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Women's Rising Share of Tertiary Enrollment: A Cross-National Analysis

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Women's Rising Share of Tertiary Enrollment: A Cross-National Analysis

Abstract

In recent decades, a dramatic shift occurred in higher education throughout the world. Women now enroll in and complete more education than men in the majority of countries. Using a lagged cross-sectional design on a dataset of 75 countries from 1990 to 2008, this study examines the predictors of the current gender gap in tertiary enrollment. I find that prior arguments developed by neo-institutionalist theorists do predict the gender gap in tertiary enrollment to some degree. Countries that have historically supported women's rights and experienced more rapid educational expansion are linked to a larger share of women enrolled in tertiary education than men. However, countries with greater memberships in IGOs and INGOs do not influence women's share of higher education enrollment. Additionally, fertility rates are important predictors of women's share of tertiary enrollment. Countries with lower fertility rates are associated with a larger female share of higher education. The results support the hypotheses that both neo-institutionalists arguments and fertility norms shape the female-favorable gender gap in tertiary enrollment throughout the world.

द्वल के दशकीमे, एक नटकीय बदलव द्दनिय भर मेउ चच शिकष मेइई. महिलओकी अब मे वखिल लिय और देशी के बहुमत मे प्ररुषी की तलन मे अधिक शिकष प्ररी. 1990-2008 मे 75 देशी की एक डेटासेट पर एक lagged पर के अज्ञभरीय डिजइन का उपयोग करन, इस अध्ययन तृतीयक नमकन मे वरतमन लैगिक अंतर के भविष्यवकतओ की परख चेती है. मे नव संसथव वे सिद्धतकारी दवर विकसित पिछले तरक कुछ हद तक तृतीयक नमकन मे लैगिक अंतर की भविष्यवणी करते है. ऐतिहासिक दृष्टि से महिलओ के अधिकारी का समर्थन क्रिय और अधिक तेजी से शिकष के विसतर अज्ञभव क्रिय है कि देश के प्ररुषी की तलन मे तृतीयक शिकष मे वखिल महिलओ का एक बड़ हिस्सा से जुड़ी है. चलेकि, IGOs और INGOs मे अधिक से अधिक सदस्यत के सथ देशी के उच्च शिकष मे नमकन की महिलओ की हिस्सेवरी को प्रभावित नही करते. इसके अतिरिक्त, प्रजनन दर तृतीयक नमकन की महिलओ की हिस्सेवरी की महत्वपूर्ण predictors है. कम प्रजनन दर के सथ देश मे उच्च शिकष का एक बड़ महिल के सथ जुड़े रहे है. परिणम नव institutionalists तरक और प्रजनन कषमत मन देवी वेनी द्दनिय भर मे तृतीयक नमकन मे महिल अज्ञकल लैगिक अंतर को आकार कि परिकल्पन का समर्थन है.

近几十年来,世界高等教育发生了巨大的变化。大部分国家女性参与和完成教育的比例大于男性。本文运用了1990年到2008年间75个国家的跨国数据,检查了目前高等教育入学率的性别差异,发现新制度主义理论者所预言的高等教育入学率的性别差异的确存在。历史上支持女性权益并在教育上迅速扩张的国家,与女性参与高等教育的比例大于男性密切相关。但是,加入国际组织(IGOs)和国际非政府组织(INGOs)的国家并没有影响女性高等教育的入学率。并且,生育率是女性高等教育入学率的重要预测因素。低生育率的国家有着较大的女性高等教育入学比例。结果显示:新制度主义者的理论和生育率造成了世界高等教育入学率中的女性优势。

In den letzten Jahrzehnten ist eine dramatische Verschiebung in der Hochschulbildung weltweit eingetreten. In den meisten Ländern finden mehr Frauen als Männer Zugang zu und absolvieren eine Hochschulausbildung. Mit einem lagged cross-sectional-Design untersucht diese Studie ein Dataset von Prädiktoren für die aktuellen Geschlechterunterschieden in der tertiären Bildung in 75 Ländern im Zeitraum

1990 bis 2008. Die Ergebnisse zeigen, dass die von neo-institutionalistischen Theoretikern entwickelten Argumente die Kluft zwischen den Geschlechtern in der tertiären Bildung zu einem gewissen Grad vorhersagen. Länder, die historisch die Rechten der Frau unterstützt und eine raschere Bildungsexpansion erlebt haben, zeigen einen größeren Anteil an eingeschriebenen Frauen im tertiären Bildungsbereich als Männer. Jedoch haben Länder mit mehr Mitgliedschaften in zwischenstaatlichen Organisationen NGOs und INGOs keinen Einfluss auf den Anteil von Frauen in der Hochschulbildung. Darüber hinaus sind Geburtenraten wichtige Prädiktoren für den Frauenanteil im tertiären Sektor. Länder mit niedrigeren Geburtenraten weisen einen größeren weiblichen Anteil in der Hochschulbildung auf. Die Ergebnisse stützen die Hypothesen, dass neo-institutionalistische Argumente und Fruchtbarkeit-Normen sich auf den weiblichen Vorsprung in der Beteiligung im tertiären Sektor weltweit auswirken.

في العقود الأخيرة، حدث تحول جذري في نظام التعليم العالي في العالم بأسره، حيث تلتحق النساء حالياً بالتعليم وتستكملن تعليمًا أكثر من الرجال في معظم البلدان. وباستخدام تصميم متأخر مشترك بين الأقسام لمجموعة بيانات تخص 75 دولة من عام 1990 إلى عام 2008 لفحص المنبئات الدالة على الفجوة الحالية بين الجنسين في الالتحاق بالتعليم الجامعي، وجد أن المناقشات السابقة التي وضعها واضعو النظريات من أتباع المنهج النظامي الجدد تتنبأ في الواقع إلى حد ما بالفجوة في الالتحاق بالتعليم الجامعي بين الجنسين، فالدول التي دعمت على مدار تاريخها حقوق المرأة شهدت توسعاً تعليمياً أسرع ترتبط بجزء أكبر من نسبة النساء الملتحقين بالتعليم الجامعي عن الرجال. ومع ذلك، الدول التي تتمتع بعضوية أكبر في المنظمات الحكومية الدولية والمنظمات الدولية غير الحكومية لا تؤثر على نصيب النساء من الالتحاق بالتعليم الجامعي. إضافة إلى ذلك، معدلات الخصوبة من المنبئات المهمة بنصيب التحاق المرأة بالتعليم الجامعي، فالدول ذات معدلات الخصوبة الأقل مرتبطة بنسبة أكبر من التحاق الفتيات بالتعليم الجامعي. وتؤيد النتائج الافتراضات القائلة أن كلا من حجج مناصري المنهج النظامي الجدد وعادات الخصوبة تشكل الفجوة بين الجنسين لصالح الفتيات فيما يتعلق بالالتحاق بالتعليم الجامعي في أنحاء العالم.

