this parameter to vary by types of union, but it cannot vary over time and across countries. According to the *BIC* statistic, the fit of model 3 is significantly closer than that of model 2 ($BIC_{M3} - BIC_{M2} = -1193$). This result indicates that the strength of homogamy varies by type of union and, thus, that there is a homogamy gap between married and cohabiting couples. Models 4 and 5 relax the constraints on the homogamy gap to enable this gap to vary over time and across countries, respectively. Compared with model 3, neither of these more complex models significantly improves the fit according to the *BIC*; by this same criterion, model 5 fits more poorly than model 4. The less parsimonious fit of model 5 indicates that cross-country variations in the homogamy gap are less important than over-time variations. Finally, model 6 allows for unrestricted variation of the educational homogamy gap over time and across countries. According to L^2 , model 6 offers the best fit, but the *BIC* suggests that this model is inefficient when compared with model 3 due to the large loss of degrees of freedom. Nevertheless, given the number of countries involved in the analysis and the simulated distributions that we used for several years, we prefer to present the parameters from this model to obtain country- and time-specific parameters to estimate the homogamy gap.

The homogamy gap

Table 4 presents the homogamy gaps between married and cohabiting couples by country and census round. As described in the methods section, this gap corresponds to the difference in the strength of educational homogamy between the two types of unions. The coefficients are obtained from model 6. Similar parameters were found when we examined country-specific

models. Nevertheless, we preferred to pool the data so that we could compare whether time trends were stronger than cross-country trends. If married and cohabiting couples present similar levels of educational homogamy, then the gap will be close to 0. Positive values indicate that married couples are more likely to be homogamous than cohabiting couples. Negative values indicate the opposite result. A 0.2 difference equals an odds ratio of 1.22 ($\exp(0.2) = 1.22$), which indicates that the strength (odds) of homogamy net of the marginal distribution is 22% larger for married couples than for cohabiting couples. Because we are primarily interested in the magnitude of the homogamy gap, we do not present data pertaining to the overall strength of educational homogamy by type of union, country and census round (results available from the authors).

The results in Table 4 show that married couples are more likely to be homogamous than cohabiting couples in all countries and samples except in Panama in 1980 and Costa Rica in 1984, in which no differences exist between the two types of couples. The homogamy gap diminishes between 1970 and 2000. In the 1970s, the gap was higher than 0.2 in all countries. Three decades later, only the gap in Ecuador (0.23) exceeded this threshold. The homogamy gap in Argentina decreased from 0.22 in 1970 to 0.01 in 2000.

Table 4 about here

The relationship between the homogamy gap and the spread of cohabitation

In addition to the homogamy gap, Table 4 shows the proportions of cohabiting couples by country and census round (as also shown in Table 1) and the correlation coefficients (R) between the size of the homogamy gap and the proportion of cohabiting couples. We estimate the

correlation between years for each country and the correlation across countries for each census round. Despite the small number of observations, all countries except Panama show negative correlations. The years in which the homogamy gap was highest had the lowest proportions of cohabitation. Argentina and Colombia show strong and statistically significant correlations of -0.97 ($p < 0.05$) and -1.00 ($p < 0.032$), respectively. When we observe cross-national differences in a single year, the strength of the correlation is significantly lower and never statistically significant. Similar values for the homogamy gap are found for very different levels of cohabitation. This result can be observed in the cases of Chile and Panama in 1970. The findings are consistent with our hypothesis: the size of the homogamy gap has decreased the most in countries that had the lowest levels of cohabitation in the 1970s (e.g., Argentina, Brazil and Chile).

5. Discussion

In this paper, we have investigated differences in educational homogamy (termed the homogamy gap) between married and cohabiting couples in 8 Latin American countries from 1970 to 2000. The countries selected are among the most populous in the region and presented different levels of cohabitation in the early 1970s. Cohabitation has increased in all of these countries except Panama, where it has remained above 50% during the entire period. Using data on young couples from IPUMS census microdata samples, the log-linear models show that, despite strong tendencies toward homogamy among both married and cohabiting couples, the homogamy gap between the two types of unions was sufficiently large to yield better-fitting models when type of union was considered. The main results can be summarized as follows. Married couples are more

likely to be homogamous than cohabiting couples. The size of the homogamy gap decreased in all countries between 1970 and 2000. Time trends indicate that the homogamy gap is negatively correlated with the spread of cohabitation. Differences between countries have decreased, but such differences still persist. Countries with high levels of cohabitation do not necessarily have smaller homogamy gaps.

