

Stockholm School of Economics

Department of Economics

BE551 Degree Project in Economics

Spring 2023

The Effect of a Universal Primary Education Reform on Gender Attitudes in Uganda

Emma Bergman Karlsson (24056) and Klara Holmer (25037)

Abstract. This thesis examines whether greater access to primary school education for girls and a decreased gender gap in primary school education affects gender attitudes, by studying a Universal Primary Education reform in Uganda that eliminated primary school fees. We conduct a Two-Stage Least Squares regression where we use exogenous variation in exposure to the reform as an instrumental variable to estimate the effect of educational attainment on gender attitudes. Our findings show that the reform increased educational attainment for both genders and decreased the gender gap in education, but did not appear to change gender attitudes. The implications of these findings are important for future policies and academic work on the shaping of gender attitudes.

Keywords: Fuzzy Regression Discontinuity Design, Two-Stage Least Squares, Gender Attitudes, Universal Primary Education, Uganda

JEL: H52, I24, I28, J16, J18

Supervisor:	Celine Zipfel
Date submitted:	15-05-2023
Date examined:	25-05-2023
Discussants:	Elin Roslund and Malin Lindblad
Examiner:	Johanna Wallenius

We are incredibly grateful to our advisor, Celine Zipfel, for her invaluable support, guidance, and patience. In addition, we want to thank discussants Elin Roslund and Malin Lindblad for their insightful comments. We also would like to express our deepest appreciation to Avenia Ghazarian, as well as to our families, friends, and partners for all their support throughout this journey.

Table of contents

1 Introduction	4
2 Background	5
2.1 Overview Uganda	5
2.2 Gender equality and attitudes in Uganda	6
2.3 The Uganda public school system	6
2.4 Universal Primary Education reform	7
3 Literature review	8
3.1 The primary education reform's effect on educational attainment	8
3.2 Increased educational attainment's effect on gender attitudes	8
4 Conceptual framework	11
4.1 The Universal Primary Education reform's effect on educational attainment	11
4.2 Educational attainment's effect on gender attitudes	11
5 Data	12
5.1 Description of data	12
6 Methodology	13
6.1 Fuzzy regression discontinuity design using Two-Stage Least Squares	13
6.2 Assumptions for fuzzy regression discontinuity design	15
7 Results	17
7.1 First stage regression	17
7.2 Second stage regression	20
8 Discussion	21
8.1 Analysis of results	21
8.2 Data limitations	22
8.3 Limitations of method	23
8.4 Implications and future steps	23
9 Conclusion	24
10 Bibliography	25
11 Appendices	33
11.1 Appendix 1: Questions used for each index	33
11.2 Appendix 2: Additional data cleaning	35
11.3 Appendix 3: Full first stage regression analysis table	36
11.4 Appendix 4: Reduced form graphs and table	38
11.5 Appendix 5: Full IV regression analysis table (second stage)	44

1 Introduction

“If you educate a man you educate an individual, but if you educate a woman you educate a nation” – old African proverb

Examining gender norms, defined as “social principles that govern the behavior of girls, boys, women, and men in society and restrict their gender identity into what is considered to be appropriate” (Save the Children, n.d.), is highly relevant to economics as they affect the economy in several ways. One way that women are affected by gender norms is the division of unpaid labor, for instance caring for children and elderly, cleaning, and cooking. Unpaid care work is often seen as women’s responsibility and as a result, women tend to spend “three times more of their time on unpaid care work than men” (OECD, 2014). This disparity is even greater in low income countries (Sida, n.d.). When women take up a larger share of domestic work, they also tend to earn less. When women spend twice as much time compared to men on unpaid care work they earn 65% of male wages, while if they spend five times more they earn 40% of male wages (OECD, 2014). It also correlates negatively with job opportunities, as women who perform the majority of unpaid care work have a higher probability of working part-time or within the informal economy (OECD, 2014). From a financial perspective, traditional gender norms can be costly for nations, as barriers to education and fewer educational opportunities for girls can cause countries to lose from US\$15 trillion to \$30 trillion (World Bank, 2018). Traditional gender norms have an effect on lower market participation among women (Huettel & Kranton, 2012) and countries with a lower share of women in the workforce relative to men have less growth (Cuberes & Teignier, 2016). This highlights one reason that it is important to study what causes more traditional versus more equitable gender norms.

One aspect of gender equality that has been associated with important aspects for development, such as economic growth and health outcomes, is gender equality within education. In terms of primary school enrollment, it has had a significant positive effect on GDP in African countries (Licumba et al., 2015). Women’s education has also positively influenced both their own and their children’s health (Gunes, 2015; UNICEF, n.d.). While gender equality in education has positive benefits for society, 51% of countries have a gender gap in primary school education (UNICEF, n.d), which primarily disadvantages girls (UNESCO, 2023a). Many girls face barriers to education, with gender norms, early marriage, and pregnancy being some of them (UNESCO, 2023b). Another reason is poverty, as poor families tend to prioritize boys’ education (UNICEF, n.d.). Consequently, decreasing the cost of education could potentially lead to increased gender equality within education. This should arguably also have the strongest effect within low-income countries with high levels of poverty, as the cost of education is a barrier for a larger share of families in these countries. While the effects of increased gender equality in education are influential for many important outcomes, the effect on gender norms has not been sufficiently studied (Kyoore & Sulemana, 2019). This is true, especially for Africa (Kyoore & Sulemana, 2019).

We will examine a Universal Primary Education (UPE) reform which eliminated primary school fees in Uganda, a low-income country in Sub-Saharan Africa. Considering that the topic of gender norms is both highly important to society and not sufficiently researched within economics, this provides an opportunity for valuable additions within this field. This thesis aims to explore this gap, by studying the effect of education on gender attitudes. The terms gender norms and gender attitudes are frequently used interchangeably in previous literature, but in this thesis we consider gender attitudes to be the individual beliefs held about gender while norms reflect the beliefs of a larger group.

2 Background

To investigate the effect of the Universal Primary Education reform on gender attitudes in Uganda, it is essential to develop a further understanding of Uganda as a country; the state of gender equality and gender attitudes within the country, the educational system and the UPE reform as well as a general overview of the country.

2.1 Overview Uganda

Uganda is a low-income country (World Bank, 2022) where 30.1% of people live in poverty (Kakumba & Afrobarometer, 2022). Yet, there is a lack of safety net programs, causing many who are struggling financially to instead seek help from family (25%) or use savings (35%) (World Bank, 2016). Additionally, between the years 2005 and 2009, two thirds of those that had escaped poverty returned to poverty (World Bank, 2016). If education is not free, then the poorer households (which in Uganda are a relatively large share) might not prioritize education as there are more urgent needs to be met. The cost of education can therefore be an important hindrance to education in Uganda. While there have been many programs aimed at reducing poverty in Uganda, many of them have not been successful. One reason for this could be corruption (Kakumba & Afrobarometer, 2022).

Uganda is not a democracy, nor authoritarian, but rather has a semi-authoritarian regime that both promotes civil liberties and democracy while at the same time works against it (Tripp, 2010). While many institutions have been implemented under the current president Yoweri Museveni, these institutions have often been used for “nondemocratic ends simply to keep Museveni’s government and party in power” (Tripp, 2010, p.3). Museveni came to power after helping take down the authoritarian regime of Idi Amin, the “Butcher of Uganda”, a dictator known for his brutality (Encyclopaedia Britannica, 2023a). Museveni has now been president for almost 40 years, after law changes were implemented during his reign that first changed how many terms a president can sit and then the age limit for presidents, the second change is described as a “military coup” by Oloka-Onyango, a professor of constitutional law in Uganda (Moore, 2017). From 1986-2005, Museveni’s regime followed a “no-party system (a de facto one-party system)” (Tripp, 2010, p. 4), but multipartyism has now been implemented after a referendum showed that there was large support for it (Encyclopaedia Britannica, 2023b).

2.2 Gender equality and attitudes in Uganda

The Global Gender Gap Index, which measures “the percentage of gender gap that has been closed” ranks Uganda at place 66 globally (out of 156 countries) and 10 in Sub-Saharan Africa (out of 35 countries) (World Economic Forum, 2021). This indicates that Uganda performs better than the global and sub-saharan median in terms of the gender gap.

In Uganda, women tend to earn less than men and if women earned the same as men, the national wealth would increase by 11.8% (Walker, R. A. et al., 2021). There is also gender disparity in enrollment and completion of primary school education (Lsj, 2021). Furthermore, according to a SIGI study, attitudes that endorse early marriage for girls are prevalent in Uganda. Almost half (45%) agreed that women should be married by 18 while declaring that men should be married later (85%) (OECD, 2015). Unpaid care and domestic work are seen as the women’s responsibility (Oxfam, 2018). On average, women spend 14.6% of their time on unpaid care and domestic work while men spend 8.8% (UN Women, n.d.).

The COVID-19 pandemic disproportionately affected women in paid work, business ownership and unpaid care work, increasing existing disparities (World Bank, 2021). The pandemic also increased domestic violence among those who were forced to stay home during lockdowns (Kiiza, 2022).

The Ugandan government has taken steps toward gender equality, for instance in the 1995 Constitution, which “opposes laws and practices that violate women’s dignity” (Kiiza, 2022). Its provisions have been based on “The Convention on the Elimination of All Forms of Discrimination Against Women” (CEDAW) and the “Protocol to the African Charter on Human and People’s Rights on the Rights of Women in Africa” (Maputo Protocol) (Kiiza, 2022). Other initiatives include “The 2006 National Equal Opportunities Policy”, “The 2007 Uganda Gender Policy” (Kiiza, 2022) and the “Uganda Women Entrepreneurship Program” (World Bank, 2021).

Uganda was also one of the first African countries to make significant improvements in the amount of women that have roles within government (Tripp, 2010). They implemented quotas for women within the legislature, causing the number of women within parliament to increase from one woman in 1980 to women having 31% of the seats in 2009 (Tripp, 2010). Today, Uganda performs highly in the “proportion of elected seats held by women in deliberative bodies of local government” (UN Women, n.d.) at 45.69% and in the “proportion of seats held by women in national parliament” (UN Women, n.d.) at 34.86% of all seats. In 1994 Uganda also became the first African country to have a female vice president (Government of Uganda, n.d.).

2.3 The Uganda public school system

In Uganda, the public education system includes 7 years of primary school, followed by 6 years of secondary school, and later 3-5 years of tertiary education (UBOS, 2014). The official entry of school is at age 6, however, a majority of children start school at the age of 8

according to Keats (2018) when analyzing data from DHS 1995 (*Demographic and Health Survey*, 1995). 87% of children of primary school age attend primary school according to the UBOS National Census Report from 2014. The numbers are similar for boys and girls in completing primary education, 59.1% for boys and 57.8% for girls in 2014. However, only 18.5% of the population has completed secondary school, 20.2% of men and 16.9% of women. Furthermore, according to UBOS data from 2002, the literacy rate is 77.4% for men and 62.4% for women above the age of 10. In 2014, the literacy rate had increased to 67.6% of women, but is constant for men at 77.4% (UBOS, 2014).

2.4 Universal Primary Education reform

The Universal Primary Education (UPE) reform 1997 was a major change in Uganda's education system and aimed to increase access to education for all children in the country. In 1997, Uganda introduced the Universal Primary Education reform (UPE) to increase enrollment rates, especially among girls and children from poor households. In the beginning, the reform allowed 4 children to attend school without tuition fee but was shortly changed to abolish primary education fees and make primary education mandatory for all children. The reform also contains elements that aim to narrow the gender enrollment gap, when 4 children of each family could attend tuition free, 2 of them had to be girls as well as encouragement to enroll girls was given to parents (Tamusuza, 2011). With the implementation of the reform, the enrollment rates increased from 57% to 85% from 1996 to 1997 (Essama-Nssah, n.d.). This caused a spike in enrollment growth, as can be seen in *Figure 1*.

