PAA 2019 Extended Abstract: Marriage Markets and Women's Schooling in Latin America

Daniela R. Urbina Julio*

*Department of Sociology and Office of Population Research,
Princeton University*

Motivation and Research Questions

In many countries women are on average achieving higher levels of schooling than men, changing the composition of marriage markets in one of its key structuring dimensions—educational attainment. This trend has been associated with the end of hypergamy—the expectation that men should marry down and women should marry up in schooling and other markers of social status (Van Bavel, Schwartz & Esteve, 2018). Currently, in most high-income countries wives have the same or more education than their husbands (Van Bavel & Klesment, 2017), and hypogamy—women marrying less educated men—has become more salient in recent cohorts (De Hauw et al., 2017; Esteve, García-Román & Permanyer, 2012; Grow & Van Bavel, 2015). In these contexts being highly educated no longer reduces women's chances of entering marriage, nor increases their likelihood of marital dissolution (De Hauw et al., 2017; Fry, 2010; Perelli-Harris & Lyons-Amos, 2016; Schwartz & Han, 2014).

A female advantage in educational attainment has also emerged in most Latin American countries, but we know very little about the marriage market implications of these demographic trends. In the last decades these societies underwent important expansion reforms in secondary and tertiary education, which were paralleled with dramatic advances in women's educational attainment (Esteve & McCaa, 2007; Torche, 2010). For instance, the female advantage index, developed by Esteve and colleagues (2012), shows that if a man and a woman were selected at random from the population, the educational attainment of the latter would be higher than that of the man in Argentina, Brazil, Chile, Colombia, Ecuador and Venezuela. Interestingly, these shifts have been coupled with highly heterogeneous trends in couples' educational pairings across countries. While

---

*E-mail: djulio@princeton.edu

Address: Department of Sociology, 104 Wallace Hall Princeton, NJ 08544

in Argentina, Brazil, Colombia and Venezuela there has been an increase of hypogamous couples, in Chile, Mexico, and Ecuador hypergamy is still a more prevalent arrengement (Esteve et al., 2012).

In this study, I investigate the implications of the reversal of the gender gap in education for Latin American marriage markets. In particular, I answer two research questions:

Research Question 1: *How educational pairings—hypergamy, hypogamy, and homogamy— at different level of attainment vary across countries?* Do we see different patterns of educational assortative mating net of the changes in the marginal distribution of education across countries? Previous analyses of educational assortative mating in Latin America have mostly focused on a smaller subset of countries (Esteve & McCaa 2007; Torche 2010) or have not examined trends for specific educational pairings (Esteve et al. 2012, 2016). By examining the variation in educational pairings across countries net of compositional changes, I lay the groundwork for the second part of this analysis.

Research Question 2: Given the economic, social and cultural diversity within Latin America I expect to find great variation in the prevalence of each type of educational pairing across countries. Therefore, my second research question is: *What are the contextual determinants associated with the proportion of educationally hypogamous couples across Latin American countries?* In other words, why in some contexts do we find a higher proportion of marriages were wives are more educated than men? Theoretically, the emergence of hypogamous unions is especially interesting given the historical importance of hypergamy norms in Latin America (García & de Oliveira, 1994; González Montes, 1991).

In particular, I inspect three context-level factors across societies. First, in order to examine the role of female educational advantage for marital behavior, I examine the ratio between men and women who have achieved a particular level of education. In addition, I analyze country-level indicators of social norms pertaining to gender and family. I specifically explore how the prevalence of gender-essentialist attitudes at the national level are associated with the proportion of hypogamous couples. Finally, I examine the role of the gender-wage gap at different levels of education. To the extent that the economic returns of having a more educated wife outpaces the costs of not complying with educational hypergamy norms, smaller gender wage gaps could also explain cross-country heterogeneity in hypogamy (Bertrand, Kamenica & Pan, 2015; Grow, Schnor & Van Bavel 2017).