Son on yılda, dünyada, yüksek öğretim alanında önemli gelişmeler meydana geldi. Şu an itibariyle ülkelerin çoğunda, eğitim'e kayıt ve eğitim seviyesinde kadınlar erkeklerden daha öndedir. 1990' dan 2008 yılına kadar yetmiş beş ülkeyi kapsayan veri kümesi ve enlemesine araştırma tekniğini kullanan bu çalışma yüksek öğretime kayıta cinsiyet ayrımcılığına neden olan öngörücüleri incelemektedir. Yeni kurumsalcılar tarafından ortaya atılan önceki savunular yüksek öğretime kayıta cinsiyet ayrımcılığını bir dereceye kadar öngörmektedir. Yüksek öğretime kayıtlı kadınların payının erkeklerden daha fazla olması ülkelerin tarihsel olarak kadın haklarını desteklemesi ve hızlı eğitimsel büyüme göstermesi ile bağlantılıdır. Bununla birlikte, ülkelerin uluslararası devlet kurumlarına ve uluslararası sivil toplum kuruluşlarına daha fazla üye olması kadınların yüksek öğretimde ki payı üzerinde etkili olmamaktadır. Ayrıca, doğurganlık oranları kadınların yüksek öğretimde ki payının önemli öngörücülerindedir. Ülkelerin düşük doğurganlığa sahip olması kadınların yüksek öğretimde ki artan payı ile ilişkilidir. Mevcut sonuçlar hem yeni kurumsalcı argümanların hem de doğurganlık normlarının bütün dünyada yüksek öğretime kayıta kadınların istihdamına yönelik pozitif ayrımcılığı yönlendirdiği hipotezlerini desteklemektedir.

Keywords

Gender, Tertiary Education, Cross-national

Cover Page Footnote

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WOMEN'S RISING SHARE OF TERTIARY ENROLLMENT: A CROSS-NATIONAL ANALYSIS

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"It was a man's world"

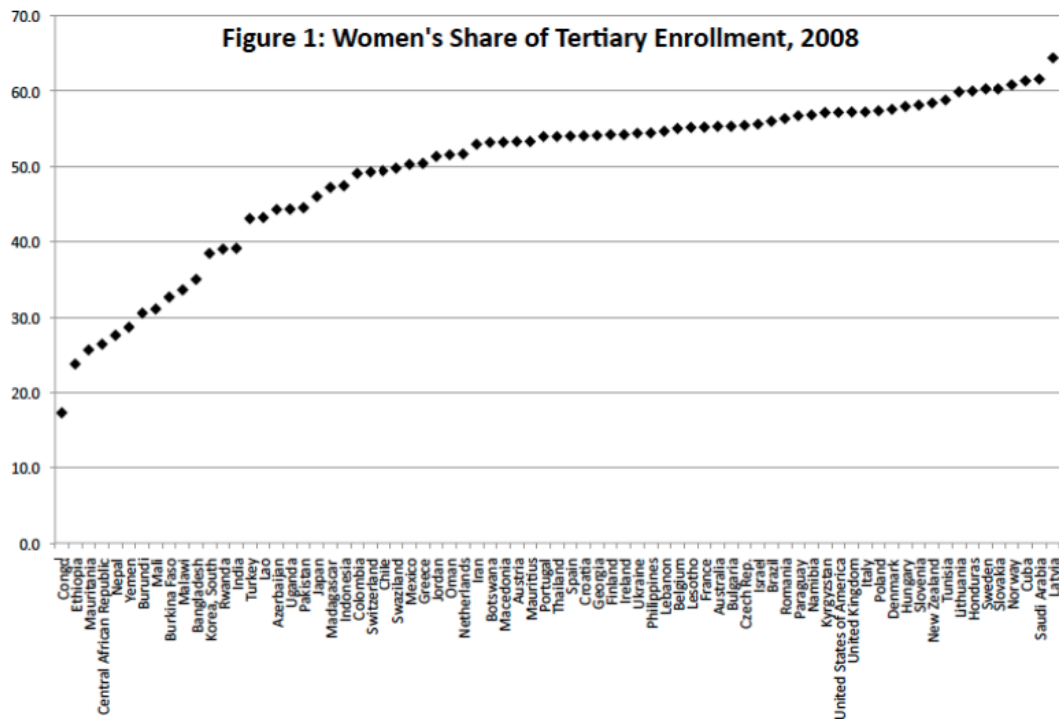
The prior quote is the title of a sub-section of the United Nations Educational, Scientific and Cultural Organization's (UNESCO) 2009 *Global Education Digest*, an annual publication on the status of education throughout the world (UNESCO, 2010). This title appropriately highlights the fact that prior to the 1980s, women lagged behind men in the number of tertiary degrees completed in most nations (Kelly & Slaughter, 1991). In the 1980s women began to reach parity with men, and in many cases surpassed men in the amount of education they received (Buchmann, DiPrete & McDaniel, 2008). By 2008, women reached parity with or surpassed men in tertiary enrollment in most countries. However, there is a great deal of variation in the gender gap in tertiary enrollment across countries. As Figure 1 demonstrates, women's share of higher education (i.e. the number of women enrolled as a percentage of all students) varies from a low of 17 percent in the Republic of Congo to a high of 64 percent in Latvia, yet a pattern of female advantage is evident. The striking variation in the gender gap in tertiary enrollment throughout the world and the current female-favorable gender gap in higher education warrant further study.

The global gender gap in higher education has wide-reaching implications for scholars and policymakers alike. Educational institutions will have to respond by considering a different student make-up than the past, and decide whether to implement controversial admissions practices that preference men (Baum & Goodstein, 2005).² If women continue to outpace men in university enrollment and completion, there may be changes in the families, marriage markets, the labor market and political system. For example, women may delay marriage or forgo childbearing in order to pursue education, and assortative mating patterns may shift toward women marrying men with less education (Lewis & Oppenheimer, 2000). Relationships between men and women may become more egalitarian in terms of housework and parenting (Hook, 2006; Sayer et al., 2004). Gender gaps in wages may decrease while women's

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² For example, see the controversy following Kenyon College's Dean of Admissions Jennifer Delahunty Britz's 2006 *New York Times Op-Ed* "To All the Girls I've Rejected" (Britz, 2006).

participation in the labor market and politics may increase (Bernhardt, Morris, & Hancock 1995; Pettit & Hook, 2005; Paxton & Kunovich, 2003).



Given the remarkable shift in the gender gap in tertiary education and the possible implications of this shift, it is surprising that there is scarce research on this issue. Many studies note women's rising enrollment in higher education throughout the world (Schofer & Meyer, 2005; Bradley, 2000; Jacobs, 1996; Kelly, 1989), but most comparative research on gender gaps in higher education focus on two patterns 1) women's continued lack of participation in science, technology, engineering and math (STEM) fields (for example, see Charles and Bradley 2002; 2009) or 2) increasing enrollment in higher education for men and women (while ignoring the gender gap in enrollment) (Schofer & Meyer, 2005). Additional research on gender gaps in higher education consists of single-country case studies (Shavit et al., 2007). Furthermore, studies on the gender gap in tertiary enrollment use data from periods when men were still largely advantaged in higher education or when men and women were reaching parity in higher education; Researchers Bradley and Ramirez (1996) use data from 1985 while Bradley and Charles (2004) use data from 1995. To date, research does not examine the gender gap in tertiary enrollment using a large cross-national sample, recent data that represent the reality that more women are currently enrolled in higher education than men, and multivariate methods.³ We clearly need to reexamine this topic, especially since women are projected to continue to outpace men in higher education in the coming decade (Vincent-Lancrin, 2008; UNESCO, 2010).

Prior research on the gender inequalities in higher education almost exclusively utilizes a neo-institutionalism perspective. This perspective highlights how the diffusion of gender

³ The majority of prior research uses small sample sizes or bivariate methods. In an unpublished study, Ortega (2009) examines the gender gap in enrollment using data as recent as 2000.

egalitarian norms, educational expansion, modernization and democratization increase women's enrollment and reduce the male-favorable gender gap. For example, Bradley and Ramirez (1996) argue that the push for gender equality by the world polity, in conjunction with democratization and the need for nation-states to appear modern by incorporating women into public spheres, increase women's share of enrollment in higher education. Research has also found that the expansion of higher education across countries is also linked to increases women's enrollment (Schofer & Meyer 2005; Shavit et al., 2007). Given the reversal in the gender gap, it is important to ask whether the factors that predicted the gender gap in tertiary enrollment when more men were enrolled in higher education than women continue to predict the gender gap now that more women enroll than men.