These results provide support for the three hypotheses outlined in the paper, and future research should attempt to provide more thorough verification of these results. We predicted that cohabiting unions would be less homogamous than marriages because of the weaker role of education in the partner markets in which cohabiting couples were formed than in those in which marriages were formed. Consistent with this hypothesis, we have demonstrated that cohabiting couples are less homogamous than married couples. Nevertheless, we have not provided a direct measure of the structuring role of education in the partner market. Our assumption was based on secondary sources that have reported extensively on the historical, cultural and social roots of traditional cohabitation in Latin America (Charbit, 1987; De Vos, 1998; Rodríguez 2005).

According to these sources, cohabitation was especially prevalent among the less educated, indigenous, African-descended, and isolated populations. Nevertheless, in the last few decades, cohabitation has spread among the higher social and educational groups and abandoned its more traditional setting by entering partner markets that are increasingly similar to those for marriages.

These results lead us to the second hypothesis. The increase of cohabitation has reduced the homogamy gap between married and cohabiting couples; however, as predicted, differences between countries remain and are not correlated with their levels of cohabitation. As mentioned earlier, Latin American countries cannot be ordered in a continuum from traditional to modern

societies based on their levels of cohabitation. Therefore, the process of comparing countries without employing a historical perspective may lead to flawed conclusions. A historical perspective is essential for understanding the dynamics of cohabitation in Latin America. Further, the third hypothesis predicted that the association between the homogamy gap and the level of cohabitation would be stronger in those countries in which cohabitation was less widespread in 1970 because the traditional and modern forms of cohabitation in such countries would be less mixed. Our results are consistent with this hypothesis: Argentina, Brazil and Chile are the countries in which the homogamy gap was lowest in 2000 and are the countries that had the lowest levels of cohabitation in the 1970s.

Overall, these results can be directly linked to the emerging debate regarding the type of cohabitation that is emerging in the region. The extent to which the Latin American cohabitation boom includes some characteristics of the second demographic transition (Lesthaeghe, 1991; Van de Kaa, 1988) is receiving considerable attention among social scientists. Some researchers have emphasized the uniqueness of cohabitation in Latin America (Castro, 2002; Rodríguez, 2005), whereas other authors have referred to a gradual convergence toward the second demographic transition (Quilodrán, 1999). The decrease in the homogamy gap that we observe suggests that cohabitation in Latin America is gradually disengaging from its traditional form. Thus, if the increase of cohabitation were primarily an intensification of its traditional form, then the homogamy gap would have remained more stable over time.

This research has implications beyond Latin America. The historical perspective has clearly shown that the relationship between cohabitation and marriage is changing. This result provides support for one of the main arguments of the institutionalization hypothesis: differences between

married and cohabiting couples may change as the degree of institutionalization evolves in society (Kiernan, 2002). The lack of historical data pertaining to cohabitation may have prevented researchers from conducting similar analyses of the situations in the U.S. or in Europe. The current analysis was facilitated by the availability of individual records organized by households in Latin American censuses since the 1970s and the ability of these censuses to identify cohabiting unions through the marital status question.

Although the literature pertaining to assortative mating frequently uses cross-sectional data, such data have some limitations. Our analysis is based on a set of prevailing young couples at the time of the census. Some men and women whose ages are similar to those considered here may have already ended previous relationships. Moreover, some couples that began cohabiting may already be married by the time of the census. In this regard, our results would also be consistent with the winnowing hypothesis (Blackwell & Lichter, 2000, 2004), which predicts higher homogamy among married couples because couples with higher affinity (i.e., those who are homogamous) will be more likely to marry over time, while other couples separate or remain in less engaged union arrangements (i.e., dating and cohabiting couples). The data used in this research do not allow the examination of such cases, as recently done by Schwartz (2010) in the U.S. using longitudinal data pertaining to couples. In the absence of data that allow us to directly test these hypotheses, our results suggest that the winnowing hypothesis could also explain why marriages are more homogamous than cohabiting unions, but it may not explain why the homogamy gap has diminished. Based on scattered evidence of increasing union instability and the increased use of cohabitation as a trial period (Rindfuss & Vanden Heuvel, 1990), differences between the two types of unions should have increased. Therefore, although the winnowing

hypothesis may explain some of our findings, time trends should be explained by other factors, particularly the generalization of cohabitation across all social groups in Latin America.