Given space limitations, in the remainder of this document I will focus on the methods and preliminary analysis pertaining my first research question only.

Data and Measures

For this project I use the Integrated Public Use Microdata Series (IPUMS) census samples from: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, and Venezuela[1] (Minnesota Population Center, 2018). For each country I use census rounds from 1970 until the most recent census collection; I combined all available samples for each country and generated ten-year birth cohorts. Following previous studies, I restrict this analysis to the sub-sample of prevailing marriages and cohabitating couples (Schwartz and Mare, 2005). Ideally, I would focus on newlyweds as prevailing unions are subject to different sources of bias, but unfortunately that type of data is not available to conduct a comparative project such as this one. In addition, I only include couples where male partners are between 30 and 35 years old to ensure that most of the cohort that enters a union is observed (Torche, 2010).

My most important measure is the highest educational attainment of each spouse. Fortunately, IPUMS-International has created harmonized educational attainment variables for all census samples across countries. This variable measures educational attainment using four categories: 1 "Less than Primary", 2 "Completed Primary", 3 "High School Completed", and 4 "College Degree or Higher".

Methods

I use log-linear models for contingency tables in order to characterize the pattern of assortative mating across countries. These models provide estimates of the association of couples' education while controlling for changes in the marginal distribution of educational attainment. I analyze three-way tables by cross-classifying husband's education (5 categories), wife's education (5 categories) and country (7 categories).

In particular, I rely on different specifications of the *homogamy* model, which examines if individuals are more likely to marry partners with their same level of schooling (Powers & Xie, 2000). The canonical version of this model assumes mating patterns are captured by the marginal distribution of husbands' and wives' schooling, plus one three-way interaction that models educational homogamy across the main diagonal of the contingency table for each country (Powers & Xie, 2000). Formally,

$$\ln(F_{ijk}) = \mu + \mu_i^H + \mu_j^W + \mu_k^N + \mu_{ij}^{HW} + \mu_{ik}^{HN} + \mu_{jk}^{WN} + \gamma_{ol}^{ON} \tag{1}$$

Where H is husband's education, W is wife's education and N is nation. In this model a single parameter γ_{ol}^{ON} represents the changes in the log-odds of *educational homogamy* in nation l relative to the baseline country. And $O=1$ if the husband's education is equal to his wife's education, and

---

[1]In future iterations of this project I will add samples from Bolivia, Costa Rica, Paraguay, Perú and Uruguay.

$O = 0$ otherwise. Other versions of this model allow for more complex patterns of educational pairings. For instance, the unconstrained homogamy model allows the strength of homogamy to vary across levels of educational attainment, while the asymmetric model incorporates parameters to capture hypergamy and hypogamy patterns along the minor diagonals of the contingency table (Powers & Xie, 2000; Schwartz & Mare, 2005).

In this analysis I test several of these model specifications—each corresponding to a different hypothesis regarding the mating structure across Latin American countries—and adjudicate between them on the basis of both substantive reasons and goodness of fit statistics[2].

Preliminary Results

In order to have a sense of the transformations in educational attainment across Latin American countries I plotted the distribution of husbands and wives schooling in Figure 1. This graph shows the average trends in educational attainment across countries and birth cohorts. First, we can see how the married population has upgraded their schooling over time; while 60% of husbands and around 70% of wives born in 1930 had less than primary, in younger cohorts that is the case only for 25% of men and women. Second, Figure 1 also indicates that in younger cohorts there is gender parity for most levels of attainment. The only exception is secondary completion, where we can see a slight female advantage.

[Figure 1 here]

To get a more detailed account of the interaction between schooling levels and marital selection I examine trends in educational pairings for each country. In Figure 2 we can see there is great variation in the evolution of assortative mating patterns in Latin America. There are countries like Argentina, Chile and Venezuela where homogamy levels have remained stable across birth cohorts, while in Brazil, Colombia and Ecuador homogamy has decreased quite drastically. In addition, Figure 2 confirms the rise of hypogamy in Brazil and Colombia, while also revealing that hypergamy is still a prevalent arrangement in several countries like Chile and Ecuador.