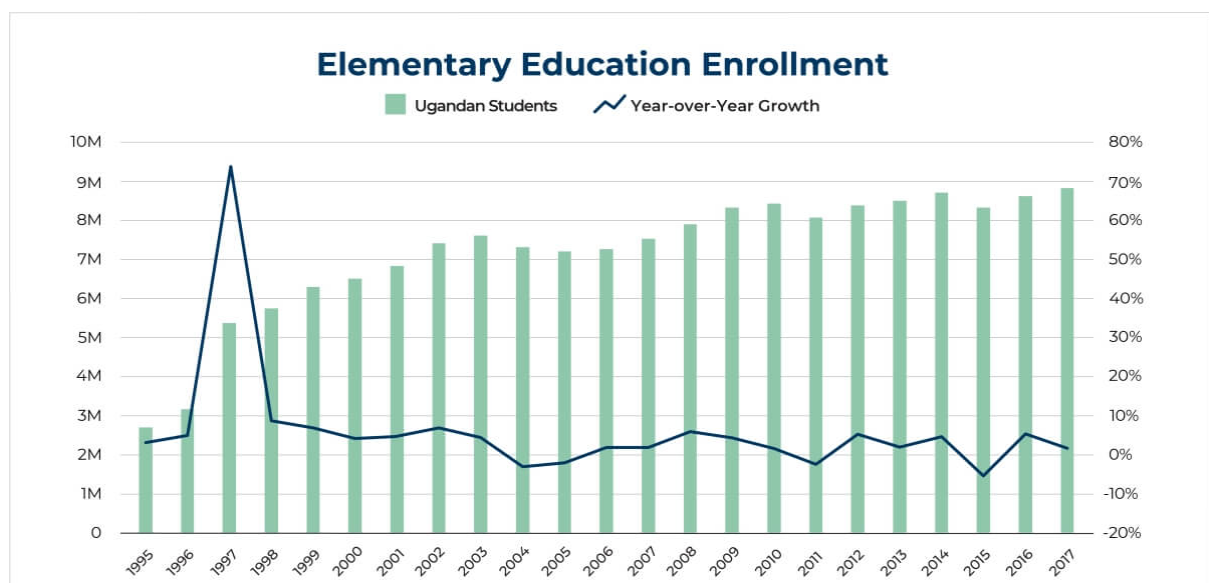


Figure 1: The development of elementary school enrollment over time (Hassan & Macha, 2020)

Although the reform eliminated fees for primary school attendance, it did not remove all costs associated with going to school, such as paying for a uniform or books (Keats, 2018). Therefore costs could still be a hindrance for very poor children (Hassan & Macha, 2020). The reform also led to more students per teacher, potentially causing a decrease in the quality

of education (Hassan & Macha, 2020). Today there are also large problems in Uganda with high dropout rates from school (Hassan & Macha, 2020), showing that the reform did not solve all problems surrounding primary schooling in Uganda. However, it did increase the availability of primary school for many children in Uganda, making it an interesting reform to examine.

3 Literature review

3.1 The primary education reform's effect on educational attainment

How educational reforms affect educational attainment is well-covered in the literature, and the findings are aligned. Previous studies on the Universal Primary Education reform in Uganda have consistently shown similar results. Keats (2018) found that the Universal Primary Education reform in Uganda 1997 had a positive effect on education. The reform increased attendance for boys and girls in primary school, and had the largest effect on girls' attendance which indicates that the cost of primary school hinders girls more. It is also seen that the gender gap in educational attainment as well as secondary school attendance decreased, since the effect size was larger for girls compared to boys. Girls affected by the reform became more likely to complete primary school as well as transition to secondary school and the results also show that educational attainment increased in all grades for girls even until the end of secondary school which shows that the primary school fees also are seen to hinder high educational attainment for girls. The results were however only significant for girls younger than 14 at the time of the reform as they have had a larger exposure to the reform (Keats, 2018).

Similarly, in a study conducted by Nishimura et al, (2008) on the impact of the Universal Primary Education reform 1997 on educational attainment in primary school in rural Uganda, it was found that the reform led to an increase in educational attainment and increase in completion of each grade except for grade 7. The effects were also larger for girls compared to boys.

3.2 Increased educational attainment's effect on gender attitudes

There is limited research on the role of educational attainment in shaping gender norms attitudes, especially for Africa (Kyoore & Sulemana, 2019). Additionally, previous research has mostly studied correlation rather than causation between educational attainment and more equitable gender norms. For example, Kyoore & Sulemana (2019) found that increased education, especially beyond primary school is strongly correlated with more progressive attitudes regarding gender equality in a study set in 5 developing countries in Africa, including Ghana, Nigeria, Rwanda and South-Africa.

To study a causal effect of increased educational attainment is difficult since an unobserved value that affects gender role attitudes also in many cases can affect education (Du et al.,

2021) but there have been a few attempts of causal results of higher educational attainment on more equitable gender roles. A study set in Europe finds that education casually leads to more equitable gender roles and that an extra year of schooling decreases the likelihood to agree with the statement: “Men should have more right to a job than a woman when jobs are scarce” with 11 percentage points (Rivera-Garrido, 2022).

Furthermore, Rivera-Garrido (2022) finds 2 mechanisms that describe how education can shape attitudes regarding more equal gender roles. One mechanism is that education can change the way an individual thinks and promote more tolerant views. However, Rivera-Garrido finds that it also depends on the type of government in the country. If it is conservative dictatorship such as Spain during the Francoist dictatorship, education is not working to promote gender equality, but rather can work to shape traditional attitudes. The second mechanism explained is that education can increase economic opportunity and give women better job opportunities, which then would change their perception of the role women can have in society (Rivera-Garrido, 2022). These mechanisms are also in line with other research, as described by Si (2022). The expansion of higher education provides more opportunities for women to receive increased education (Si, 2022; Heath & Jayachandran, 2016), which in turn can create more equality for women in the labor market and thereby decrease traditional gender norms (Si, 2020; Jayachandran, 2021).

The mechanism regarding education's effect to develop more tolerant views is further explained by Kyoore & Sulemana (2019). The socialization aspect, which is a large part of education, can help to develop capacities to tolerate different opinions (Kyoore & Sulemana 2019; Kingston et al., 2003). Additionally, this mechanism is also in line with the evidence that it is possible to shape gender attitudes through education. In an experiment, a school program in India aimed to change individual attitudes through discussions and persuasion for more gender equal norms. The results show that there was significant change of individual attitudes to more equal (Dhar et al., 2018), which further explains the possibilities education has to change gender norms.

Research on a causal effect of increased educational attainment on gender attitudes in developing countries is even more limited. Du et al., (2021) contributed to the evidence of how attitudes are formed in an Asian setting, with focus on gender role attitudes. They found that education due to an educational reform in China that made the first 9 years of education compulsory, has significantly affected individual attitudes. An additional year of schooling has resulted in a change in individual attitudes regarding the role of women and resulted in more equal gender role attitudes (Du et al., 2021).

However, there is one study showing somewhat conflicting results. Si (2022) found that China's higher education expansion significantly increased educational attainment for men and women, but that women's attitudes toward gender roles became less progressive. The author believes that the explanation for women's decreasing progressive attitudes regarding their role is that labor market opportunities for women were decreasing relative to men's opportunities. The expansion has failed to promote women in the labor market and the

increase in supply in the labor market due to the expansion of higher education created a larger disadvantage for women (Si, 2022).

There have in general been few studies on African countries on this topic, illustrated for instance by a “global” review where 90% of the studies used were on either Western Europe or North America (Kågesten et al., 2016). To date, there is no causal evidence of the effect of educational attainment on gender attitudes set in Sub-Saharan Africa. With this paper we hope to contribute to the lack of studies on the role of education and gender norms in developing countries and to fill the gap with causal results of education's effect on gender attitudes in developing countries, especially Sub-Saharan Africa. Furthermore, since gender inequality hinders human development in Sub-Saharan Africa (Davis & Theodore, 2015); Kyoore & Sulemana, 2019), we hope to make an essential contribution to research set in this highly under-studied area.

Additionally, we aim to provide a more nuanced understanding by studying different aspects of gender attitudes; *attitudes about gender roles*, *attitudes about women's political engagement* and *attitudes about women's agency*. We plan to investigate the effect of increased educational attainment on these attitudes since research on education's effect on *attitudes about women's political engagement* and *attitudes about women's agency* is lacking in the current literature. Previous research on education and political engagement has found that education can have an effect on political engagement overall. Larreguy & Marshall (2017) found that the Universal Primary Education Reform in 1976 in Nigeria increased political engagement and the more educated a citizen is, the more likely is the citizen to be engaged in politics (Larreguy & Marshall, 2017). There is limited research on the impact of education on women's participation in politics in developing countries. In a study in Ethiopia, Bishaw (2014) found that higher levels of education for women increases the level of engagement significantly. Specific literature on education's effect on attitudes about women's participation in politics is lacking however, especially in developing countries. Since women's participation in politics could have positive implications on society, it is of high interest to study if education can affect attitudes on political engagement for women especially in Sub-Saharan Africa (*Facts and Figures: Women's Leadership and Political Participation*, n.d.).

Our objective is to contribute to the missing research on causal evidence of educational attainment on gender attitudes in Sub-Saharan Africa. We hope to further contribute with knowledge by investigating different areas within these gender attitudes; *attitudes about gender roles*, *attitudes about women's political engagement* and *attitudes about women's agency*.

4 Conceptual framework

4.1 The Universal Primary Education reform's effect on educational attainment

Looking at previous literature, primary school reforms that provide free primary school are seen to have an effect on educational attainment. As the previous studies on the Universal Primary Education reform in Uganda found to increase educational attainment, especially for girls that are younger and have a larger exposure to the reform (Keats, 2018 ; Nishimura et al., 2008), we would expect similar results as our study also investigates the effect of the Universal Primary Educational reform in Uganda. Additionally, we would expect to see a decrease in the educational gender gap for educational attainment similarly to the previous study, as the primary school fees are seen to hinder higher educational attainment especially for girls (Keats, 2018).

4.2 Educational attainment's effect on gender attitudes

Based on previous studies, education can work to promote more equal gender attitudes through 2 mechanisms (Rivera-Garrido, 2022), either through changing the way individuals think and develop capacities to tolerate different opinions through socialization (Rivera-Garrido, 2022 ; Kyoore & Sulemana 2019; Kingston et al., 2003). The second mechanism is that education can increase economic opportunity and give women better job opportunities which then would change their perception of the role women can have in society (Rivera-Garrido, 2022 ; Si, 2022 ; Jayachandran, 2021).

Based on previous studies, education can work to promote more equal gender attitudes through 2 mechanisms. The first mechanism describes that education can change the way individuals think and develop capacities to tolerate different opinions through socialization (Rivera-Garrido, 2022; Kyoore & Sulemana 2019; Kingston et al., 2003). The second mechanism is that education can increase economic opportunity and give women better job opportunities which then would change their perception of the role women can have in society (Rivera-Garrido, 2022; Si, 2022; Jayachandran, 2021).

Based on these mechanisms, the increase in educational attainment in Uganda due to the UPE reform should change how people think and promote more tolerant views. Furthermore, with the increase in education, especially the decreasing educational gender gap, we expect girls to receive more economic opportunities which can promote more equitable attitudes. Based on these mechanisms, we expect to see effects from the increased educational attainment to lead to more equitable gender attitudes.

To summarize, we expect:

- H1: The UPE reform in Uganda increased educational attainment for girls

- H2: The UPE reform in Uganda decreased the educational gender gap
- H3: Higher female educational attainment (and/or reduction in the gender gap) leads to more equitable attitudes about gender roles
- H4: Higher female educational attainment (and/or reduction in the gender gap) leads to more equitable attitudes towards women's agency
- H5: Higher female educational attainment (and/or reduction in the gender gap) leads to more equitable attitudes towards women's political engagement

5 Data

The data used for this paper consists of the *Social Institutions and Gender Index* (SIGI) Uganda Survey 2014, which is an extensive national survey covering all 112 districts in Uganda (Uganda Bureau of Statistics, 2014). It was collected over 2 months in 2014 by the Uganda Bureau of Statistics together with the Austrian Development Cooperation. Interviewers received both theoretical and practical training beforehand and were selected based on their performance in these two parts. The interviewers collected household data using the household questionnaire and then they randomly selected one man and one woman above 18 years old from each household for the individual questionnaire (Uganda Bureau of Statistics, 2014).

The focus of this data aligns well with the aim of our thesis. It examines gender inequality with a focus on how discriminatory social institutions (DSIs), described as “social norms, formal and informal laws and practices that discriminate against women and girls” (Uganda Bureau of Statistics, 2014, p. 3), can affect gender inequality and women empowerment. While there has been a large amount of data collection on other aspects concerning female empowerment such as health, employment and education, DSIs have been largely neglected, causing the need for the SIGI Uganda survey. The data collected is based on five dimensions that measure gender inequality: “Discriminatory Family Code, Restricted Physical Integrity, Son Bias, Restricted Civil Liberties and Restricted Resources and Entitlements” (Uganda Bureau of Statistics, 2014, p. 1).