Future research will be necessary to examine additional evidence for the hypotheses outlined in this paper. Census microdata offer sufficient geographical detail with which to compare regions within countries in the same way in which we have compared such data at the national level. For example, in countries such as Brazil and Colombia, non-marital cohabitation is not evenly distributed across regions, but regional differences have diminished due to the increase of cohabitation. We could predict that the homogamy gap should be higher in regions that were associated with the highest levels of cohabitation in the 1970s. The analysis could also involve specific subpopulations. We could compare ethnic and educational homogamy among indigenous populations who are less likely to marry. Research in this regard has shown that the tendency to marry or partner within the same educational group is lower among ethnic minorities (Esteve & López-Ruiz, 2010). Demographic Health Survey data and country-specific surveys, such as the Mexican Retrospective Demographic Survey (EDER), could also provide more detail regarding marital and union history to account for selectivity. Unfortunately, due to data availability and differences across countries, most of the suggested follow-up analyses will need to be conducted for specific countries and will thus lack the historical and cross-national perspectives of this paper.

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Table 1. Sample characteristics and numbers of couples (both spouses aged 25-34)

Country	Year	Sample density	Number of couples	Cohabiting couples (%)	Men 25-34 in unions (%)	Women 25-34 in unions (%)
Argentina						
	1970	2.0%	12122	9.0	66.4	75.6
	1980	10.0%	77152	12.4	70.0	77.1
	1991	10.0%	128937	17.7	69.5	75.4
	2001	10.0%	98991	32.9	60.9	67.0
Brazil						
	1970	5.0%	128374	5.6	70.7	75.7
	1980	5.0%	183928	9.8	74.4	76.3
	1991	5.8%	278378	17.6	68.8	72.6
	2000	6.0%	299680	33.2	65.8	70.1
Chile						
	1970	10.0%	20897	3.2	68.6	71.0
	1982	10.0%	34314	4.8	69.8	70.8
	1992	10.0%	47368	8.2	66.1	70.6
	2002	10.0%	41035	19.7	56.3	64.4
Colombia						
	1973	10.0%	33929	16.2	65.5	71.2
	1985	10.0%	68091	28.1	65.5	69.2
	2005	10.0%	85322	63.0	62.2	68.5
Costa Rica						
	1973	10.0%	4196	13.3	71.1	74.0
	1984	10.0%	7851	15.8	71.9	72.5
	2000	10.0%	11401	27.2	65.1	71.7
Ecuador						
	1974	10.0%	13372	20.8	70.7	77.4
	1982	10.0%	19300	24.8	74.7	77.9
	1990	10.0%	27213	25.8	71.8	75.8
	2001	10.0%	32220	32.6	69.2	72.5
Mexico						
	1970	1.0%	12234	12.8	77.1	80.4
	1990	10.0%	269725	11.6	76.5	78.4
	2000	10.5%	337972	17.9	74.8	76.0
Panama						
	1970	10.0%	3001	52.8	66.1	75.7
	1980	10.0%	4721	46.9	67.0	73.2
	1990	10.0%	5957	46.6	62.1	70.0
	2000	10.0%	7479	56.1	60.8	69.2

Source: The calculations are based on Latin American census microdata samples from IPUMS-International.

Table 2. Share of cohabitation by educational group, sex, country and census round (couples aged 25-39 years)

	1970s			1980s			1990s			2000s					
	< Prim.	Prim.	Sec.	Uni.	Tot.	< Prim.	Prim.	Sec.	Uni.	Tot.	< Prim.	Prim.	Sec.	Uni.	Tot.
Men															
Argentina	19.7	5.4	1.2	0.7	9.0	26.7	8.4	3.7	2.3	12.4	41.0	17.7	7.5	5.4	17.7
Brazil	6.7	4.1	2.0	1.1	5.6	12.3	9.3	5.3	3.5	9.8	23.9	17.2	10.8	7.2	17.6
Chile	5.8	2.4	0.5	0.0	3.2	8.5	5.1	2.0	0.9	4.8	16.7	9.6	4.1	2.3	8.2
Colombia	22.0	11.6	3.7	1.3	16.2	38.2	29.2	16.7	6.9	28.1	-	-	-	-	-
Costa Rica	19.5	8.0	2.6	1.9	13.3	26.9	15.4	6.5	1.6	15.8	-	-	-	-	-
Ecuador	25.5	15.9	5.4	2.6	20.8	33.3	25.6	10.1	5.1	24.8	38.9	28.2	16.1	8.7	25.8
Mexico	15.6	7.3	4.0	1.2	12.8	-	-	-	-	-	17.7	11.2	6.6	3.7	11.6
Panama	75.5	48.2	12.6	3.4	52.8	77.3	51.5	18.3	5.7	46.9	75.9	57.8	31.9	14.2	46.6
Women															
Argentina	20.8	3.9	0.3	0.6	9.0	28.4	7.2	3.2	3.4	12.4	42.7	17.7	7.1	6.0	17.7
Brazil	7.1	3.1	0.9	1.1	5.6	13.5	8.5	4.0	3.7	9.8	26.0	17.1	9.6	6.7	17.6
Chile	5.8	1.9	0.3	0.0	3.2	9.2	4.7	1.6	0.6	4.8	18.8	9.7	3.5	2.8	8.2
Colombia	23.2	7.4	0.9	0.8	16.2	42.0	27.3	11.0	4.8	28.1	-	-	-	-	-
Costa Rica	20.2	7.3	0.6	2.4	13.3	31.5	13.6	3.4	1.7	15.8	-	-	-	-	-
Ecuador	24.7	15.2	2.8	5.0	20.8	31.1	26.2	7.2	3.9	24.8	34.9	30.4	11.9	7.9	25.8
Mexico	16.0	4.2	3.3	4.3	12.8	-	-	-	-	-	18.2	10.1	5.1	3.0	11.6
Panama	76.5	44.7	7.4	1.2	52.8	78.1	51.0	15.2	5.9	46.9	77.7	59.2	28.3	12.5	46.6