[Figure 2 and 3 here]

Since these trends in hyper/hypogamy are partly a function of the changes in homogamy in each country, Figure 3 provides further insights by depicting educational pairings only among heterogamous couples. Among this group of marriages, we can see that hypergamy has decreased in almost all countries, but it remains dominant in Chile, Ecuador and Mexico. Most importantly, Figure 3 shows that several Latin American countries—Argentina, Brazil, Colombia and

---

[2]AIC, BIC, Dissimilarity Index and Likelihood

Venezuela—follow the worldwide trend of experiencing a reversal in educational pairings, from exhibiting higher proportions of hypergamous couples to the opposite trend—having higher proportions of hypogamous marriages.

Next, I turn to log-linear models to characterize the pattern of assortative mating across countries. The purpose of this analysis is to disentangle the net association between spouses' educational attainment from compositional changes in the population's level of schooling. Table 1 contains all the model specifications and their corresponding goodness-of-fit statistics. I start fitting a Model of Independence (1), which assumes that husband's education, wife's education and country are independent of each other—and increasingly build more complex specifications. The best fitting model according to all goodness-of-fit criteria is Model 10. The latter contains an unconstrained diagonal parameter to model homogamy, which varies for each educational level, and an additional parameter that models asymmetrical movements across the minor diagonals. The asymmetrical nature of this parameter allows for hypergamy to be different than hypogamy in the model. All parameters are allowed to vary across countries.

[Table 1 here]

Figure 4 plots the patterns of educational assortative mating according to the preferred model (Model 10). Each coefficient represents the log-odds of observing a particular combination of wive's and husband's schooling in a particular nation.

[Figure 4 here]

First, this figure shows that across contexts the log-odds of homogamy are especially high for pairings at the extremes of the educational distribution. In other words, in all countries educational homogamy is extremely likely if both spouses have less than primary schooling or a college degree. Second, if we focus on heterogamous couples we can see convergent and divergent patterns across countries depending on the educational level. For instance, at higher levels of education (College and High School) the log-odds of hypogamy are higher than those associated with hypergamy in almost all countries. Moreover, in Brazil and Colombia the log-odds of hypogamy between a woman with a college degree and a man with a high school degree are notably higher than the opposite pairing. In contrast, when we focus on lower levels of education (Less than Elementary and Elementary) we see more variation in the log-odds of hypogamy or hypergamy across contexts. In Chile and Ecuador it is more likely to find a husband with completed primary married to a woman with less than primary, while in Brazil, Colombia, Mexico and Venezuela log-odds indicate that hypogamy is more likely—a woman with completed primary married to a man with less than elementary schooling. Finally, negative log-odds for pairings between individuals with high school and elementary schooling indicate how rare these unions are across countries.

5

Conclusions and Next Steps

Preliminary analyses indicate that net of the marginal changes in educational expansion there are divergent patterns of educational assortative mating across Latin American countries. This is especially the case for lower educational transitions, where we can see that in some countries hypergamous unions are more likely—husband has elementary schooling and wife has less than elementary education—while in others contexts the opposite pairing is more prevalent. Findings also reveal important commonalities across contexts, namely the high levels of homogamy at the extremes of the educational distribution.

In future iterations of this project I will incorporate new countries to the analysis, and construct more granular measures of the educational attainment of spouses. Most importantly, I will proceed to address the second research question of this project: What are the contextual determinants associated with the proportion of educationally hypogamous couples across Latin American countries? In this analysis I will more directly examine the implications of the female advantage in education and its implications for marital selection.

References

Bertrand, M., Kamenica, E., and Pan, J. (2015). Gender Identity and Relative Income within Households. The Quarterly Journal of Economics, 130(2), 571–614.