Using this data we constructed three indexes examining different aspects of gender attitudes: 1) Attitudes about women's agency 2) Attitudes about gender roles and 3) Attitudes about political engagement (see Appendix 1 for the list of questions used in each index). The questions used for our analyses followed a five point likert scale, from 1. Strongly agree to 5. Strongly disagree (see *Figure 2*). For some of the questions, a higher number represented less equitable gender attitudes, while for others, a higher number represented more equitable gender attitudes. Therefore, we reverse scored some questions so the scale went in the same direction for all questions; from less to more equitable gender attitudes. Thereafter, we standardized the values with respect to the control group to remove some of the correlations in the index and make the results more robust. By standardizing the answers to the questions in the index, potential differences between the control and treatment group are observed as differences in standard deviations.

617: Give your opinions on the following practices. Using the following codes, write the code that corresponds to the rating in the table below

1. Strongly agree 2. Agree 3. Not sure 4. Disagree 5. Strongly disagree

Statement	Code
a) Girls and boys should spend the same amount of time on domestic work	
b) Men and women must share equally household tasks and child caring if both are working.	
c) Men must be responsible for household chores.	
d) Many women who are housewives would prefer to work outside the house if there were jobs available.	
e) Women can relax while they are looking after children.	
f) If there are too few jobs for everyone, employers must hire women first.	
g) Most men would prefer their wives to be housewives instead of going out to get a job.	

Figure 2: Example of questions from the SIGI survey (Uganda Bureau of Statistics, 2014)

We recoded missing values and removed those under 18 as they were not an intended part of the sample selection (see Appendix 2 for more information on data cleaning).

6 Methodology

6.1 Fuzzy regression discontinuity design using Two-Stage Least Squares

The goal of this paper is to examine whether educational attainment affects gender attitudes, but if we simply ran a linear regression where we regress gender attitudes on educational attainment we would likely get biased results. Other factors might affect both education and gender attitudes, for instance family background, traditions, culture etc., causing omitted variable bias. As a result, the estimate of the effect of education on gender attitudes would be of greater magnitude than the true parameter, causing an overestimation of the effect. To address this, we conduct a regression discontinuity design (RDD). A regression discontinuity design is useful for examining causality as it utilizes a natural experiment, which in our study is the exogenous variation in exposure to the UPE reform caused by the timing of the implementation of the reform.

The intuition behind the RDD in our setting is that if there is a sudden increase in educational attainment that affects some children but not others, then those close to the threshold of this effect should have similar characteristics, regardless of which side of the threshold they end up. Therefore, we can compare the groups close to the threshold who did receive an increase in education to those who did not and see whether an increase in education affects gender norms. This is where we implement the UPE reform in our research design. Eliminating primary school fees should enable more children to attend primary school, but this reform should not affect older children, as they no longer attend or seek to attend primary school. Therefore, we can compare the groups that did not have primary school fees to those that did, and thereby compare a group that was more likely to receive more education to one that was not.

In this way we create a control group (those less likely to be affected by the reform) and a treatment group (those more likely to be affected by the reform) based on the year of birth of the different individuals. If a person was 14 years old or younger at the time of the reform they are included in the treatment group, while if they were older than 14 in 1997 they are placed in the control group. The reason we chose to place the threshold at 14 years old is that many children start primary school at 8 years old and since primary school is 7 years long in Uganda, this means that many leave primary school at 15 years old (Keats, 2018). Children that were 14 years old in 1997 were born in 1983, causing this to be the threshold we use for comparing birth cohorts.

This threshold does not determine whether someone will receive more education or not, but rather it determines the likelihood of receiving more education. We are therefore conducting a fuzzy regression discontinuity design, where the threshold determines probability of treatment rather than a sharp RDD, where the threshold determines treatment (see *Figure 3*).

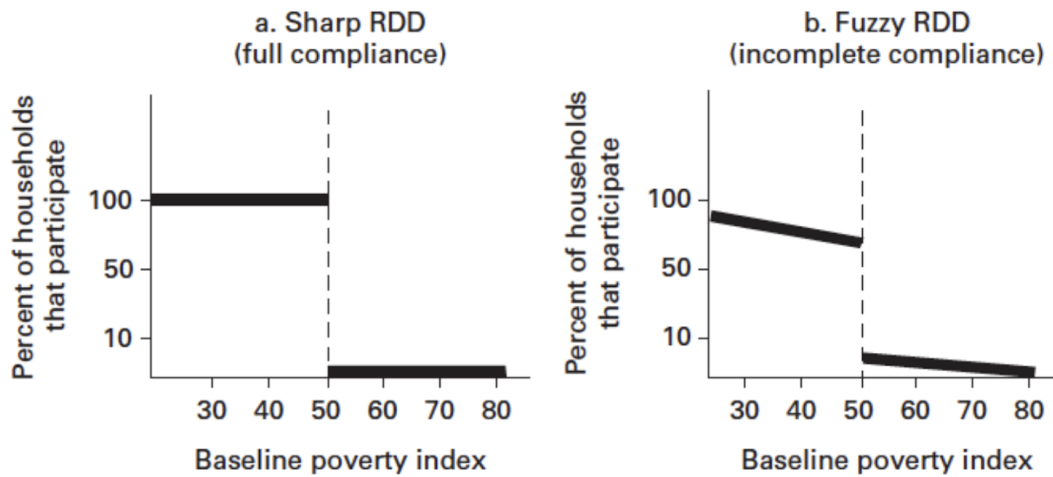


Figure 3: Visualization of the difference between a sharp and fuzzy regression discontinuity design (World Bank, n.d.)

As a result, we follow a Two-Stage Least Squares (2SLS) analysis (Angrist & Pischke, 2018), where we conduct a first stage based on Keats' (2018) previous study and examine the effect of the timing of the reform on educational attainment across different birth cohorts. This is then followed by a second stage regression, where we use the estimated education derived from the first stage to examine whether the reform had an impact on gender attitudes. For this we use local linear regressions, as is standard (Imbens & Lemieux, 2008). In the first stage regression (1), we regress the outcome variable *Education* on the dummy variable *D*. *Education* is defined as the years of completed education. The dummy variable *D* is determined by the running variable *Birthyear*, which is defined as the year of birth. When $Birthyear \geq 1983$ the dummy takes on the value 1 and when $Birthyear < 1983$ the dummy takes on the value 0. We also include year fixed effects *B2-BT*, to account for some of the within year variations.

$$Education = \alpha_1 + \beta_1 D[Birthyear \geq 1983] + \delta_2 B2 + \dots + \delta_T BT + \varepsilon_1 \quad (1)$$

The second stage regression (2) uses the estimated *Education* as an instrumental variable to estimate the outcome variable *Gender attitudes*, again with year fixed effects included.

$$Gender\ attitudes = \alpha_2 + \beta_2 \widehat{Education} + \delta_2 B2 + \dots + \delta_T BT + \varepsilon_2 \quad (2)$$

As measurements of gender attitudes, we use the three indexes constructed using our survey data, which examine different aspects of gender attitudes: 1) Beliefs about women's agency 2) Attitudes about gender roles and 3) Attitudes about political engagement. Using formula (2), we create three additional formulas where the outcome variables are based on the indexes, see formulas (3), (4) and (5).

$$Beliefs\ about\ women's\ agency = \alpha_3 + \beta_3 \widehat{Education} + \delta_2 B2 + \dots + \delta_T BT + \varepsilon_3 \quad (3)$$

$$Attitudes\ about\ gender\ roles = \alpha_4 + \beta_4 \widehat{Education} + \delta_2 B2 + \dots + \delta_T BT + \varepsilon_4 \quad (4)$$

$$Attitudes\ about\ political\ engagement = \alpha_5 + \beta_5 \widehat{Education} + \delta_2 B2 + \dots + \delta_T BT + \varepsilon_5 \quad (5)$$

6.2 Assumptions for fuzzy regression discontinuity design

For a fuzzy RDD, the same assumptions as for a sharp RDD must be met (Cunningham, 2021) as well as the assumptions for an IV (Hahn et al., 2001).

The regression discontinuity design relies on one main assumption, the continuity assumption, which assumes that there are no other treatments at the cutoff that may affect the outcome variable (Cunningham, 2021). It assumes that all other observed and unobserved variables that affect the outcome variable have a smooth trend across the threshold, rather than a discontinuous jump.

For the first stage regression, the continuity assumption implies that in the absence of the reform, educational attainment should change continuously over time rather than have a discontinuous jump at the time of the reform. Thereby, if there is a jump at the threshold, this can be attributed to the reform rather than some other factor affecting educational attainment. Previous academic papers that have examined this reform using this first stage regression have investigated and ruled out confounding changes (see Keats, 2018; Nishimura et al., 2008), indicating that this should not be a great concern for our analysis.

Since our research design also uses an instrumental variable, we must also meet the two assumptions underlying an IV (see *Figure 4*):

- 1) The relevance assumption
- 2) The exclusion restriction

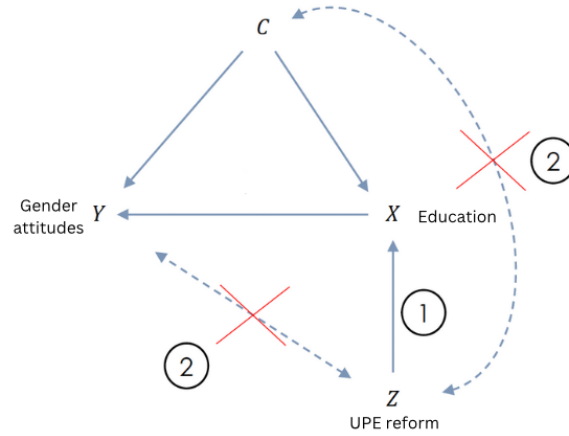


Figure 4: The assumptions required for use of an instrumental variable (authors' alteration of Östling, 2022)

The relevance assumption states that the instrument Z has an effect on the running variable X . Our first stage regression tests this assumption, as it examines whether the reform leads to a discontinuous jump in educational attainment.

The exclusion restriction states that the instrumental variable Z should only influence the outcome variable Y through the running variable X , not through a separate (observed or unobserved) variable or influence Y directly. We argue that this assumption is met in our case, as it is reasonable for us to assume that the universal primary reform would only affect gender norms through an increase in educational attainment. While gender norms may change over time, they are unlikely to change discontinuously at a certain point in time, causing any potential change to likely be attributed to the reform. Furthermore, we include fixed effects for year of birth, which should handle any potential changes in norms that would rather be attributed to growing up in a different time.

If the first stage shows that the relevance assumption is met then both assumptions are met and we consider this instrumental variable to be valid.

7 Results

7.1 First stage regression

Our first stage regression is visualized using regression discontinuity graphs with the bandwidth 1965-1996. The data points in the graphs show the average level of education for each birth cohort for improved readability. The first stage regression graph for girls shows that there is a positive discontinuous jump at the threshold, although small and with overlapping confidence intervals (see Figure 5). Our regression table for the first stage shows that this positive effect is statistically significant at the 95% confidence level (p-value is less than 0.05) (see Table 1). It is also practically significant, as the magnitude of the effect is

quite large with those belonging to the treatment group receiving an additional 3 years of education. Table 1 as well as subsequent tables only show relevant variables for improved readability, but for full tables including the year fixed effects, see *Appendices 3 and 5*. For boys, the graph also illustrates a positive discontinuous jump at the threshold, although the slope appears to flatten out after the threshold (see *Figure 6*). The table shows that this jump is also significant, but the effect size is smaller than for the girls. Our graphs exhibit that girls were at a lower level of educational attainment than boys previous to the reform. Hence, a larger effect size of the reform for girls' educational attainment leads to a decreased gender gap in educational attainment. The positive and significant effect of the reform on educational attainment shows that the relevance assumption is fulfilled and the instrumental variable is valid.