In this study, I utilize a dataset of national statistics collected for 75 countries for the period covering 1990 to 2008 and examine the gender gap in tertiary enrollment in 2008. The objective of the analysis is twofold. First, I test prior explanations of the gender gap in higher education to determine if the factors that predicted the male-favorable gender gap also explain the current female-favorable gender gap in higher education. Second, I test new hypotheses related to how women's incentives to complete education based on fertility norms as well as women's labor market opportunities shape women's share of higher education. I find that neo-institutionalist arguments do predict the gender gap in tertiary enrollment. Countries that have historically supported women's rights and experienced more rapid educational expansion are linked to a higher share of women enrolled in tertiary education than men. However, being more connected to the world polity through IGOs and INGOs does not influence women's share of higher education enrollment. Additionally, alternative explanatory factors - specifically, fertility norms - are important predictors of women's share of tertiary enrollment. Countries with lower fertility rates are associated with a larger female share of higher education. The results support the hypotheses that both neo-institutionalists' arguments and fertility norms shape the female-favorable gender gap in tertiary enrollment throughout the world.

Theoretical Background

Neo-institutionalist, or world polity, theory argues that the world is no longer comprised of separate countries and cultures. Countries now embrace and are embedded within one worldwide institution, known as the world polity, which diffuses Western ideas (Strang & Meyer, 1993). As countries interact within a global economy and global mass media, they become more similar over time. Liberal ideologies that support women's rights, democratization and the expansion of higher education are spread through the world polity and increase women's enrollment in tertiary education (Bradley & Ramirez, 1996; Schofer & Meyer, 2005). The world polity spreads these ideas through international organizations, such as UNESCO, OECD, and the World Bank, which have been promoting gender equity in education since the 1960s (Ortega, 2009; Bradley & Ramirez, 1996; Ramirez & Wotipka, 2001). As norms of gender equality and democracy spread throughout the world, women's enrollment grew, and countries moved toward gender parity in higher education (Bradley & Ramirez, 1996; Schofer & Meyer, 2005). Following neo-institutionalist theories, I outline three sets of hypotheses that test the influence of the world polity, educational expansion, and the support for women's rights on the gender gap in tertiary enrollment.

The World Polity

Neo-institutionalist theorists maintain that the diffusion of Western ideologies and growing connectedness of nations is largely due to the influence of international non-

governmental organizations (INGOs) and international governmental organizations (IGOs) - which provide links between nations, and diffuse the norms of the world polity. INGOs and IGOs promote women's rights and equal access to education. IGOs, like the United Nations and the World Bank, regularly implement programs to promote gender equity in education, and approximately 40 percent of all INGOs focused on women include education as one of their missions or activities (Berkovitch & Bradley, 1999). Countries that are involved in the world polity are more likely to accept the norms and values of the world polity, including gender equity in education; therefore national involvement in the world society should increase women's share of education. Schofer and Meyer (2005) demonstrated that female enrollment expanded more rapidly from 1970 to 2000 in countries with greater linkages to the world polity. Therefore, I expect:

Hypothesis 1: The greater number of memberships in IGOs and INGOs a country has, the larger the female share of higher education within that country.

Expansion of Higher Education

The expansion of educational systems is a key trait of modern nation-states, and schooling for all citizens is a goal held not only by international organizations but also embraced by countries as evidenced by the inclusion of the right of education in constitutions and national laws (Boli-Bennett & Meyer, 1978; Meyer et al., 1992). The ideal of educational access for all extends to higher education. Higher education experienced massive global expansion during the 20th century. Disadvantaged groups gain greater access to higher education as systems of tertiary education expand. The expansion of education diminishes the importance of ascribed characteristics, such as gender, socioeconomic or minority status, and allows greater access to higher education for all individuals in a society (Shavit et al., 2007; Schofer & Meyer, 2005; Meyer et al., 1992; 1997).

Women particularly benefit from educational expansion. Many case studies highlight the link between educational expansion and educational opportunities for females at the primary, secondary and tertiary level (for example, see Post's 1994 study of Hong Kong). In countries where higher education expanded quickly, women increased their share of education at more rapid rates, in many cases surpassing men (Schofer & Meyer, 2005; Shavit et al., 2007). Of course, it is important to note that the massive growth in higher education has been fueled, in part, by the incorporation of women into higher education (Baker & LeTendre, 2005), and there is a reciprocal relationship between educational expansion and women's incorporation. Given this pattern, educational expansion in an earlier time period should influence women's share of higher education such that:

Hypothesis 2: More rapid expansion in tertiary education is associated with a larger female share of tertiary education.

Gender Ideologies and Support for Women's Rights

Gender ideologies and support for women's rights represent an important cultural value that shape women's status within countries. Gender ideologies affect women in multiple realms, from the dynamics of families and the division of housework to the number of women elected to parliament (Fuwa, 2004; Paxton & Kunovich, 2003). Cross-national education research finds that countries with more gender egalitarian attitudes have less sex segregation in field of study

(Charles & Bradley, 2002; 2009), and adolescent girls have greater expectations to complete tertiary education than boys (McDaniel, 2010).⁴

While gender-egalitarian discourse is pervasive, it is not always coupled with actual policies and practices that support women. Therefore, I test how liberal gender ideologies and the support for women's rights affect women's share of higher education.

Gender ideology is notoriously difficult to measure across countries, but religion serves as a useful proxy for a country's gender ideology as it is an important source of cultural beliefs in most countries. Men's superiority over women is a value present in the majority of religions, and religion has long been used to exclude women from public spheres such as education, work, and politics (Paxton et al., 2007). Some religions actively promote the subordination of women by regulating their rights in terms of marriage, divorce and contraception (Inglehart & Norris, 2003). All world religions dictate gender roles to some degree, but some religions are more restrictive than others. For example, Islamic law is typically practiced in a way that enforces strict, patriarchal gender roles that constrain women's public activities (Ahmed, 1992). Protestantism, on the other hand, promotes less hierarchical religious practices and more readily accepts women as religious leaders or important members of the church compared to Islam, Catholicism or Orthodox Christianity (Ahmed, 1992), which may be due to Protestant ideas about the rights of individuals. Research on women's participation in politics often uses religion as a proxy for a country's gender ideology, and consistently finds that more traditional or conservative religions, like Islam, are negatively associated with the percentage of women elected to parliament (Paxton et al., 2007). A country's dominant religion will influence women's share of tertiary enrollment such that:

Hypothesis 3: Predominantly Muslim countries will be associated with a smaller female share of tertiary education than predominantly Protestant, Catholic or Orthodox Christian countries.

Another way to capture gender ideologies is through governmental support for women. When women were granted suffrage is an important indicator of historical support for women and more egalitarian gender ideologies. In all countries, men had access to civil, political, and social rights before women did (Orloff, 1993; Ramirez et al., 1997). The international women's movement, with support from the world polity, promoted women's suffrage, which resulted in 96 percent of all nations guaranteeing women the right to vote by 1994 (Ramirez et al., 1997). Therefore, when women were granted suffrage could be an important indicator of a country's historical support of women and should influence the gender gap in higher education as follows:

Hypothesis 4: Granting women suffrage at earlier time periods will be associated with a larger share of women in higher education.