De Hauw, Y., Grow, A., and Bavel, J. V. (2017). The Reversed Gender Gap in Education and Assortative Mating in Europe. European Journal of Population, 33(4), 445–474.

Esteve, A., García-Román, J., and Lesthaeghe, R. (2012). The Family Context of Cohabitation and Single Motherhood in Latin America. Population and Development Review, 38(4), 707–727. Esteve, A., and McCaa, R. (2007). Homogamia educacional en México y Brasil, 1970-2000: Pautas y tendencias. Latin American Research Review, 42(2), 56–85.

Esteve, A., Schwartz, C. R., van Bavel, J., Permanyer, I., Klesment, M., and García-Román, J. (2016). The End of Hypergamy: Global Trends and Implications. Population and Development Review, 42(4), 615–625.

Fry, R. (2010). The Reversal of the College Marriage Gap. Retrieved July 17, 2018, from http://www.pewsocialtrends.org/2010/10/07/the-reversal-of-the-college-marriage-gap/

García, B. and Oliveira, O. (1994). Trabajo Feminino y Vida Familiar en México. México, D.F.: El Colegio de México.

González Montes, S. (1991). "Los Ingresos No Agropecuarios, Trabajo Remunerado Femenino y la Transformación de las Relaciones Intergenéricos e Intergeneracionales de las Familias Campesinas." In Textos y Pre-textos. Once Estudios Sobre la Mujer., edited by Vania Salles and Elsie McPhail, pp. 225–260. Ciudad de México: El Colegio de México.

Grow, A., Schnor, C., and Bavel, J. V. (2017). The reversal of the gender gap in education and relative divorce risks: A matter of alternatives in partner choice? Population Studies, 71(sup1), 15–34.

Minnesota Population Center. Integrated Public Use Microdata Series, International: Version 7.0 [dataset]. Minneapolis, MN: IPUMS, 2018. https://doi.org/10.18128/D020.V7.0

Perelli-Harris, B., and Lyons-Amos, M. (2016). Partnership Patterns in the United States and across Europe: The Role of Education and Country Context. Social Forces, 95(1), 251–282.

Powers, D. A. and Xie, Y. (2000). Statistical methods for categorical data analysis. Academic Press, San Diego, California.

Schwartz, C. and Mare, R. D. (2005). Trends in Educational Assortative Marriage from 1940 to 2003. Demography, 42(4):621-646.

Schwartz, C. R., and Han, H. (2014). The Reversal of the Gender Gap in Education and Trends in Marital Dissolution. American Sociological Review, 79(4), 605–629.

Torche, F. (2010). Educational assortative mating and economic inequality: a comparative analysis of three Latin American countries. Demography, 47(2):481-502.

Van Bavel, J., Schwartz, C. R., and Esteve, A. (2018). The Reversal of the Gender Gap in Education and its Consequences for Family Life. Annual Review of Sociology, 44(1), 341–360.

Van Bavel, J., and Klesment, M. (2017). Educational Pairings, Motherhood, and Women's Relative Earnings in Europe. Demography, 54(6), 2331–2349.