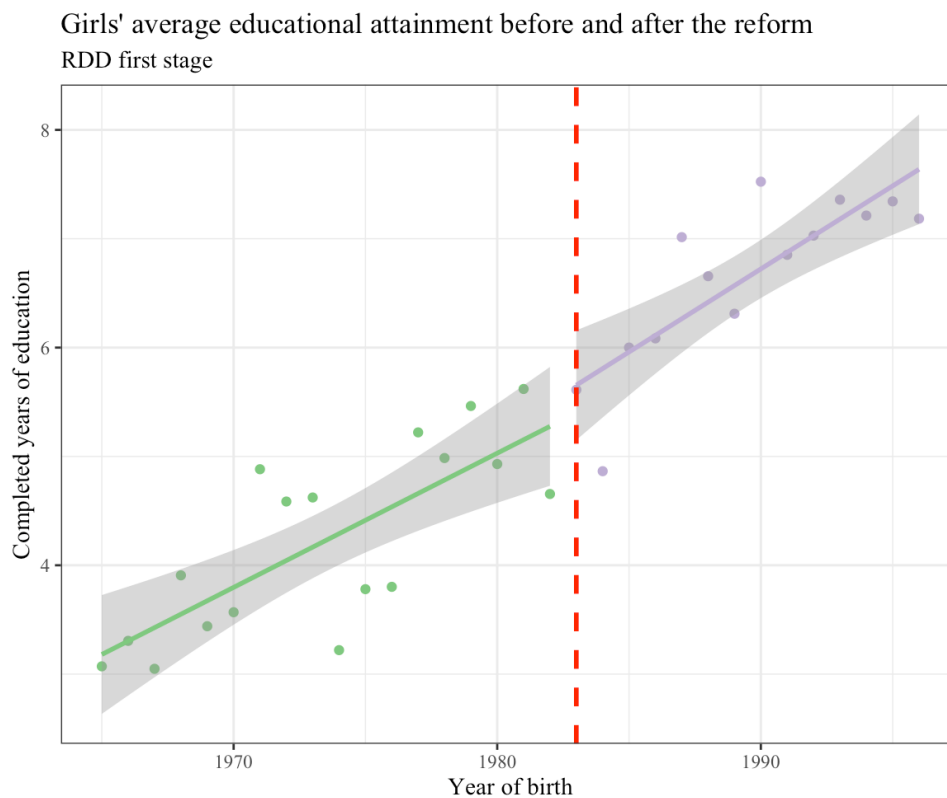


Figure 5: First stage RDD for girls (authors' analysis of SIGI data)

Boys' average educational attainment before and after the reform
RDD first stage

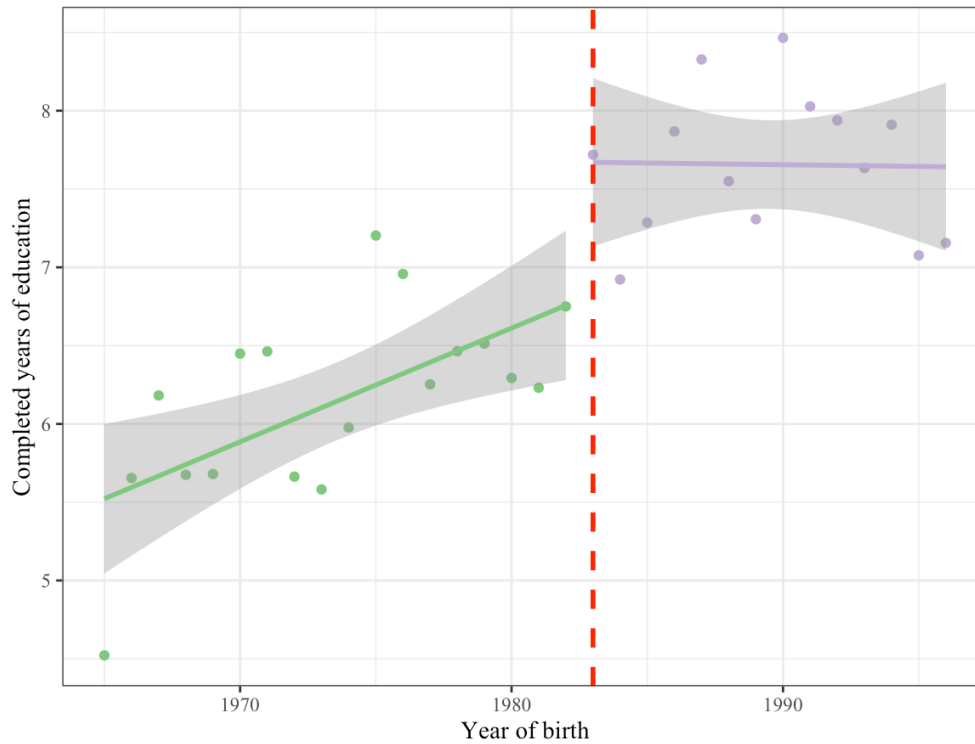


Figure 6: First stage RDD for boys (authors' analysis of SIGI data)

First stage regression results		
	Dependent variable:	
	Education Boys (1)	Education Girls (2)
Treatment	2.605** (1.313)	3.077** (1.210)
Observations	3,352	3,629
R ²	0.075	0.325
Adjusted R ²	-3.415	-2.239
F Statistic	1.839*** (df = 31; 702) 11.741*** (df = 31; 756)	
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 1: First stage regression results, abridged version (authors' analysis of SIGI data)

It is worth noting that the R-squared for girls is relatively low at 0.325, meaning that the model explains 32.5% of the variation in the outcome variable and for boys this is even lower at 7.5%. This does not mean however that the model is not useful, but rather that there are other factors also at play that are not included in the model. While it would be beneficial to

add more control variables to account for this variation, our adjusted R-squared is quite low (unsurprisingly, since the year fixed effects add a lot of variables to the model), so adding more variables could decrease the explanatory power of the model. As year fixed effects felt most relevant to our research design, this is the variable we focused on including.

As a robustness test, we explore using a smaller bandwidth at ± 5 years (see *Figures 7 and 8*). Both these graphs illustrate a positive jump, providing some additional support for the model, although they might not be significant. While the shorter bandwidth can be useful as it looks at cohorts closer to the threshold, the lower amount of data points decreases precision, resulting in the large confidence intervals. To include more data points in our analysis, we will use the original bandwidth going forward.

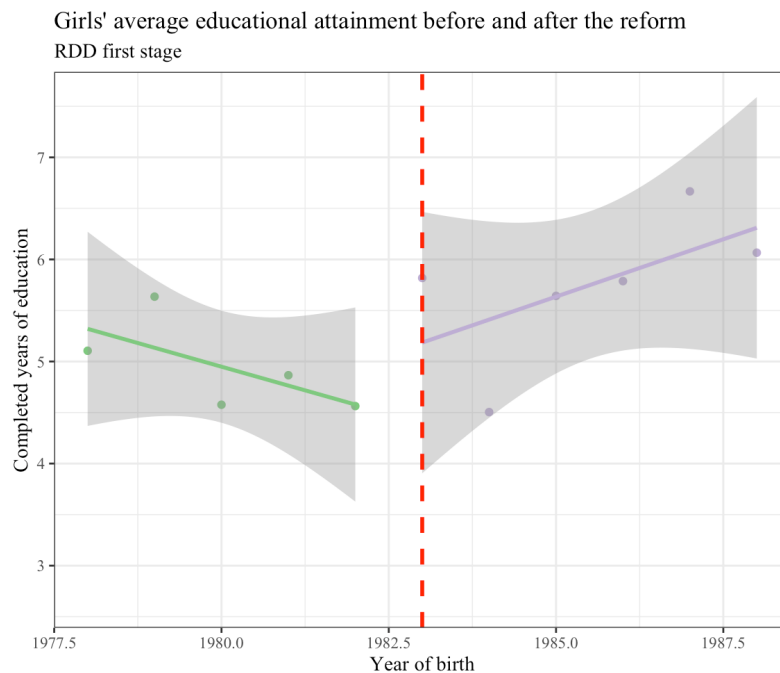


Figure 7: First stage RDD for girls at ± 5 years bandwidth (authors' analysis of SIGI data)

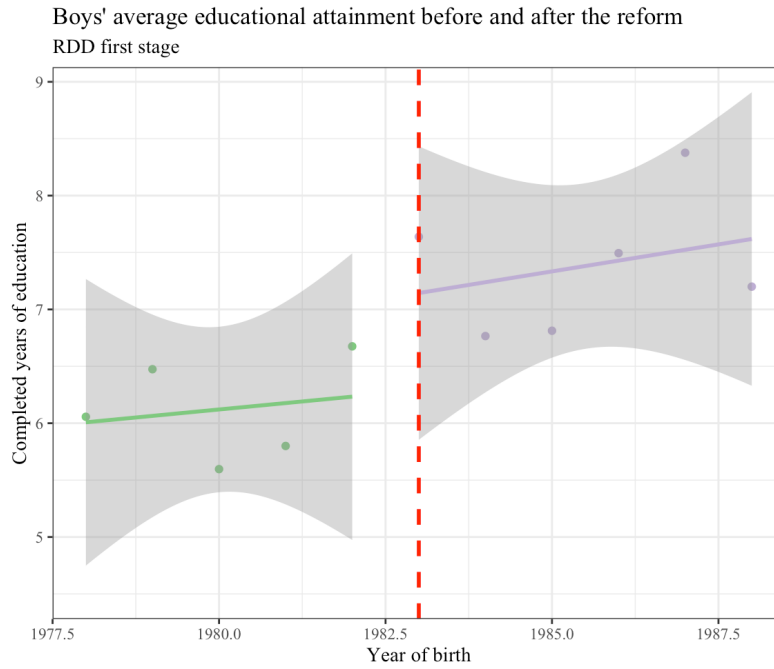


Figure 8: First stage RDD for boys at ± 5 years bandwidth (authors' analysis of SIGI data)

7.2 Second stage regression

Our second stage is described in our IV regression analysis table (see *Table 2*), which examines the effect of the estimated education on each index separated by gender. The results from our regression analysis table indicate that increased educational attainment has a positive effect on gender equitable attitudes among men in terms of women's agency (Index 1) and women's political engagement (Index 3). For women, the effect of education on these aspects is instead negative and for attitudes about gender roles (Index 2) the effect is negative for both men and women. However, none of these results are significant at the 95% confidence interval. This indicates that the reform did not influence gender attitudes of the types examined here. We also examine the reduced form (meaning a regression discontinuity design using the same running variable and treatment as in the first stage, but with each index as the outcome variable), but as this is not essential for the 2SLS analysis, this is placed in Appendix 4.

While our first stage shows that there is a significant positive effect of the reform on educational attainment, our second stage finds no significant results of the effect of educational attainment on gender attitudes. Hence, we can not reject the null hypothesis that the reform had no effect on gender attitudes.

We calculate the F-statistic for the IV using the formula $F\text{-statistic} = T\text{-test}^2$, where the T-stat looks at the estimate of the IV in the first stage regression and $T\text{-stat} = \text{Estimated IV}/SE$. The result is an F-statistic = 6.467 for women and F-statistic = 3.936. This indicates that our instrumental variable is weak, since the F-statistic is less than 10. Consequently, our results

are less reliable, because this decreases the support for the relevance assumption. Therefore, our findings should be considered with some caution.

IV regression results						
	<i>Dependent variable:</i>					
	Index 1 Men	Index 1 Women	Index 2 Men	Index 2 Women	Index 3 Men	Index 3 Women
	(1)	(2)	(3)	(4)	(5)	(6)
Estimated Education	0.128* (0.071)	-0.030 (0.034)	-0.048 (0.066)	-0.060 (0.039)	0.070 (0.063)	-0.039 (0.038)
Constant	-0.964** (0.477)	0.068 (0.202)	0.204 (0.441)	0.162 (0.235)	-0.678 (0.422)	0.240 (0.228)
Observations	1,918	2,446	1,918	2,446	1,918	2,446
R ²	-0.542	-0.079	-0.155	-0.230	0.075	-0.140
Adjusted R ²	-0.568	-0.093	-0.174	-0.245	0.060	-0.155
Residual Std. Error	0.774 (df = 1886)	0.597 (df = 2414)	0.715 (df = 1886)	0.694 (df = 2414)	0.684 (df = 1886)	0.673 (df = 2414)
<i>Note:</i>					*p<0.1; **p<0.05; ***p<0.01	

Table 2: IV regression analysis table, abridged version (authors' analysis of SIGI data)

8 Discussion

8.1 Analysis of results

Our hypothesis H1 and H2 appears to have been correct; the UPE reform succeeded in their goal to increase educational attainment among girls, thereby decreasing the gap in education. This is also in line with previous studies of the reform (Keats, 2018; Nishimura et al., 2008).