Fertility Norms & Women's Access to the Labor Market

Education is often thought of as an investment decision - both for individuals and countries. For countries, investing in education increases economic and cultural advancement, especially in terms of worker productivity and economic output (Schultz, 1961). For

⁴ Charles and Bradley (2002; 2009) demonstrate that egalitarian gender ideologies can co-exist with gender essentialist ideologies - which assert that while men and women are equal, innate gender differences exist, and men and women have different abilities and preferences. Gender essentialism reinforces sex segregation in field of study in higher education.

individuals, the decision to invest in education is based on perceived returns to education (Becker, 1991) and individuals must foresee a return on his or her investment in order to pursue higher education.

According to Brinton (1993), gender stratification is systematic, and it results from a sequence of choices made by individuals as well as structural constraints placed on individuals by institutions. Applied to women's education, women must foresee both personal returns on their educational investment, and a society that will not constrain their ability to utilize their degrees in order for women to widely pursue tertiary education. The ability of women to use tertiary degrees depends on the demand for educated women in the labor market and whether the norms regarding marriage and family are conducive to women pursuing education and working. In countries where these factors produce fewer constraints on women, women will fare better and go farther in higher education. Conversely, women will fare worse in terms of educational attainment in countries where cultural norms and institutional structures place greater constraints on women. Therefore, fertility norms and women's access to the labor market should shape cross-national variability in the gender gap in higher education.

Fertility Norms

Across a wide range of countries, women are delaying marriage to later ages, fertility rates are rapidly declining and rates of divorce and cohabitation are rising (Lesthaeghe, 1983; Mason & Jensen, 1995; Corijn & Klijzing, 2001). As the average age of marriage for women rises and fertility rates fall, women are more able to devote their time to education and the labor market (Brinton et al., 1995). In the United States, the invention and widespread use of the birth control pill gave women more control over their fertility, which is a driving force behind their growing educational attainment (Goldin & Katz, 2002). As women gained the ability to postpone marriage and childbearing to later ages, they were able to invest more in their education. One way to assess whether women are able to control their fertility is through a country's fertility rate. Therefore, I expect:

Hypothesis 5: Lower fertility rates will be associated with a larger female share of tertiary education.

Women's Access to the Labor Market

While prior research finds that women's education affects women's labor market status at both the individual and national level (Weiss et al., 1976), there is also evidence that women's labor market participation affects women's education. For example, greater female participation in the labor force is linked to women entering into math and science in higher education (Van Langen & Deekers, 2005; Riegle-Crumb, 2005). As young women make decisions about whether to invest in higher education, they may consider women's opportunities for inclusion in the labor market. As previous generations of women completed tertiary education and made inroads into powerful positions, young women may be sent a signal that investing in education will pay off. Therefore, women's participation in the labor market should be related to women's share of tertiary education:

Hypothesis 6: Higher female labor force participation rates will be associated with a larger female share of tertiary education.

Data and Methods

This study utilizes aggregate country-level data collected from a variety of published sources, such as UNESCO's Global Education Digest, the Yearbook of International Organizations, the UN's Human Development Report and Demographic Yearbook, and the CIA's The World Factbook. Data for the dependent variables are from 2008. Data for independent variables are lagged by 10 or 20 years, depending on when data are available for the greatest number of countries. Information for each variable, including descriptive statistics and data sources, are presented in Table 1. The sample consists of all nations for which all focal variables were available. This resulted in a sample of 75 countries. The sample includes countries for all regions of the world as well as all levels of economic development.

Table 1. Descriptive Statistics and Data Sources.

| Variable | Std. | | | | Data Source |
|--|------|------|------|-------|---|
| | Mean | Dev. | Min. | Max. | |
| % Women Enrolled in Tertiary Education, 2008 | 49.7 | 10.5 | 17.3 | 64.4 | UNESCO |
| % Women Enrolled in Tertiary Education, 1990 | 43.0 | 13.4 | 11.5 | 66.0 | UNESCO |
| GDP per capita (logged), 1990 | 7.8 | 1.7 | 4.9 | 10.4 | UN Development Report |
| Gross Tertiary Enrollment Ratio (logged), 1990 | 11.5 | 2.0 | 7.6 | 16.5 | UNESCO |
| Fertility Rate, 1990 | 3.5 | 2.0 | 1.3 | 8.7 | UN Demographic Yearbook |
| Female Labor Force Participate Rate, 1990 | 49.5 | 17.6 | 13.5 | 90.7 | UN Development Report |
| Change Gross Tertiary Enrollment Ratio (logged), 1990-2000 | 3.9 | 3.3 | 0.9 | 18.9 | UNESCO |
| Years since Women's Suffrage, 2008 | 60.6 | 22.8 | 0.0 | 115.0 | UN Development Report |
| IGOs and INGOs (logged), 2000 | 7.8 | 0.8 | 6.2 | 9.0 | Yearbook of International Organizations |
| Protestant | 0.2 | | 0.0 | 1.0 | CIA World Factbook |
| Catholic | 0.4 | | 0.0 | 1.0 | CIA World Factbook |
| Orthodox | 0.1 | | 0.0 | 1.0 | CIA World Factbook |
| Muslim | 0.2 | | 0.0 | 1.0 | CIA World Factbook |
| Other Religion | 0.1 | | 0.0 | 1.0 | CIA World Factbook |

Using a lagged cross-sectional design, the dependent variable is regressed on predictors from one to two decades earlier using OLS regression. Diagnostic tests were carried out to find any problems with multicollinearity, heteroskedasticity and influential cases, details of which

are found in Appendix A. Variance inflation factors (VIFs) were used to detect problems with multicollinearity, and are presented in for each model.

Dependent Variable

The dependent variable is the number of women enrolled in tertiary education (ISCED 5 or 6) as a percentage of all students in 2008.⁵ This represents the gender gap in tertiary enrollment. Tertiary enrollment is used instead of a variable for tertiary graduation because enrollment data are more readily available for a wide range of countries, allowing a broader cross-section of data. Fifty percent is equal to parity between men and women, or that the same number of men and women are enrolled in higher education. Numbers higher than 50 percent represent more women than men enrolled in tertiary education. The percentage ranges from 17.3 percent to 64.4 percent with mean of 49.7 percent. Table 2 presents all countries in the analysis and the percentage of women enrolled in tertiary education for the years 1990 and 2008. This highlights the change in women's share of higher education over time. In 1990, women had reached or surpassed parity with men in tertiary enrollment in 26 of 75 countries. By 2008, they reached parity or surpassed men in 49 out of 75 countries.

Independent Variables

Connectedness to the World Polity. Following the research of world polity scholars (Boli & Thomas, 1999; Ortega, 2009), embeddedness in the world polity is measured as a country's logged total membership in international governmental organizations (IGOs) and international non-governmental organizations (INGOs) for the year 2000.

Educational Expansion. To measure expansion of higher education, I calculate the ratio of change in a country's gross tertiary enrollment ratio (GER) from 1990 to 2008 (i.e. GER 2008: GER, 1990). The gross tertiary enrollment ratio is the total enrollment in tertiary education, regardless of age, expressed as a percentage of the eligible five-year age group following on from the secondary-level school leaving population. The GER represents the capacity of the education system to enroll tertiary students, and the ratio of change in GER represents growth in system of higher education.

Gender Ideologies and Support for Women's Rights. Dominant religion is often used as a proxy for gender ideology in comparative research (Paxton, 1997, Kenworthy & Malami, 1999, Inglehart & Norris, 2003). The dominant religion of a country provides a measure of gender ideology because religious traditions of the world are differentially patriarchal or conservative in their views of men's and women's roles. In the model, four dummy variables are used for a country's dominant religion (predominantly Muslim is the omitted category): predominantly Protestant, predominantly Roman Catholic, predominantly Orthodox, and countries with other major religions such as Hinduism, Buddhism or Judaism (other). To measure a country's support for women's rights, I use the number of years since the year 2008 that a country granted women the right to vote is included to represent a government's historical commitment to gender equality. As of 2008, Saudi Arabia had not granted women's suffrage and therefore are coded as zero.