Appendix: Figures

Figure 1: Wives and Husbands Educational Attainment Across Countries
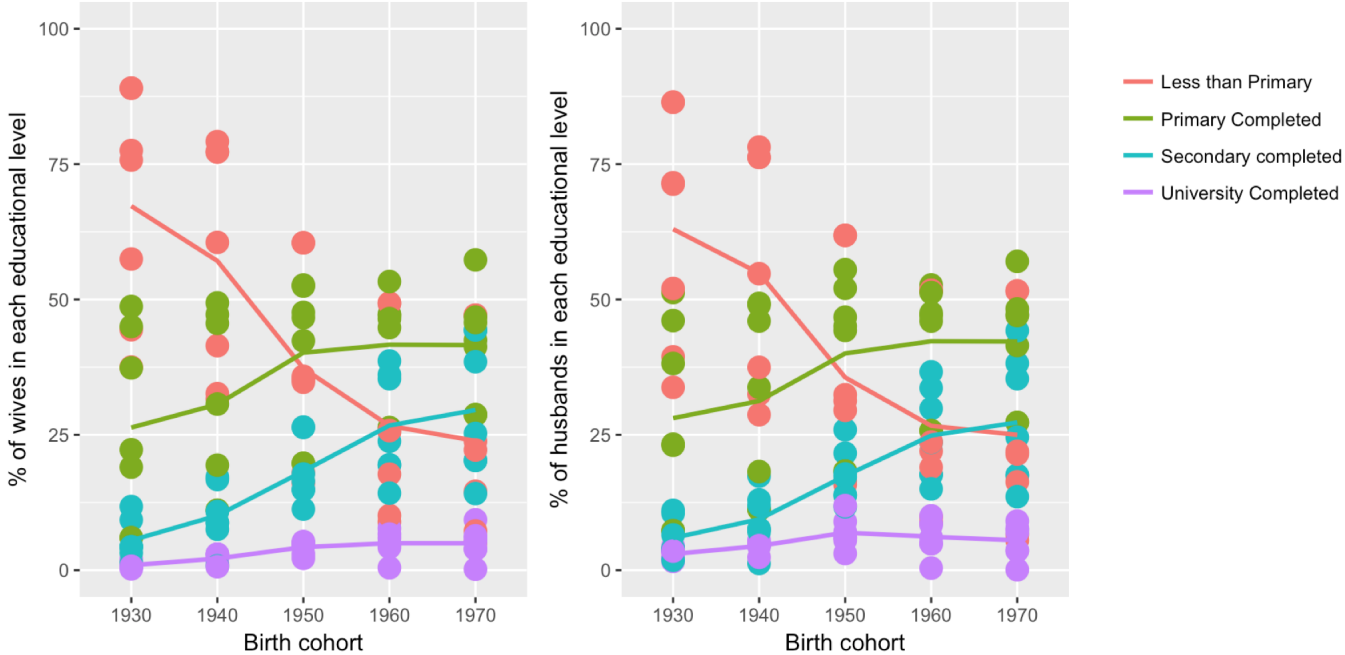
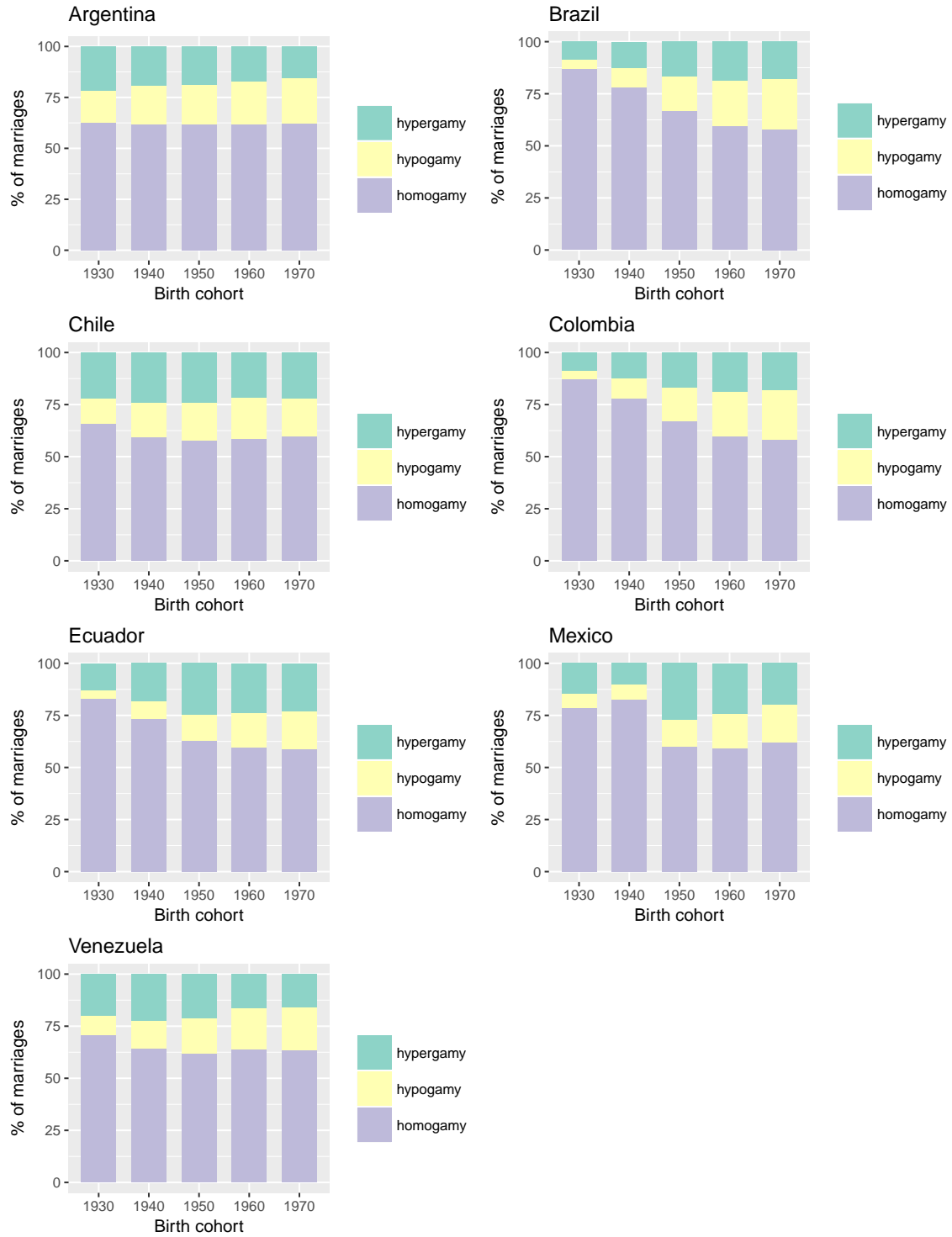Figure 2: Educational Pairings by Country