Regarding our three hypotheses connected to the effect of increased educational attainment on gender attitudes (H3, H4 and H5), we expected that a higher female educational attainment would lead to more equitable attitudes about gender roles, more equitable attitudes towards women's agency and more equitable attitudes towards women's political engagement. For these hypotheses we can not reject the null hypothesis that there was no effect. These results were surprising, as they do not fully align with the previous (although limited) work in this topic.

One explanatory factor could be connected to country specific aspects. Considering that Uganda has a semi-authoritarian government, they might be more intent on promoting their own ideology onto the population. This could potentially affect the mechanism of how education can shape gender attitudes through promoting more tolerant views. Rivera-Garrido (2022) describes how this mechanism depends on the type of government, as it can influence the content that is taught in schools. To analyze whether this could have influenced our results, we inspect the values promoted by the government. Their views appear to be somewhat contradictory, which aligns with Tripp's (2010) description of semi-authoritarian governments. On one hand, the government appears to want to promote gender equality, considering for instance the 1995 constitution and political quotas for women. On the other hand, there have also been actions taken to decrease human rights in the country, for instance

towards LGBTQ+ people (Busari et al., 2023). The reform had as part of its aim to decrease the educational gender gap, but this was not the main focus of the reform.

Considering these mixed views, it is uncertain whether the government's ideology could be an influencing factor to the effect of the increased educational attainment on gender attitudes. Additionally, we can not know what content was taught in schools as a result of the reform. This uncertainty highlights the importance for more studies on the formation of gender attitudes in different countries' contexts and also suggests further studies on how the content that is taught in schools can affect these attitude formations.

Another aspect that could explain our results could be if the increase in educational attainment for boys and girls makes the job market more competitive, in line with the study by Si (2022). Si described that the negative effect of educational attainment on gender attitudes they found in China could be due to women's labor market opportunities decreasing relative to men due to an increase in supply in the labor market. Since there are cultural biases in Uganda that negatively affect women's career advancement (Kiiza, 2022) and Uganda has relatively traditional gender roles, this could be one reason that we do not see an effect on gender attitudes. In this way, the characteristics of the job market could hinder the mechanism where education affects gender attitudes through more equal economic opportunities described by Rivera-Garrido (2022). However, it is difficult to draw any conclusions regarding a more competitive job market for women, as the implication of increased competitiveness of the labor market for women in the study by Si (2022) could differ for us, since the competitiveness increased for higher education graduates and was set in another cultural setting.

Another potential explanation of the results is that there was an effect, but that the effect size was too small for us to uncover it in our regression analyses. Considering that the quality of primary education is quite low in Uganda, with problems such as teacher absenteeism and large school classes, this might hinder learning. If children do not learn much while in school, then the effects we expect to see from education might not be as large. Furthermore, our results might be affected by data or method limitations, which we will examine now.

8.2 Data limitations

There are some limitations to using survey data, as there could be errors or missing values due to forgetfulness among the respondents. For instance, the education variable is based on self-reporting rather than government records on educational attainment, which makes it less reliable. Additionally, some of the questions in the survey could be considered personal, such as age and attitudes about gender, which could make respondents more reluctant to answer or cause them to provide answers that are not truthful. This can result in a bias called the Social desirability bias, which is "the tendency to underreport socially undesirable attitudes and behaviors and to over report more desirable attributes" (Latkin et al., 2017). For instance, if a respondent has an opinion that does not align with the social norms of their culture, they might not want to admit this. Considering the topic of our thesis, this issue was difficult to

avoid in the data selection process, but is nonetheless an important issue to take into consideration.

8.3 Limitations of method

One concern with regression discontinuity designs is cross-contamination around the threshold. Cross-contamination is likely present in our design, as some children start primary school earlier, later or stay longer, causing them to receive treatment even though they were born before the threshold. Similarly, some children among those who were eligible for primary school in 1997 might have dropped out or did not start at all. Since we use a fuzzy rather than a sharp regression discontinuity design, this is less of an issue but could be one reason that our instrument is weak.

Choosing a bandwidth for the regression discontinuity design entails a bias-variance trade off. A larger bandwidth allows for more data points to be analyzed, making the estimates more precise, but a smaller bandwidth reduces the risk that there might be other reasons underlying the results than the threshold, making the estimates more credible. For the first stage regression we chose a relatively large bandwidth, which decreases the variance but increases the bias. The large bandwidth increases the risk that it was not the reform that caused the increase in education, but rather a different factor that also varies over time. Many reforms have been implemented and other changes have occurred in the country during the timeframe that was used as a bandwidth and this could therefore influence our results. However, using time fixed effects should control for some of the variation over time, decreasing the risk that the larger bandwidth has a negative effect on our results.

Another limitation of a RDD is that it might be difficult to use the results from the study to make generalizations about people further from the threshold, as they might not be affected in the same way by the reform. This therefore limits the external validity of our study, as we might not be able to generalize about all children affected by such a reform. However, since we use a relatively large bandwidth, this is less of a problem for our study (World Bank, n.d.).

8.4 Implications and future steps

The implications of the first stage is important for future policies, as decreasing the cost of education can have a positive impact on decreasing gender gaps in educational attainment. However, this has been covered by previous academic articles and therefore less important than the implications of the second stage on future policies. While increased educational attainment is connected with many societal benefits, our study indicates that it does not change gender attitudes. These results do not align with most of the previous work in this topic, indicating that there is a knowledge gap that needs to be explored further. Continued research within the area of gender attitudes is crucial to gain a better understanding of what shapes them and whether education could be an effective tool of doing so. We also suggest further research specifically on how country characteristics can influence this process, in line with our discussion of the results.

Furthermore, it would be valuable to conduct studies on more recent data. Since the reform examined in this paper was implemented in 1997, it made sense to use survey data that was collected in 2014, as this allowed us to look at adults on both sides of the threshold. However, this data is now almost ten years old, highlighting that it would be valuable to conduct further studies on what gender attitudes are present in Uganda today. Today technology improvements have made it easier to collect this kind of data than it was a decade ago, which will help enable this future research. The *Social Institutions and Gender Index (SIGI) Uganda Survey 2014* (Uganda Bureau of Statistics, 2014) that provided the data for this paper has also now been conducted in many other countries, meaning that similar studies could be conducted in other countries. This would be valuable, as replication studies is an important part of research.

Since the reform examined here only removed fees, it would also be interesting to examine the effect of removing other costs such as books, uniforms and transportation. As our study indicates that removal of fees decreases the gender gap in educational attainment, it would be useful to know if these other costs are as much of a barrier and which magnitude of an increase in cost would have the largest marginal effect.

9 Conclusion

This thesis examined the effect of educational attainment on gender attitudes using a 2SLS research design, which examines a fuzzy regression discontinuity design using an instrumental variable. In this design we used plausibly exogenous variation in exposure to the UPE reform in Uganda, a reform that was implemented partly as a measure to enable more girls to attend school, to assess the causal impact on gender attitudes on men and women. The first stage of our research design consisted of regressing educational attainment on a dummy variable based on the timing of the reform and in the second stage we regressed three measures of gender attitudes on the estimated education derived from the first stage. Gender attitudes were measured using SIGI survey data on a five point likert scale, which we used to construct three standardized indexes looking at three different branches of gender attitudes: attitudes about women's agency, attitudes about gender norms and attitudes about women's political engagement.

Our findings allow us to reject the null hypothesis of the reform having no effect on educational attainment both for boys and girls. Thereby, our results support our first hypothesis, which states that the reform increased educational attainment for girls. While the UPE reform increased educational attainment for boys as well as girls, the magnitude of the effect was larger for girls, causing a decrease in the educational attainment gender gap. Consequently, our second hypothesis is also supported. However, the last three hypotheses covering the effect of educational attainment on gender attitudes were not supported by our results as we can not reject the null hypothesis at a 95% confidence interval. Since these results do not align with most of the previous work in this topic, this indicates that there is a knowledge gap within this topic that needs to be explored further.

10 Bibliography

- Angrist, J. D., & Pischke, J.-S. (2018). Mastering 'Metrics: The Path from Cause to Effect
<https://press.princeton.edu/books/paperback/9780691152844/mastering-metrics>
- Bishaw, A. (2014). The impact of education on rural womens participation in political and economic activities. *International Journal of Educational Administration and Policy Studies*, 6(2), 23–31. <https://doi.org/10.5897/ijeaps2013.0316>
- Busari, S., Liakos, C., & Nicholls, C. (2023, April 20). Uganda's President Museveni to return anti-LGBTQ+ bill to parliament. *CNN*.
<https://edition.cnn.com/2023/04/20/africa/museveni-uganda-lgbtw-intl/index.html>
- Boettke, P. J., & Stein, S. (2015). Alternative Schools of Economic Thought. In *International Encyclopedia of the Social & Behavioral Sciences* (2nd ed.).
<https://doi.org/10.1016/b978-0-08-097086-8.71072-5>
- Cuberes, D., & Teignier, M. (2016). Aggregate Effects of Gender Gaps in the Labor Market: A Quantitative Estimate. *Journal of Human Capital*, 10(1), 1–32.
<https://doi.org/10.1086/683847>
- Cunningham, S. (2021). *Causal Inference: The Mixtape*. Yale University Press.
<https://doi.org/10.2307/j.ctv1c29t27>
- Davis, & Theodore, J. (2015). Examining Human Capital Capacity's Influence on Human Development and Poverty Reduction in Sub-Saharan Africa. *The Journal of African Development*, 3(1), 6.
<https://scholarworks.wmich.edu/cgi/viewcontent.cgi?article=1046&context=ijad>
- Demographic and Health Survey 1995. (1995).
<https://www.dhsprogram.com/pubs/pdf/FR69/FR69.pdf>
- Dhar, D., Jain, T., & Jayachandran, S. (2018). Reshaping Adolescents' Gender Attitudes: Evidence from a School-Based Experiment in India. <https://doi.org/10.3386/w25331>

Du, H., Xiao, Y., & Zhao, L. (2021). Education and gender role attitudes. *Journal of Population Economics*, 34(2), 475–513. <https://doi.org/10.1007/s00148-020-00793-3>

Encyclopaedia Britannica. (2023a, March 29). Idi Amin | Biography, Facts, & Death. Encyclopedia Britannica. <https://www.britannica.com/biography/Idi-Amin>

Encyclopaedia Britannica. (2023b, May 2). Yoweri Museveni | Biography, Profile, Election, & Facts. Encyclopedia Britannica. <https://www.britannica.com/biography/Yoweri--Museveni>

Essama-Nssah, B. (n.d.). Achieving Universal Primary Education through School Fee Abolition: Some Policy Lessons from Uganda. The World Bank. https://documents1.worldbank.org/curated/en/304221468001788072/930107812_201408251044901/additional/634310PUB0Yes0061512B09780821387450.pdf

Facts and figures: Women's leadership and political participation. (n.d.-b). UN Women Headquarters. <https://www.unwomen.org/en/what-we-do/leadership-and-political-participation/facts-and-figures>

Government of Uganda. (n.d.). Specioza Kazibwe | Uganda National Web Portal. Retrieved May 12, 2023, from <https://www.gou.go.ug/people/specioza-kazibwe>

Gunes, P. M. (2015). The role of maternal education in child health: Evidence from a compulsory schooling law. *Economics of Education Review*, 47, 1–16. <https://doi.org/10.1016/j.econedurev.2015.02.008>

Hahn, J., Todd, P., & Van Der Klaauw, W. (2001). Identification and Estimation of Treatment Effects with a Regression-Discontinuity Design. *Econometrica*, 69(1), 201–209. <https://www.jstor.org/stable/2692190>

Hassan, R., & Macha, W. (2020, October 8). Education in Uganda. WENR. Retrieved May 12, 2023, from <https://wenr.wes.org/2020/10/education-in-uganda>