Fertility Norms & Women's Access to the Labor Market. Fertility norms are measured as a country's fertility rate (average births per woman, per year) in 1990. Women's access to the labor market is measure as the female labor force participation rate in 1990. The female labor force participation rate is the proportion of the female population aged 15 or older that is economic active in the labor market.

⁵ Data are from 2006 in six countries: Botswana, Burundi, Mauritania, Paraguay, Rwanda and Turkey.

Table 2: Women's Share of Tertiary Enrollment by Country (ISCED 5/6), 1990-2008.

| | 1990 | 2008 | | 1990 | 2008 |
|----------------------|------|------|----------------|------|------|
| Australia | 52.7 | 55.3 | Lesotho | 58.1 | 55.2 |
| Austria | 46.0 | 53.3 | Lithuania | 40.0 | 59.9 |
| Azerbaijan | 40.0 | 44.3 | Macedonia | 48.9 | 53.2 |
| Bangladesh | 15.9 | 35.0 | Madagascar | 43.6 | 47.2 |
| Belgium | 48.0 | 55.0 | Malawi | 26.5 | 33.6 |
| Botswana | 42.2 | 53.2 | Mali | 13.1 | 31.1 |
| Brazil | 53.8 | 56.0 | Mauritania | 11.5 | 25.6 |
| Bulgaria | 52.5 | 55.3 | Mauritius | 36.5 | 53.3 |
| Burkina Faso | 23.0 | 32.7 | Mexico | 45.3 | 50.3 |
| Burundi | 29.6 | 30.5 | Namibia | 64.1 | 56.8 |
| Central African Rep. | 16.3 | 26.4 | Nepal | 23.1 | 27.6 |
| Chile | 56.4 | 49.4 | Netherlands | 44.0 | 51.7 |
| Colombia | 53.6 | 49.1 | New Zealand | 51.8 | 58.4 |
| Congo | 16.4 | 17.3 | Norway | 53.6 | 60.8 |
| Croatia | 54.1 | 54.1 | Oman | 44.6 | 51.5 |
| Cuba | 57.5 | 61.4 | Pakistan | 32.6 | 44.5 |
| Czech Rep. | 42.9 | 55.5 | Paraguay | 45.8 | 56.7 |
| Denmark | 51.4 | 57.6 | Philippines | 65.0 | 54.4 |
| Ethiopia | 18.1 | 23.8 | Poland | 58.5 | 57.4 |
| Finland | 51.6 | 54.2 | Portugal | 66.0 | 54.0 |
| France | 52.6 | 55.2 | Romania | 48.3 | 56.3 |
| Georgia | 46.2 | 54.1 | Rwanda | 18.9 | 39.0 |
| Greece | 49.8 | 50.4 | Saudi Arabia | 47.5 | 61.6 |
| Honduras | 43.0 | 60.0 | Slovakia | 48.2 | 60.3 |
| Hungary | 50.8 | 58.0 | Slovenia | 54.7 | 58.1 |
| India | 33.3 | 39.1 | Spain | 50.7 | 54.0 |
| Indonesia | 47.2 | 47.4 | Swaziland | 42.9 | 49.8 |
| Iran | 27.3 | 52.9 | Sweden | 53.0 | 60.3 |
| Ireland | 45.3 | 54.2 | Switzerland | 34.1 | 49.3 |
| Israel | 48.2 | 55.6 | Thailand | 63.8 | 54.0 |
| Italy | 48.2 | 57.2 | Tunisia | 38.3 | 58.8 |
| Japan | 38.5 | 46.0 | Turkey | 33.6 | 43.1 |
| Jordan | 51.4 | 51.3 | United Kingdom | 48.2 | 57.2 |
| Korea, South | 31.4 | 38.5 | USA | 54.3 | 57.2 |
| Kyrgyzstan | 51.1 | 57.1 | Uganda | 28.2 | 44.3 |
| Lao | 32.4 | 43.2 | Ukraine | 47.6 | 54.4 |
| Latvia | 57.0 | 64.4 | Yemen | 17.1 | 28.7 |
| Lebanon | 47.9 | 54.7 | | | |

Source: UNESCO 2010 (pages 162-171); UNESCO 2014

Controls. To control for women's prior share of higher education and isolate the independent variables affect women's share of tertiary enrollment in the given time period, a control for women's share of tertiary enrollment in 1990 is included in the models. I include the logged gross tertiary enrollment ratio in 1990 to control for the overall size of tertiary system in 1990. I include logged GDP per capita (in U.S. dollars for the year 1990) in order to control

for level of development of a country. Correlations for the dependent and all independent variables are presented in Table 3.

Table 3. Correlations.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|-------|-------|-------|-------|-------|-------|-------|
| (1) % Women Enrolled in Tertiary Education, 2008 | 1.00 | | | | | | |
| (2) % Women Enrolled in Tertiary Education, 1990 | 0.84 | 1.00 | | | | | |
| (3) Fertility Rate, 1990 | -0.66 | -0.64 | 1.00 | | | | |
| (4) Female Labor Force Participation Rate, 1990 | -0.23 | -0.15 | 0.11 | 1.00 | | | |
| (5) Gross Tertiary Enrollment (logged), 1990 | 0.30 | 0.37 | -0.58 | -0.32 | 1.00 | | |
| (6) Change Gross Tertiary Enrollment Growth (logged), 1990-2008 | -0.21 | -0.36 | 0.48 | 0.10 | -0.47 | 1.00 | |
| (7) IGO & INGO (logged), 2000 | 0.44 | 0.45 | -0.73 | -0.18 | 0.66 | -0.40 | 1.00 |
| (8) Years since Women's Suffrage, 2008 | 0.32 | 0.25 | -0.57 | 0.18 | 0.31 | -0.30 | 0.39 |
| (9) Muslim | -0.31 | -0.41 | 0.46 | -0.36 | -0.07 | 0.24 | -0.40 |
| (10) Protestant | 0.15 | 0.20 | -0.06 | 0.26 | -0.17 | -0.13 | 0.15 |
| (11) Catholic | 0.26 | 0.25 | -0.28 | -0.04 | 0.18 | -0.10 | 0.37 |
| (12) Orthodox | 0.12 | 0.13 | -0.24 | 0.05 | 0.08 | -0.10 | -0.03 |
| (13) Other Religion | -0.24 | -0.18 | 0.08 | 0.16 | -0.03 | 0.06 | -0.16 |
| (14) GDPC (logged), 1990 | 0.67 | 0.59 | -0.78 | -0.33 | 0.46 | -0.38 | 0.76 |
| | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| (8) Years since Women's Suffrage, 2008 | 1.00 | | | | | | |
| (9) Muslim | -0.30 | 1.00 | | | | | |
| (10) Protestant | 0.15 | -0.26 | 1.00 | | | | |
| (11) Catholic | 0.16 | -0.41 | -0.36 | 1.00 | | | |
| (12) Orthodox | 0.12 | -0.16 | -0.14 | -0.22 | 1.00 | | |
| (13) Other Religion | -0.13 | -0.22 | -0.20 | -0.31 | -0.12 | 1.00 | |
| (14) GDPC (logged), 1990 | 0.33 | -0.34 | 0.21 | 0.24 | -0.01 | -0.16 | 1.00 |

Results

Table 4 presents the results of the OLS regressions of women's share of tertiary enrollment on the independent variables. Model 1 includes the control variables. Women's share of tertiary enrollment in 1990 is positively associated with women's share of tertiary enrollment in 2008. Logged GDP per capita also has a significant, positive influence on women's share of tertiary enrollment. The gross tertiary enrollment ratio in 1990 does not significantly influence women's share of tertiary enrollment in enrollment across countries. The

high R² (0.75) is partly due to the strong influence of women's share of enrollment in the earlier time period ($\beta=0.69$). If the model excluded women's share of tertiary enrollment in 1990 the adjusted R² is 0.43, which means that women's prior share of tertiary enrollment explains 32 percent of the variation in women's current share of tertiary enrollment across countries.