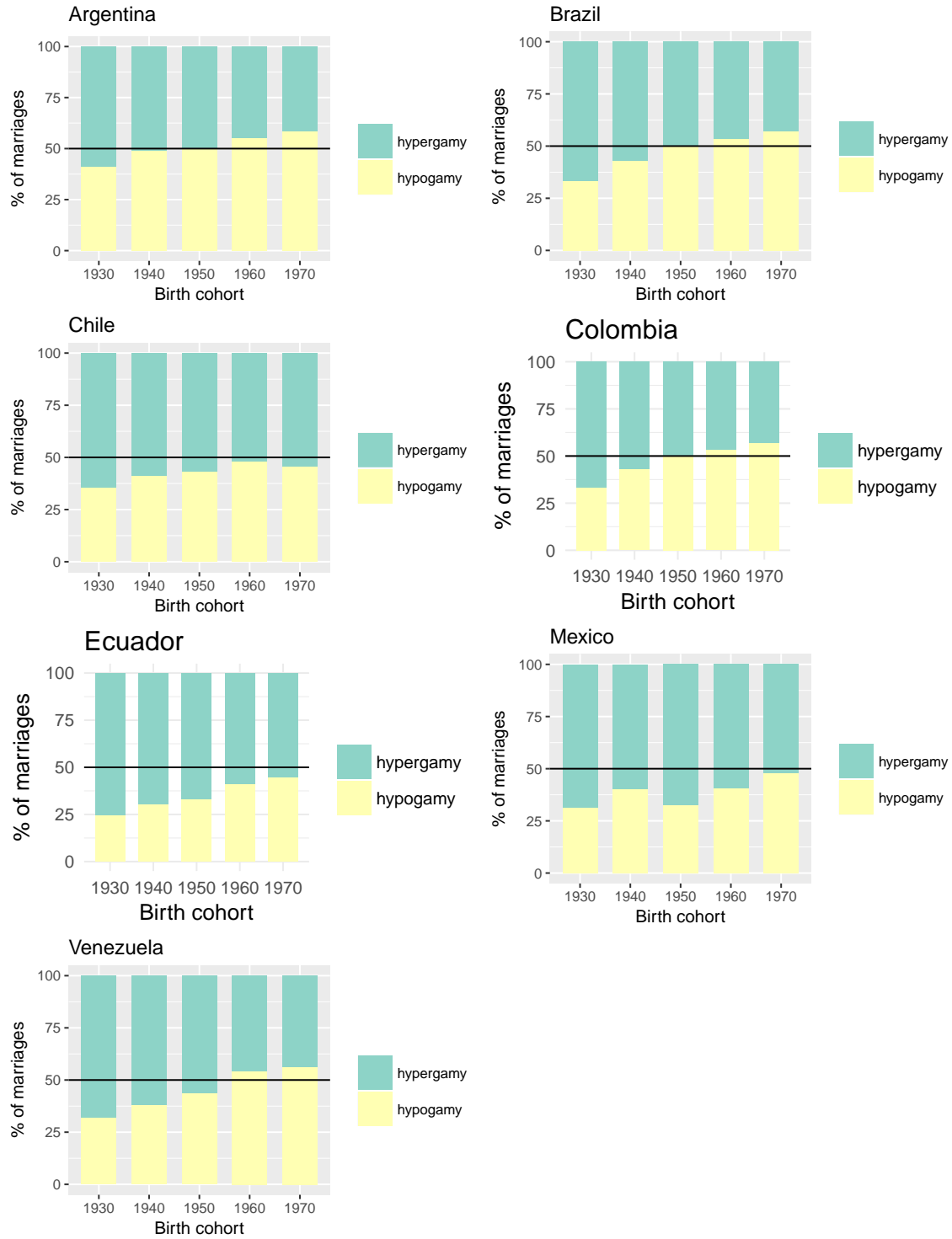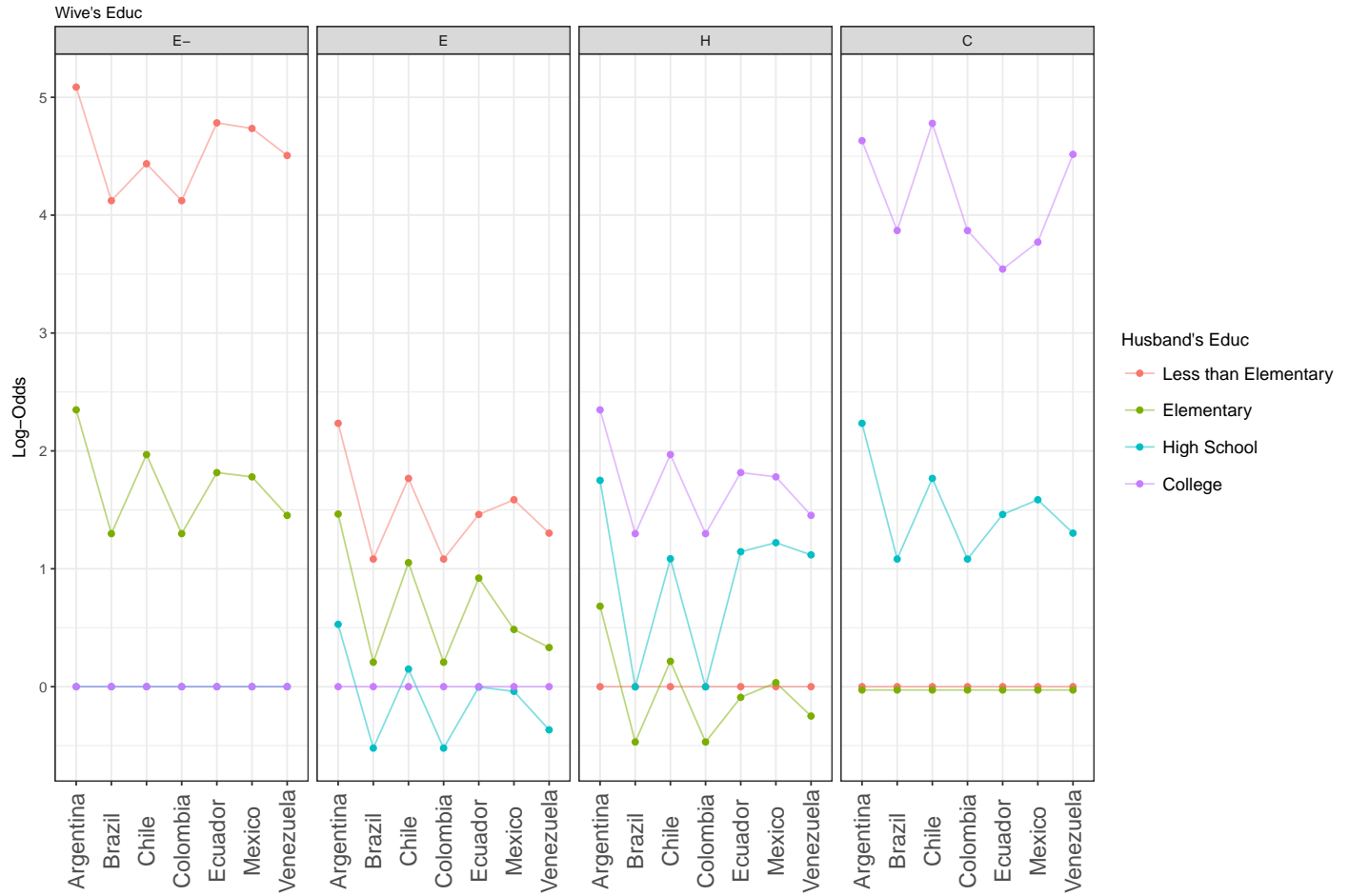Figure 3: Educational Pairings Conditional on Heterogamy by Country