- Heath, R., & Jayachandran, S. (2016). The Causes and Consequences of Increased Female Education and Labor Force Participation in Developing Countries.
<https://doi.org/10.3386/w22766>
- Huettel, S. A., & Kranton, R. E. (2012). Identity economics and the brain: Uncovering the mechanisms of social conflict. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 367(1589), 680–691
- Imbens, G. W., & Lemieux, T. (2008). Regression discontinuity designs: A guide to practice. *Journal of Econometrics*, 142(2), 615–635.
<https://doi.org/10.1016/j.jeconom.2007.05.001>
- Jayachandran, S. (2021). Social Norms as a Barrier to Women’s Employment in Developing Countries. *IMF Economic Review*, 69(3), 576–595.
<https://doi.org/10.1057/s41308-021-00140-w>
- Kakumba, M. R. & Afrobarometer. (2022, June 28). AD531: Lived poverty remains high despite Uganda’s poverty-alleviation initiatives.
<https://www.afrobarometer.org/publication/ad531-lived-poverty-remains-high-despite-ugandas-poverty-alleviation-initiatives/>
- Keats, A. (2018). Women’s schooling, fertility, and child health outcomes: Evidence from Uganda’s free primary education program. *Journal of Development Economics*, 135, 142–159. <https://doi.org/10.1016/j.jdeveco.2018.07.002>
- Kiiza, W. (2022, February 24). It is not yet Uhuru for the women of Uganda. Brookings.
<https://www.brookings.edu/blog/africa-in-focus/2022/02/24/it-is-not-yet-uhuru-for-the-women-of-uganda/>
- Kingston, P., Hubbard, R. J., Lapp, B., Schroeder, P. W., & Wilson, J. (2003). Why Education Matters. *Sociology of Education*, 76(1), 53. <https://doi.org/10.2307/3090261>

- Kyooore, J. E., & Sulemana, I. (2019). Do Educational Attainments Influence Attitudes Toward Gender Equality in Sub-Saharan Africa? *Forum for Social Economics*, 48(4), 311–333. <https://doi.org/10.1080/07360932.2018.1509797>
- Kågesten, A., Gibbs, S. E., Blum, R., Moreau, C., Chandra-Mouli, V., Herbert, A., & Amin, A. (2016b). Understanding Factors that Shape Gender Attitudes in Early Adolescence Globally: A Mixed-Methods Systematic Review. *PLOS ONE*, 11(6), e0157805. <https://doi.org/10.1371/journal.pone.0157805>
- Larreguy, H., & Marshall, J. (2017). The Effect of Education on Civic and Political Engagement in Nonconsolidated Democracies: Evidence from Nigeria. *The Review of Economics and Statistics*, 99(3), 387–401. https://doi.org/10.1162/rest_a_00633
- Latkin, C. A., Edwards, C., Davey-Rothwell, M., & Tobin, K. E. (2017). The relationship between social desirability bias and self-reports of health, substance use, and social network factors among urban substance users in Baltimore, Maryland. *Addictive Behaviors*, 73, 133–136. <https://doi.org/10.1016/j.addbeh.2017.05.005>
- Licumba, E. A., Dzator, J., & Zhang, J. X. (2015). GENDER EQUALITY IN EDUCATION AND ECONOMIC GROWTH IN SELECTED SOUTHERN AFRICAN COUNTRIES. *The Journal of Developing Areas Preview Publication Details*, 49(6), 349–360. <https://www.proquest.com/docview/1747257962/1045EC49D8704322PQ/2>
- Lundberg, S. (2022). Gender Economics: Dead-Ends and New Opportunities. <https://repec.iza.org/dp15217.pdf>
- Lsj. (2021, August 9). Girls Education in Uganda | GlobeMed at Northwestern University. <https://sites.northwestern.edu/globemed/2021/08/09/girls-education-in-uganda/#:~:text=Recent%20data%20shows%20that%20only,able%20to%20pursue%20an%20education.ion.>

- Moore, J. (2017, December 20). Uganda Lifts an Age Limit, Paving the Way for a President for Life. The New York Times.
<https://www.nytimes.com/2017/12/20/world/africa/uganda-president-museveni-age-limit.html>
- Nelson, J. A. (2008). Feminist Economics. In Palgrave Macmillan UK eBooks (pp. 1–6).
https://doi.org/10.1057/978-1-349-95121-5_2210-1
- Nelson, J. A. (1996). What Is Feminist Economics All About? Taylor & Francis, 39(1), 4–8.
<https://www.jstor.org/stable/40721660>
- Nishimura, M., Yamano, T., & Sasaoka, Y. (2008c). Impacts of the universal primary education policy on educational attainment and private costs in rural Uganda. *International Journal of Educational Development*, 28(2), 161–175.
<https://doi.org/10.1016/j.ijedudev.2006.09.017>
- OECD. (2014). Social Institutions and Gender Index 2014 Synthesis Report.
<https://www.oecd.org/development/gender-development/BrochureSIGI2015-web.pdf>
- OECD. (2015). Uganda SIGI Country Report.
<https://www.oecd.org/dev/development-gender/The%20Uganda%20SIGI%20Country%20Study.pdf>
- Oxfam. (2018, August). GENDER ROLES AND THE CARE ECONOMY IN UGANDAN HOUSEHOLDS.
<https://oxfamilibrary.openrepository.com/bitstream/handle/10546/620532/rr-gender-roles-care-economy-uganda-130818-en.pdf?sequence=4>
- Rivera-Garrido, N. (2022). Can education reduce traditional gender role attitudes? *Economics of Education Review*, 89, 102261. <https://doi.org/10.1016/j.econedurev.2022.102261>
- Save the Children. (n.d.). How Harmful Gender Norms Create an Unequal World for Children. Retrieved April 18, 2023, from

- <https://www.savethechildren.org/us/charity-stories/how-gender-norms-impact-boys-and-girls>
- Si, W. (2022b). Higher education expansion and gender norms: evidence from China. *Journal of Population Economics*, 35(4), 1821–1858.
<https://doi.org/10.1007/s00148-022-00888-z>
- Sida. (n.d.). Quick Guide to What and How: Unpaid Care Work.
<https://www.oecd.org/dac/gender-development/47565971.pdf>
- Siročić, Z. (2015). Gender: Gendering of Categories. In *International Encyclopedia of the Social & Behavioral Sciences* (2nd ed.).
<https://doi.org/10.1016/b978-0-08-097086-8.03131-7>
- Tamusuza, A. (2011). Leaving School Early: The Quest for Universal Primary Education in Uganda. *Journal Statistique Africain*, 13, 110–151.
<https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Leaving%20School%20Early%20The%20Quest.pdf>
- Tripp, A. M. (2010). *Museveni's Uganda Paradoxes of Power in a Hybrid Regime*. Lynne Rienner Publishers.
https://www.rienner.com/title/Museveni_s_Uganda_Paradoxes_of_Power_in_a_Hybrid_Regime
- UBOS. (2014). *National Population and Housing Census 2014*.
https://www.ubos.org/wp-content/uploads/publications/03_20182014_National_Census_Main_Report.pdf
- Uganda Bureau of Statistics. (2014). *Manual of Instructions for SIGI UGANDA 2014*.
<https://www.oecd.org/dev/development-gender/SIGI-Manual-Final.pdf>
- UNESCO. (2023a, May 3). Gender equality and education. UNESCO. Retrieved May 14, 2023, from <https://www.unesco.org/en/gender-equality/education>

UNESCO. (2023b). What you need to know about how UNESCO advances education and gender equality. UNESCO.

<https://www.unesco.org/en/gender-equality/education/need-know>

UNICEF. (n.d.). Girls' education. Retrieved May 11, 2023, from

<https://www.unicef.org/education/girls-education>

UNICEF. (2023). Child marriage. <https://www.unicef.org/protection/child-marriage>

United Nations. (2023). THE 17 GOALS | Sustainable Development. Retrieved May 13, 2023, from <https://sdgs.un.org/goals>

UN Women. (n.d.). Country Fact Sheet | UN Women Data Hub. Retrieved May 12, 2023, from <https://data.unwomen.org/country/uganda>

Walker, R. A., Solotaroff, J., Sebudde, R. K., Atamanov, A., Puerto Gomez, M., Willman, A.

M., & Naqvi, F. (2021, December 1). Uganda Economic Update 18th Edition : Putting Women at the Center of Uganda's Economic Revival. World Bank.

<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099100011302141746/p1748840506ccf0da0ba0d08902edcbc883>

World Bank. (n.d.). Regression Discontinuity. Retrieved May 12, 2023, from

https://dimewiki.worldbank.org/Regression_Discontinuity

World Bank. (2016). Uganda Poverty Assessment 2016: Fact Sheet. World Bank.

<https://www.worldbank.org/en/country/uganda/brief/uganda-poverty-assessment-2016-fact-sheet>

World Bank. (2018, July 11). Not Educating Girls Costs Countries Trillions of Dollars, Says New World Bank Report. World Bank.

<https://www.worldbank.org/en/news/press-release/2018/07/11/not-educating-girls-cost-s-countries-trillions-of-dollars-says-new-world-bank-report>

World Bank. (2021). Investing in Gender Equality in Uganda is Smart Economics. In World Bank.

<https://www.worldbank.org/en/country/uganda/publication/investing-in-gender-equality-in-uganda-is-smart-economics>

World Bank. (2022, July 7). World Bank Country Classifications by Income Level (Uganda). World Bank.

<https://www.worldbank.org/en/news/factsheet/2022/07/07/world-bank-country-classifications-by-income-level-uganda>

World Economic Forum. (2021, March). Global Gender Gap Report 2021. Retrieved May 12, 2023, from https://www3.weforum.org/docs/WEF_GGGR_2021.pdf

Östling, R. (2022, February 22). Instrumental Variables Continued: Lecture 14 [Lecture]. https://sse.instructure.com/courses/943/files/3788843?module_item_id=23606

11 Appendices

11.1 Appendix 1: Questions used for each index

Each question begins with:

Give your opinions on the following practices. Using the following codes, write the code that corresponds to the rating in the table below

1. Strongly agree 2. Agree 3. Not sure 4. Disagree 5. Strongly disagree

Index 1: Attitudes about women's agency

- A married woman should ask permission from her husband before she undertakes a journey away from home.
- If a man pays a bride price for his wife it means that he owns her.
- A woman is justified in refusing to have sex with her husband
- Women should have the right to decide whether to use contraception.
- Women and men should have the same decision-making power regarding:
 - Housing
 - Transport equipment
 - Electronic equipment
 - Livestock
 - Farm inputs
 - Agriculture equipment
 - Household equipment
 - Land acquisition
 - Financial services (e.g. credit, microfinance, bank account)
 - Establish a business
 - Work outside home

Index 2: Attitudes about gender roles

- Girls and boys should spend the same amount of time on domestic work
- Men and women must share equally household tasks and child caring if both are working.
- It is more important that a boy gets higher education than it is for a girl.
- Households should spend the same amount of resources on girls and boys regarding education

Index 3: Attitudes about political engagement

- A woman can become president

- Women and men should have the same opportunities to access political leadership
- Men make better political leaders than women
- A married woman must vote for the same party and candidate as her husband

11.2 Appendix 2: Additional data cleaning

We examined the distribution of birth cohorts shown by the year of birth variable and compared this to the birth cohorts calculated using the ages variable to determine if one of these variables appeared to be more accurate than the other and whether smoothing of the data would be needed. These histograms were nearly identical but we decided to use age in our regressions as this distribution appeared somewhat smoother. The graphs indicate a relatively young population. The distribution of birth cohorts might appear quite skewed, but considering the sample did not include those under 18, the graph appears smooth up until that point. Some people that were not above 18 still appeared in the data, so we removed these.