Table 4. OLS Regression of Women's Share of Tertiary Enrollment on Independent Variables.

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|-------------------|--------------------|-------------------|-------------------|-------------------|-------------------|
| % Women Enrolled in Tertiary Education, 1990 | 0.55*** (0.06) | 0.54*** (0.06) | 0.57*** (0.06) | 0.57*** (0.06) | 0.49*** (0.06) | 0.48*** (0.06) |
| Gross Tertiary Enrollment Ratio (logged), 1990 | -0.048 (0.34) | -0.14 (0.39) | -0.19 (0.35) | -0.82 (0.32) | -0.77* (0.37) | -0.19 (0.45) |
| GDP per capita (logged), 1990 | 1.93*** (0.48) | 2.57*** (0.63) | 2.05*** (0.47) | 2.06*** (0.50) | 1.91*** (0.67) | 3.11*** (0.78) |
| IGOs & INGOs (logged), 2000 | | -2.17 (1.37) | | | | -2.15 (1.47) |
| Change in Gross Tertiary Enrollment Ratio (logged), 1990-2008 | | | 0.50* (0.21) | | | 0.56* (0.20) |
| Years since Women's Suffrage, 2008 | | | | 0.50+ (0.03) | | 0.06+ (0.03) |
| Religion (ref. Muslim) | | | | | | |
| Protestant | | | | -4.75* (2.23) | | -1.38 (2.37) |
| Catholic | | | | -2.27 (1.83) | | 0.76 (2.03) |
| Orthodox | | | | -1.37 (2.63) | | 2.05 (2.79) |
| Other | | | | -3.55+ (2.00) | | -2.73 (2.04) |
| Fertility Rate, 1990 | | | | | 3.58* (1.86) | 5.33** (1.99) |
| Fertility Rate squared, 1990 | | | | | -0.48* (0.20) | -0.63** (0.20) |
| Female Labor Force Participation Rate, 1990 | | | | | -0.04 (0.04) | -0.01 (0.04) |
| Constant | 16.59** (3.74) | 25.11*** (6.52) | 9.62* (4.66) | 17.81** (3.76) | 20.09 (10.70) | 10.84 (14.10) |
| Adjusted R ² | 0.75 | 0.75 | 0.77 | 0.76 | 0.77 | 0.81 |
| Highest VIF | 1.72 | 3.33 | 1.73 | 2.23 | 3.90 | 6.62 |
| Mean VIF | 1.53 | 2.42 | 1.55 | 1.74 | 2.36 | 3.12 |
| Number of Cases | 75 | 75 | 75 | 75 | 75 | 75 |

+p<0.10, *p<0.05, **p<0.01, ***p<0.001 (two-tailed tests); standard errors below coefficients

Model 2 tests the first hypothesis: the greater number of memberships in IGOs and INGOs a country has, the larger the female share of higher education within that country. The hypothesis is not supported. The total number of IGOs and INGOs in a country is not related to women's share of tertiary enrollment. This finding is somewhat surprising, as prior research consistently found that IGO and INGO memberships were related to women's increasing enrollment in higher education. However, in her dissertation, Ortega (2009) similarly did not find that IGO and INGO memberships did not affect women's share of tertiary enrollment in 2000. To check the validity of this finding, I examined alternative specifications of both the measure of IGO and INGO memberships (see discussion in Appendix A) and of the model. Logged IGO and INGO memberships are highly correlated with logged GDP per capita ($r=.76$); that is, countries with higher GDPs have a greater number of memberships in IGOs and INGOs. While the variance inflation factor (VIF) did not suggest collinearity is a problem in my model, I excluded logged GDP per capita from my model and still found logged IGO and INGO memberships is not associated with women's share of tertiary enrollment.

Model 3 examines the influence of the educational expansion. Hypothesis 2 predicts that more rapid expansion in tertiary education is associated with a larger female share of tertiary education. Growth in a tertiary system from 1990 to 2008 is associated with a significant increase in women's share of higher education. Model 3 accounts for 77 percent of the variation in women's share of tertiary enrollment (2 percent more than Model 1). As predicted by prior research, educational expansion is associated with women's share of enrollment in higher education.

In Model 4, I test the hypotheses related to a country's liberal gender ideologies and support for women's rights. The earlier women were granted suffrage in a country is associated with an increased share of women in higher education ($p<.01$). Model 4 explains 76 percent of the variation in women's share of higher education across countries, a 1 percent improvement over the baseline model (Model 1). Contrary to expectations, predominately Protestant countries (as well as countries with "other" religions) have a lower share of women in higher education than predominately Muslim countries.⁶ On average, Muslim countries in the sample have a lower female share of tertiary enrollment (44%) compared to predominately Catholic (53%), Protestant (53%), and Orthodox (54%) countries. Women's share of tertiary enrollment is 44% in countries with predominately other religions (Buddhism, Judaism, etc.).

A bivariate regression of women's share of tertiary enrollment on religion (results not shown) reveals that Muslim countries do have a significantly lower female share of tertiary enrollment than Protestant, Catholic and Orthodox countries. But net of controls, Protestant countries are associated with a lower female share of tertiary enrollment.

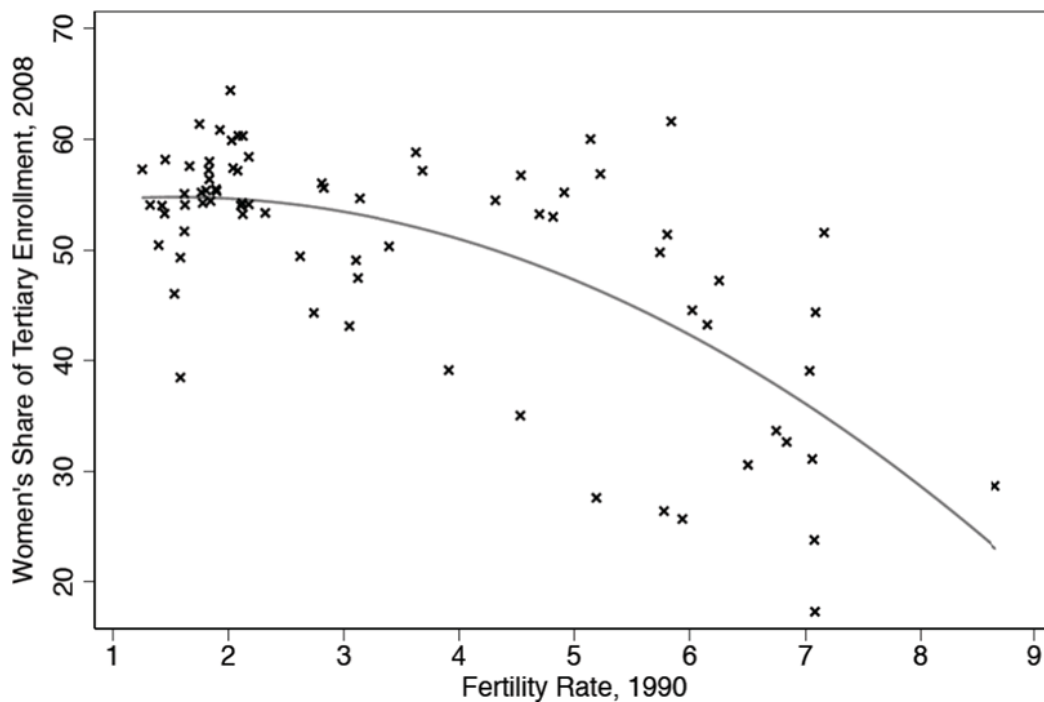
It should be noted that there is a great deal of variation in women's share of higher education in among countries of the same predominant religion. For example, among the 14 Protestant countries in the sample, women's share of higher education varies from a low of 17% in the Republic of Congo to a high of 64% in Latvia. In contrast, among the 17 Muslim countries, women's share varies from a low of 23% in Ethiopia to a high of 62% in Saudi Arabia. This suggests that religion is not the most useful measure of gender ideology in relation to higher education. For example, an extremely religiously and gender conservative country, like Saudi Arabia has one of the highest share of women enrolled in higher education. Also, if Protestant countries encompass as diverse societies as the Republic of Congo and Latvia, not to mention the United States, Sweden and Botswana, perhaps religion is no longer as useful of a