Figure 4: Log-Odds for Educational Pairings Across Countries: Preferred Model

Appendix: Tables

Table 1: Log-Linear Models of the Association Between Husband's and Wife's Educational Attainment (Husbands Aged 30-35)

		df	G2	100*D	AIC	BIC
(1)	Indep = [W][H][N]	99.00	2765605.56	38.44	2765407.56	2765785.62
(2)	CI = [W][H][N][HW][WY][HN]	54.00	24317.46	2.27	24209.46	25172.77
(3)	CI+[CDiag][CDiagN]	48.00	17708.57	1.98	17612.57	18653.92
(4)	CI+[Diag][DiagN]	30.00	9241.49	0.81	9181.49	10456.93
(5)	CI+[Hyper][HyperN]	48.00	18468.96	1.96	18372.96	19414.30
(6)	CI+[Hypo][HypoN]	48.00	18595.23	1.92	18499.23	19540.57
(7)	CI+[CDiag][CDiagN][Sym][SymN]	42.00	8558.13	1.57	8474.13	9593.50
(8)	CI+[CDiag][CDiagN][Asym][AsymN]	36.00	8430.43	1.56	8358.43	9555.84
(9)	CI+[Diag][DiagN][Sym][SymN]	24.00	709.45	0.15	661.45	2014.93
(10)	CI+[Diag][DiagN][Asym][AsymN]	18.00	615.58	0.12	579.58	2011.09

W: Wife's Education, H: Husband's Education, N: Nation, CDiag: Main Diagonal constrained

Diag: Main Diagonal unconstrained, Hyper: Hypergamy, Hypo: Hypogamy

Sym: Symmetric movements minor diagonal, Asym: Asymmetric movements minor diagonal