Legend: < Prim. Less than Primary; Prim. Primary Completed; Sec. Secondary Completed; Uni. University Completed.

Source: The calculations are based on Latin American census microdata samples from IPUMS-International.

Table 3. Specifications and goodness-of-fit statistics of log-linear models

Model design	Degrees of freedom	L ²	BIC
Independence			
1 TCUM, TCUF	576	1081531.0	1073077.7
Educational homogamy			
2 TCUM, TCUF, TCMF	288	2760.4	-1466.3
3 TCUM, TCUF, TCMF, HomU	286	1538.4	-2658.9
4 TCUM, TCUF, TCMF, HomTU	280	1457.7	-2651.5
5 TCUM, TCUF, TCMF, HomCU	272	1428.5	-2563.4
6 TCUM, TCUF, TCMF, HomTCU	224	1320.9	-1966.5

Legend: T (2) Time: 1970-2000; C (8) Country: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama; U (2) Type of Union: Cohabiting union, Marriage; M (4) Male schooling: Less than Primary, Primary Completed, Secondary Completed, University Completed; F (4) Female schooling: Less than Primary, Primary Completed, Secondary Completed, University Completed; Hom (1) Homogamy parameter.

Table 4. Homogamy gaps between married and cohabiting couples (model 6) and the spread of cohabitation by country and census round

Country	Homogamy gap				% cohabitation				R	p. value
	1970	1980	1990	2000	1970	1980	1990	2000	Over time	
Argentina	0.22	0.17**	0.10**	0.01	9.0	12.4	17.7	32.9	-0.97	0.03
Brazil	0.21**	0.14**	0.15**	0.10**	5.6	9.8	17.6	33.2	-0.86	0.14
Chile	0.32 ⁺	0.11	0.08	0.07	3.2	4.8	8.2	19.7	-0.61	0.39
Colombia	0.26**	0.23**		0.16**	16.2	28.1		63.0	-1.00	0.03
Costa Rica	0.31	0.00		0.15	13.3	15.8		27.2	-0.19	0.88
Ecuador	0.35**	0.26**	0.22**	0.23**	20.8	24.8	25.8	32.6	-0.76	0.24
Mexico	0.23		0.17**	0.12**	12.8		11.6	17.9	-0.73	0.48
Panama	0.32	-0.01	0.07	0.17 ⁺	52.8	46.9	46.6	56.1	0.70	0.30
R Cross-national	0.43	-0.21	-0.20	0.35						
p. value	0.29	0.66	0.72	0.39						

Source: The calculations are based on Latin American census microdata samples from IPUMS-International.

Note: The difference between the homogamy parameters for married and cohabitating couples correspond to the *homogamy gap* ($\Delta\gamma_k^U$) between both types of union: $\Delta\gamma_k^U = \gamma_1^U - \gamma_2^U$, ($k = 1$ for married couples, $k = 2$ for cohabitating couples). To establish statistical significance for the *homogamy gap* we have estimated confidence intervals for both γ_1^U and γ_2^U using three levels of statistical confidence (90%, 95%, 99%). The following symbols indicate at which level the confidence interval do not overlap: + > 90%. * > 95%; ** > 99%.