⁶ In an alternative model with predominantly Muslim included as a covariate (and all other religions as the reference category), net of controls, being a predominantly Muslim country is associated with a 2.9 percent increase in women's share of higher education ($p<.01$).

measure of gender ideologies as prior research once suggested (Paxton, 1997; Inglehart & Norris, 2003), at least in terms of women's education.

Model 5 examines the influence of fertility norms and women's access to the labor market on the gender gap in tertiary enrollment. I predicted that lower fertility rates and higher rates of female labor force participation would be associated with a larger female share of higher education. However, in examining the relationship between fertility rates and women's share of higher education, I found the relationship to be curvilinear. Therefore, I include fertility rate and fertility rate-squared in the model.⁷ The fertility rate term is significant and positive, while the squared term is significant and negative, showing that the relationship between fertility rate and women's share of tertiary enrollment decreases at an increasingly accelerated rate (see Figure 2). Higher fertility rates are associated with an increasingly lower female share of tertiary enrollment. Model 5 also tests the hypotheses that higher female labor force participation rates are associated with a larger female share of tertiary enrollment, but this hypothesis is not supported. Female labor force participation rates are not associated with women's share of higher education. Model 5 accounts for 77 percent of the variation in women's share of tertiary enrollment across countries.

Figure 2: Relationship between Women's Share of Tertiary Enrollment and Fertility Rate



Model 6 includes all independent variables in the model. Connectedness to the world polity (memberships in IGOs and INGOS) is not associated with women's share of tertiary enrollment. Educational expansion and support of women's right are associated with a greater women's share of tertiary enrollment. Furthermore, fertility rates are associated with women's share of higher education. The effect of predominant religion in a country is no longer significant, and the female labor force participation rate is not significant. The model explains 81 percent of the variation in the gender gap in tertiary enrollment across countries.

⁷ Regression diagnostics suggest that including fertility rate-squared improves the fit of the model.

In order to determine which factors have the strongest association with the gender gap, I examine standardized coefficients (beta). Women's share of tertiary enrollment in 1990 is the strongest predictor of the gender gap ($\beta = 0.61$), followed by logged GDPC ($\beta = 0.31$). Educational expansion is the third strongest predictor ($\beta = 0.18$), women's suffrage is the fourth strongest predictor ($\beta = 0.12$), and fertility rates are the fifth strongest predictor ($\beta = 0.09$). These findings suggest that level of development and women's prior incorporation into higher education are the strongest predictors of women's current share of higher education. Educational expansion, support for women's rights and fertility rates are also important predictors of the gender gap in higher education.

As in any cross-national research with a small sample, demonstrating the robustness of the results is crucial. I consider outliers, heteroskedasticity, multicollinearity and the inclusion of auxiliary variables. My results are robust against a wide range of robustness checks. Appendix A discusses these results and Appendix Table 1 presents additional regressions in detail.

There are some limitations of this study. First, although large for a study of this nature, the sample size used for the multiple regression is smaller than ideal and many independent variables are undoubtedly interrelated. While tests indicate that multicollinearity is not an issue in the models and the results are robust against a variety of model specifications, future research should explore ways to further test these relationships. Second, causality is difficult to assess. For example, women's share of tertiary enrollment has been found to predict fertility rates (Brewster & Rindfuss, 2000). I acknowledge these complex relationships and believe that there are important feedback loops between these concepts. For example, for women to have more control over their fertility, education is key, but for women to participate in higher education, they must often delay childbearing or be able to control their fertility. Lagging the independent variables by nearly two decades and controlling for women's share of tertiary enrollment in 1990 allows some leverage over these complex causal relationships, but future research should tease out these relationships and further illuminate the causes of changing gender gaps in tertiary enrollment cross-nationally and over time.

Conclusion

Women's current advantage in tertiary enrollment throughout the world, a striking reversal of a gender gap which once favored males, has large implications for the study of higher education and the status of women globally. In this article, I tested a series of hypotheses based on prior neo-institutionalist theories of women's education as well as new hypotheses that consider the influence of fertility norms and women's access to the labor market on the gender gap in tertiary enrollment. I find support for theories stating that the expansion of higher education and countries that support women's rights are associated with a large female share of tertiary enrollment. Furthermore, fertility norms are important for women's incorporation into higher education. Women's share of higher education is larger, or more female-favorable, in countries with lower fertility rates. Women's labor force participation, a country's predominate religion and memberships in IGOs and INGOs do not have a significant association with women's share of tertiary enrollment.

The results do not support the idea that a country's connectedness to the world polity (measured as memberships in IGOs and INGOs) increases women's share of tertiary enrollment. This result is surprising since Bradley and Ramirez (1996) argued that a country's connectedness to the world polity should be a key determinant in women's share of higher education but their study did not explicitly test this relationship. While Schofer and Meyer (2005) find that a country's INGO memberships increase women's tertiary enrollment (as well

as men's), they do not test how INGO memberships affect the share of women in higher education compared to men. There are two plausible explanations for the insignificant finding in this article. First, it's possible that memberships in IGOs and INGOs affect overall enrollment rates of women (and men) but do not influence whether more women than men are enrolled in higher education. That is, connectedness to the world polity is effective at expanding systems of higher education but do not affect men's and women's places in higher education. Therefore, other factors (such as fertility norms or educational expansion) shape whether more women than men enroll in higher education.

Another plausible explanation is that being connected to the world polity shaped women's share of tertiary enrollment in the past, and served to push women toward parity with men in higher education, as Bradley and Ramirez (1996) argued was the case for the time period between 1965 and 1985. But once women reached parity with men, being connected to the world polity plays a less important role in shaping the female-favorable gender gap in higher education and other factors, like fertility rates or educational expansion, determine whether women's share of higher education. It's possible that the world polity diffused norms of gender egalitarianism and education as a right, and therefore successfully secured women's access to higher education, but other conditions must be in place for women to surpass men in higher education. That is not to say that the world polity, through international organizations like UNESCO and the World Bank, does not continue to influence gender equity in education. Many male-favorable gender inequalities in education persist, from enrollment in pre-primary school or sex segregation in field of study (Grant & Berhman, 2010; Charles & Bradley, 2009; UNESCO, 2010). The findings of this article suggest that IGO and INGOs do not affect women's current share of higher education, but that is not to say that they did not shape women's access to higher education in the past or continue to influence gender equity in other realms of education.