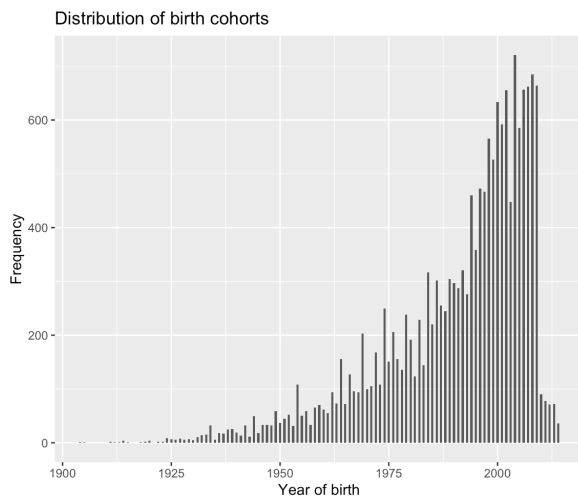


Figure 9: Distribution of birth cohorts using 2014-age (authors' analysis of SIGI data)

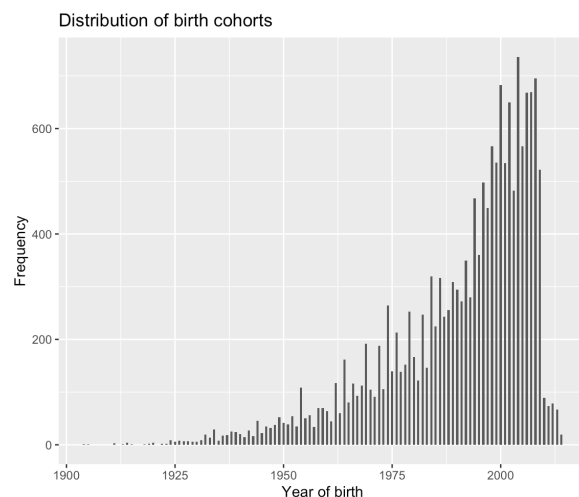


Figure 10: Distribution of birth cohorts using Year of birth (authors' analysis of SIGI data)

11.3 Appendix 3: Full first stage regression analysis table

First stage regression results		
	<i>Dependent variable:</i>	
	Education Boys	Education Girls
	(1)	(2)
Treatment	2.605** (1.313)	3.077** (1.210)
Year of Birth 1966	4.462*** (1.543)	-1.156 (1.362)
Year of Birth 1967	2.628* (1.514)	0.367 (1.442)
Year of Birth 1968	3.701** (1.702)	-0.256 (1.379)
Year of Birth 1969	1.860 (1.429)	0.249 (1.289)
Year of Birth 1970	1.865 (1.694)	-1.221 (1.461)
Year of Birth 1971	2.265 (1.639)	1.123 (1.354)
Year of Birth 1972	2.159 (1.497)	0.236 (1.383)
Year of Birth 1973	2.260 (1.705)	0.459 (1.385)
Year of Birth 1974	3.398** (1.487)	-0.652 (1.287)
Year of Birth 1975	2.994* (1.784)	1.042 (1.471)
Year of Birth 1976	3.334** (1.602)	0.747 (1.408)
Year of Birth 1977	3.738** (1.847)	1.268 (1.436)
Year of Birth 1978	3.369** (1.704)	-0.325 (1.497)
Year of Birth 1979	2.636* (1.493)	2.572* (1.331)
Year of Birth 1980	3.832** (1.558)	2.574* (1.436)
Year of Birth 1981	3.316* (1.943)	3.277** (1.514)
Year of Birth 1982	3.699** (1.468)	0.938 (1.335)
Year of Birth 1983	1.876 (1.164)	-1.331 (0.941)

Year of Birth 1984	0.064 (0.732)	-0.832 (0.647)
Year of Birth 1985	2.330*** (0.863)	1.976** (0.834)
Year of Birth 1986	1.180* (0.672)	0.610 (0.668)
Year of Birth 1987	1.612** (0.684)	0.491 (0.638)
Year of Birth 1988	1.636** (0.686)	0.345 (0.635)
Year of Birth 1989	1.240** (0.603)	1.133* (0.603)
Year of Birth 1990	2.380*** (0.571)	0.746 (0.553)
Year of Birth 1991	1.168** (0.531)	0.529 (0.549)
Year of Birth 1992	0.972** (0.488)	0.738 (0.512)
Year of Birth 1993	1.175** (0.512)	0.294 (0.541)
Year of Birth 1994	0.746* (0.416)	0.761* (0.414)
Year of Birth 1995	-0.049 (0.501)	0.943** (0.430)
Observations	3,352	3,629
R ²	0.075	0.325
Adjusted R ²	-3.415	-2.239
F Statistic	1.839*** (df = 31; 702)	11.741*** (df = 31; 756)
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01		

Table 3: First stage regression results (authors' analysis of SIGI data)

11.4 Appendix 4: Reduced form graphs and table

The reduced form is illustrated through six RDD graphs; one for women and one for men for each index. For women, all three graphs show a positive jump at the threshold and a downward slope following the threshold, which would indicate that gender norms became more equitable at the time of the reform but that this effect decreased over time (see *Figures 11, 12 and 13*). However, the confidence intervals are quite large and overlapping, so the results may not be significant.

For men, the graphs are more varied. For men's beliefs about women's agency there is a positive slope before and after the threshold but a negative jump at the threshold (see figure 14). The graph showing men's attitudes about gender roles there is no jump, but the slope becomes more negative after the threshold (see *Figure 15*). Men's attitudes on women's political engagement showed a negative jump and then a slightly negative slope after the threshold (see *Figure 16*). The confidence intervals for both figure 14 and 16 are somewhat overlapping while they are completely overlapping for figure 15.

The general conclusion from the graphs of the second stage is that it is unclear whether there is a relationship between the reform and the gender attitudes measured.