The relationship between women's share of higher education and fertility rates is important for several reasons. First, cross-national research on women's education has not considered the impact of fertility rates. This article shows that variations in fertility rates are associated with women's share of higher education. Evidence from the U.S. suggests that women's control over their fertility was a driving force behind their rising educational attainment (Goldin & Katz, 2002), and it appears that relationship holds globally. Second, due to increasingly widespread promotion of birth control methods and the fact that much of the industrialized world is going through the "second demographic transition" - or a period of declining fertility (Lesthaeghe, 1983; Morgan & Taylor, 2006), women will likely continue to gain greater control over their fertility throughout the world in the coming decades. The role of fertility rates may be particularly relevant for future research. Greater access to fertility control should impact the educational choices of women since one barrier to women attaining higher education is that the timing of higher education often conflicts with prime childbearing years. Education researchers must pay attention to these broader cultural shifts that shape individuals' constraints and choices to enter higher education in order to better understand both global and local patterns of educational inequalities.

This article focuses on a macro-level, cross-national pattern of gender inequality in higher education, but in order to understand the overall gender gap in tertiary enrollment we must also consider gender inequalities at the micro-level that contribute to this pattern. Women's advantages in schooling at the micro-level are well documented. For decades, women have earned better grades in school than men in the United States (for a review, see Buchmann et al., 2008). Cross-national research in industrialized countries shows that young girls have higher expectations than boys to complete a tertiary degree (McDaniel, 2010), and while boys

score slightly higher on standardized tests of math and science, girls score higher on reading and verbal tests, and the female advantage in reading is much larger than the male advantage in math or science (Marks, 2008). Even in developing countries, girls outperform boys in school and are less likely to drop out (King & Hill, 1993). It is plausible that women are enrolling in tertiary education at higher rates than men in many countries because of their better grades and higher expectations in combination with fewer constraints from cultural norms and institutional structures. Women's advantage in higher education in many countries is due to the interaction of individual women's academic abilities with loosening constraints on women's opportunities to enter higher education. Future research must be cognizant of the complex factors that influence women's share of tertiary enrollment at the national level and researchers should also be mindful of differences between men's and women's abilities at the individual level.

This article contributes to our knowledge on gender inequalities in higher education by being the first study to examine the factors related to the female-favorable gender gap in tertiary enrollment in a large sample of countries. The time period of 1990 to 2008 is of particular importance, since women overtook men in higher education in the majority of countries in the world during this time. The findings represent an important contribution to the gender stratification and comparative education literatures. The female advantage in tertiary enrollment is widespread and will have broad implications for education policymakers and researchers as they grapple with this emerging inequality. An understanding of the factors that are related to this gender reversal in higher education attainment is a crucial first step.

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About the Author

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Appendix A: Robustness of Results and Auxiliary Regressions

Appendix Table 1 presents the results of OLS regression presented in Table 4, Model 6 correcting for heteroskedasticity and removing potentially influential outliers. Variance inflation statistics and collinearity diagnostics developed by Belsley et al. (1980) and Belsley (1991) were examined and the models do not suffer from multicollinearity. Heteroskedasticity is also a concern, especially when working with aggregate data. After performing Breusch-Pagan tests for heteroskedasticity, there was some evidence of multivariate heteroskedasticity in some models. To remove this problem, I apply Long and Ervin's (2000) HC3 correction to the data (see Appendix Table 2, Model 1). The procedure provides OLS regression coefficients and calculates robust standard errors that are adjusted for both known and unknown sources of heteroskedasticity. HC3 is preferable over weighted least square regression because for the source of heteroskedasticity can be unknown and is especially useful in small samples (less than 250 cases) (Long & Ervin, 2000). After correcting for heteroskedasticity, my results are substantively the same.

A variety of diagnostics were used to test for outliers: leverage $\hat{}$, Cook's D, DFFits, and DFBetas (Bollen & Jackman, 1990). Compiling these results identified several potential outliers or influential cases in the model: the Congo, Uganda and Yemen. I removed these cases from the analysis and find my results are robust (presented in Appendix Table 2, Model 2).

Finally, I tested a variety of alternative variables for connectedness to the world polity, support for women's rights, fertility norms and women's participation on the labor market; my findings are robust against a variety of specifications (results available from author upon request). To test alternative measure regarding the connectedness to the world polity, I included measures of a country's total INGO memberships and total IGO memberships in the year 2000 in separate models but found they do not influence women's share of tertiary enrollment. Additionally, I included a measure of democratization by including the Polity Score in 2000, a combined index of the democracy and authoritarianism scales from the Polity IV project for the Center for Systemic Peace. This variable is coded -10 to 10, with 10 being the most democratic. Polity scores were not related to women's share of tertiary enrollment.

To test alternative specifications of gender ideologies and support for women's rights I tested whether a country ratified CEDAW and abortion legality. In previous cross-national research, it is argued that the United Nations' Convention to Eliminate all Forms of Discrimination Against Women (CEDAW) is a crucial turning point for women's rights and status around the world (Ortega 2009). In terms of women's education, whether a country has ratified CEDAW or the years since a country ratified CEDAW may be an important market of ideologies supportive of women. However, models estimated to test the effect of whether a country ratified CEDAW or the number of years since CEDAW was ratified did not reach significance. I included a measure of abortion laws for the year 2000 ranging from the most to least restrictive (with zero equaling the most restrictive or that abortion is never legal, and seven equaling abortion is available upon request). I find that, like support for women's suffrage, more liberal abortion laws are associated with a significant, positive increase in women's share of tertiary enrollment.

For variables related to fertility norms, as an alternative to the fertility rate, I tested the birth control prevalence in 2000, which was positive and significant. Greater use of birth control increases women's share of tertiary enrollment. As an alternative to the female labor force participation rate, I included the female economic activity rate compared to men, but it was not significant.

Appendix Table 1. OLS Regression of Women's Share of Tertiary Enrollment on Independent Variables.

| | Model 1: HC3 Correction | Model 2: Excluding Outliers |
|--|-------------------------------|-----------------------------------|
| % Women Enrolled in Tertiary Education, 1990 | 0.48*** (0.08) | 0.44*** (0.06) |
| Gross Tertiary Enrollment Ratio (logged), 1990 | -0.19 (0.45) | -0.23 (0.44) |
| GDP per capita (logged), 1990 | 3.11*** (0.85) | 2.91*** (0.74) |
| IGOs & INGOs (logged), 2000 | -2.15 (1.69) | -2.42 (1.45) |
| Ratio of Change in Gross Tertiary Enrollment Ratio (logged), 1990-2008 | 0.56* (0.24) | 0.54* (0.19) |
| Years since Women's Suffrage, 2008 | 0.06* (0.03) | 0.05+ (0.03) |
| Religion (ref. Muslim) | | |
| Protestant | -1.38 (3.65) | 0.67 (2.73) |
| Catholic | 0.76 (2.67) | 1.22 (2.00) |
| Orthodox | 2.05 (2.86) | 2.51 (2.63) |
| Other | -2.73 (2.34) | -2.24 (1.95) |
| Fertility Rate, 1990 | 5.33* (2.53) | 5.80* (2.37) |
| Fertility Rate squared, 1990 | -0.63* (0.28) | -0.74* (0.26) |
| Female Labor Force Participation Rate, 1990 | -0.01 (0.06) | -0.04 (0.05) |
| Constant | 10.84 (17.81) | 17.69 (14.69) |
| Adjusted R ² | 0.84 | 0.80 |
| Number of Cases | 75 | 72 |

+p<0.10, *p<0.05, **p<0.01, ***p<0.001 (two-tailed tests). Standard errors below coefficients. Model 2 excludes the Congo, Uganda, and Yemen.