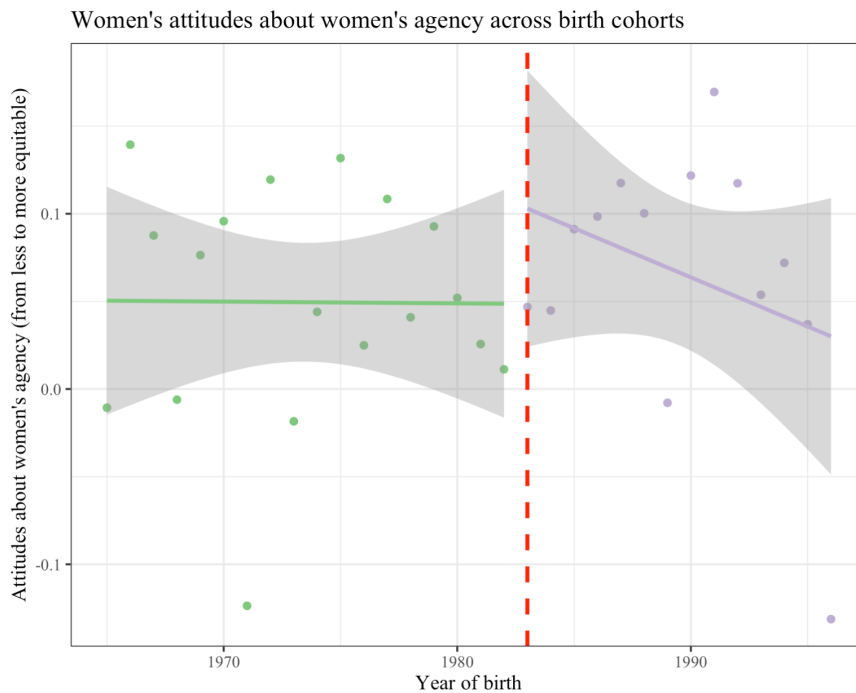


Figure 11: Reduced form RDD for women using Index 1

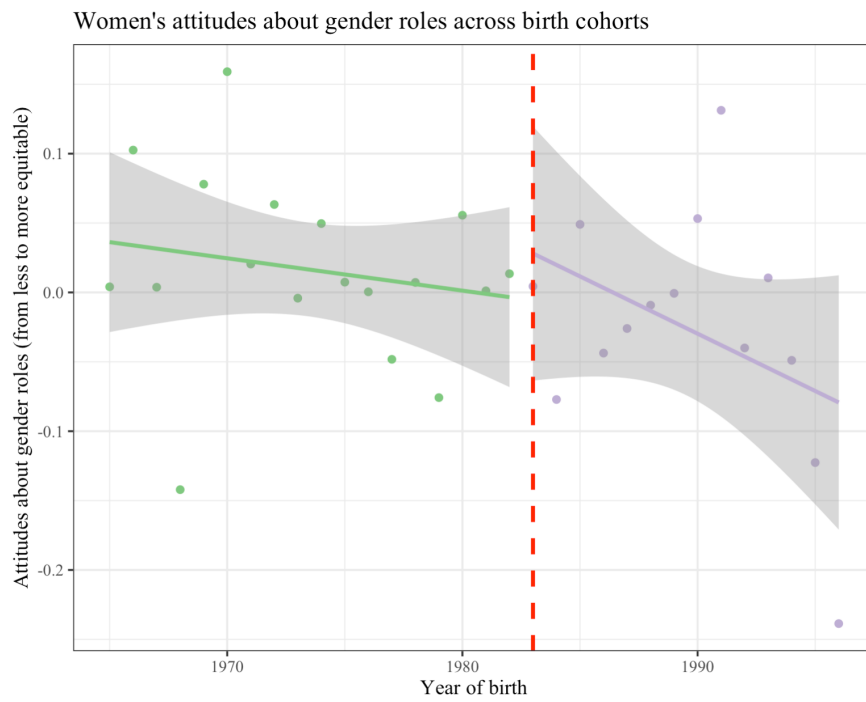


Figure 12: Reduced form RDD for women using Index 2

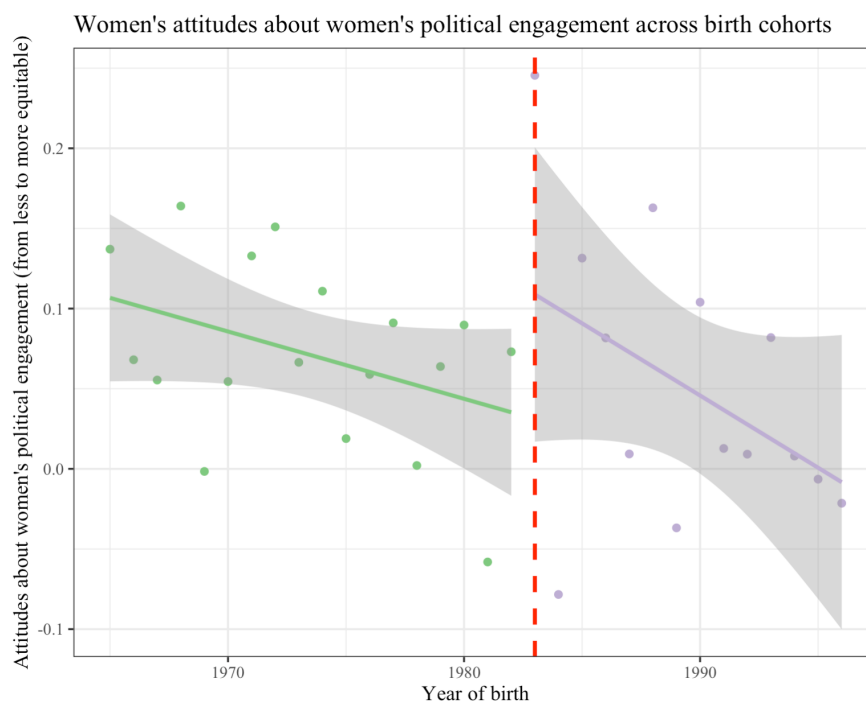


Figure 13: Reduced form RDD for women using Index 3

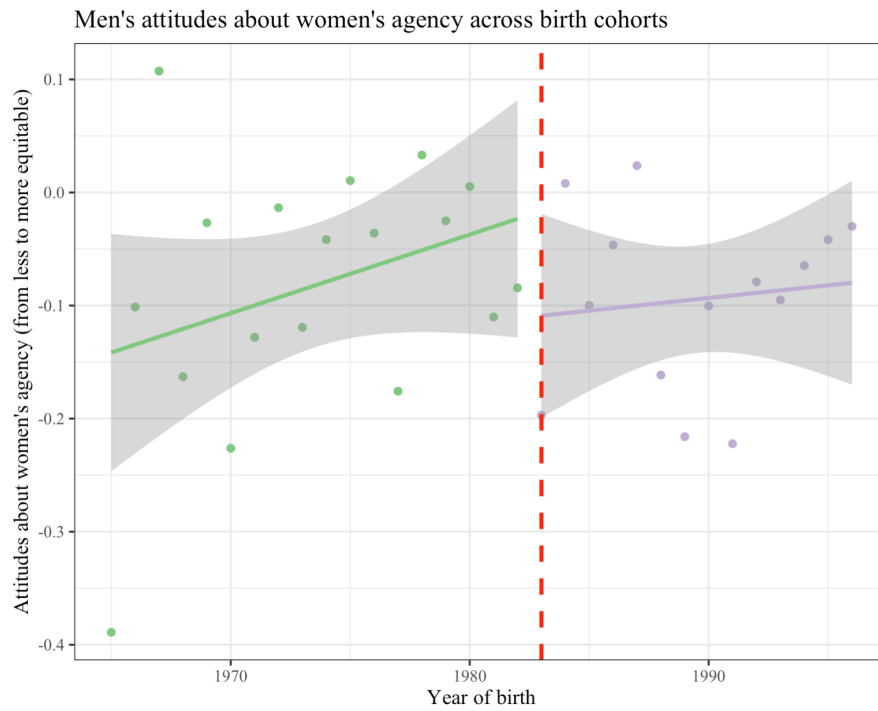


Figure 14: Reduced form RDD for men using Index 1

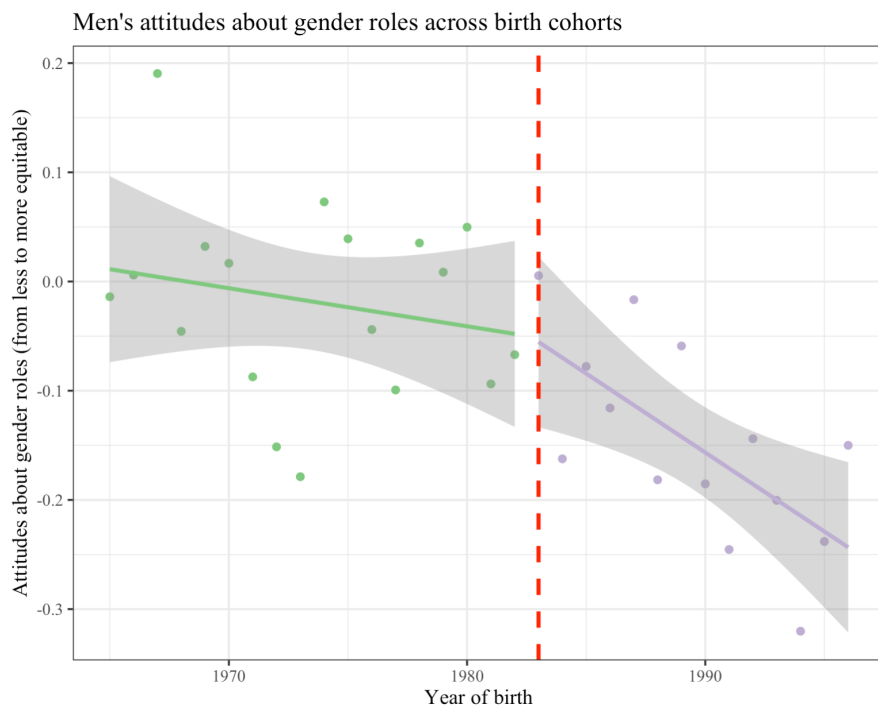


Figure 15: Reduced form RDD for men using Index 2

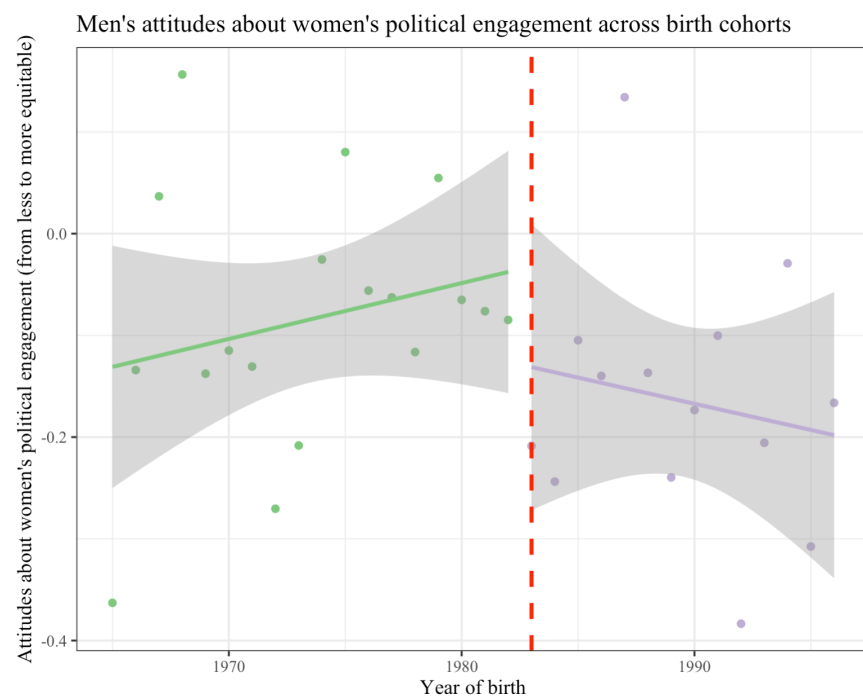


Figure 16: Reduced form RDD for men using Index 3

Reduced form regression results

	<i>Dependent variable:</i>					
	Index 1 Men (1)	Index 1 Women (2)	Index 2 Men (3)	Index 2 Women (4)	Index 3 Men (5)	Index 3 Women (6)
Treatment	0.348** (0.164)	-0.137 (0.133)	-0.050 (0.174)	-0.236 (0.145)	0.247 (0.186)	-0.130 (0.147)
Year of Birth 1966	0.288 (0.180)	0.145 (0.139)	0.012 (0.190)	0.099 (0.152)	0.227 (0.204)	-0.071 (0.153)
Year of Birth 1967	0.490*** (0.170)	0.094 (0.150)	0.204 (0.180)	0.001 (0.164)	0.396** (0.193)	-0.084 (0.165)
Year of Birth 1968	0.226 (0.182)	0.006 (0.146)	-0.030 (0.193)	-0.146 (0.159)	0.520** (0.207)	0.028 (0.161)
Year of Birth 1969	0.363** (0.156)	0.082 (0.133)	0.043 (0.166)	0.073 (0.145)	0.225 (0.177)	-0.138 (0.146)
Year of Birth 1970	0.165 (0.170)	0.107 (0.142)	0.032 (0.180)	0.155 (0.154)	0.248 (0.193)	-0.081 (0.156)
Year of Birth 1971	0.256 (0.167)	-0.115 (0.143)	-0.091 (0.177)	0.017 (0.156)	0.248 (0.189)	-0.003 (0.157)
Year of Birth 1972	0.375** (0.157)	0.131 (0.139)	-0.145 (0.167)	0.059 (0.151)	0.096 (0.178)	0.015 (0.153)
Year of Birth 1973	0.267 (0.167)	-0.011 (0.143)	-0.166 (0.177)	-0.009 (0.156)	0.160 (0.189)	-0.066 (0.157)
Year of Birth 1974	0.348** (0.155)	0.050 (0.130)	0.081 (0.164)	0.046 (0.142)	0.338* (0.175)	-0.025 (0.143)
Year of Birth 1975	0.401** (0.163)	0.145 (0.133)	0.042 (0.173)	0.003 (0.145)	0.441** (0.185)	-0.116 (0.146)
Year of Birth 1976	0.354** (0.158)	0.037 (0.128)	-0.040 (0.167)	-0.003 (0.140)	0.305* (0.179)	-0.076 (0.141)
Year of Birth 1977	0.216 (0.160)	0.121 (0.134)	-0.091 (0.170)	-0.052 (0.146)	0.300* (0.182)	-0.044 (0.148)
Year of Birth 1978	0.430*** (0.162)	0.055 (0.137)	0.068 (0.172)	0.001 (0.149)	0.249 (0.184)	-0.130 (0.151)
Year of Birth 1979	0.364** (0.155)	0.108 (0.128)	0.022 (0.164)	-0.082 (0.140)	0.417** (0.176)	-0.069 (0.141)
Year of Birth 1980	0.390** (0.161)	0.068 (0.130)	0.056 (0.170)	0.051 (0.141)	0.314* (0.182)	-0.044 (0.143)
Year of Birth 1981	0.279* (0.169)	0.042 (0.139)	-0.086 (0.179)	-0.003 (0.151)	0.286 (0.192)	-0.191 (0.153)
Year of Birth 1982	0.302* (0.155)	0.028 (0.130)	-0.056 (0.164)	0.012 (0.141)	0.277 (0.176)	-0.059 (0.143)
Year of Birth 1983	-0.155 (0.126)	0.197** (0.098)	0.065 (0.134)	0.236** (0.107)	-0.094 (0.143)	0.240** (0.108)
Year of Birth 1984	0.051 (0.106)	0.196** (0.087)	-0.098 (0.112)	0.155 (0.094)	-0.125 (0.120)	-0.080 (0.095)
Year of Birth 1985	-0.058 (0.112)	0.240*** (0.092)	-0.017 (0.119)	0.281*** (0.100)	0.012 (0.127)	0.128 (0.101)
Year of Birth 1986	-0.008 (0.109)	0.259*** (0.085)	-0.051 (0.116)	0.199** (0.093)	-0.026 (0.124)	0.082 (0.093)
Year of Birth 1987	0.067 (0.115)	0.265*** (0.089)	0.046 (0.121)	0.205** (0.097)	0.260** (0.130)	0.007 (0.098)
Year of Birth 1988	-0.106 (0.113)	0.251*** (0.090)	-0.108 (0.120)	0.218** (0.098)	-0.027 (0.128)	0.162 (0.099)
Year of Birth 1989	-0.173 (0.110)	0.136 (0.087)	0.019 (0.116)	0.230** (0.095)	-0.123 (0.124)	-0.035 (0.096)

Year of Birth 1990	-0.065 (0.109)	0.276*** (0.086)	-0.088 (0.116)	0.286*** (0.094)	-0.050 (0.124)	0.108 (0.095)
Year of Birth 1991	-0.190 (0.118)	0.323*** (0.091)	-0.158 (0.125)	0.362*** (0.100)	0.018 (0.134)	0.017 (0.101)
Year of Birth 1992	-0.052 (0.120)	0.275*** (0.087)	-0.043 (0.127)	0.194** (0.094)	-0.244* (0.136)	0.013 (0.095)
Year of Birth 1993	-0.065 (0.121)	0.202** (0.091)	-0.087 (0.128)	0.239** (0.099)	-0.083 (0.137)	0.092 (0.100)
Year of Birth 1994	-0.055 (0.111)	0.214** (0.086)	-0.197* (0.117)	0.184** (0.093)	0.096 (0.125)	0.017 (0.094)
Year of Birth 1995	-0.015 (0.113)	0.190** (0.091)	-0.085 (0.120)	0.114 (0.099)	-0.172 (0.128)	0.018 (0.100)
Observations	1,918	2,446	1,918	2,446	1,918	2,446
R ²	0.018	0.013	0.019	0.013	0.027	0.011
Adjusted R ²	-0.004	-0.004	-0.003	-0.004	0.005	-0.006
F Statistic	1.113 (df = 31; 1875) 1.030 (df = 31; 2403) 1.157 (df = 31; 1875) 1.019 (df = 31; 2403) 1.661** (df = 31; 1875) 0.901 (df = 31; 2403)					
Note:					*p<0.1; **p<0.05; ***p<0.01	

Table 4: Reduced form regression results (authors' analysis of SIGI data)

11.5 Appendix 5: Full IV regression analysis table (second stage)

IV regression results						
	<i>Dependent variable:</i>					
	Index 1 Men (1)	Index 1 Women (2)	Index 2 Men (3)	Index 2 Women (4)	Index 3 Men (5)	Index 3 Women (6)
Estimated Education	0.128* (0.071)	-0.030 (0.034)	-0.048 (0.066)	-0.060 (0.039)	0.070 (0.063)	-0.039 (0.038)
Year of Birth 1966	0.237 (0.207)	0.165 (0.134)	0.039 (0.191)	0.130 (0.155)	0.201 (0.183)	-0.049 (0.151)
Year of Birth 1967	0.347** (0.165)	0.105 (0.152)	0.261* (0.153)	0.012 (0.177)	0.318** (0.146)	-0.073 (0.172)
Year of Birth 1968	0.186 (0.214)	0.039 (0.130)	-0.016 (0.198)	-0.077 (0.151)	0.497*** (0.189)	0.072 (0.146)
Year of Birth 1969	0.271* (0.161)	0.093 (0.134)	0.081 (0.148)	0.085 (0.156)	0.176 (0.142)	-0.131 (0.152)
Year of Birth 1970	-0.104 (0.151)	0.137 (0.126)	0.132 (0.139)	0.217 (0.147)	0.102 (0.133)	-0.042 (0.142)
Year of Birth 1971	0.029 (0.147)	-0.047 (0.111)	0.015 (0.135)	0.148 (0.130)	0.105 (0.129)	0.082 (0.126)
Year of Birth 1972	0.261* (0.154)	0.187* (0.109)	-0.094 (0.142)	0.174 (0.126)	0.030 (0.136)	0.089 (0.123)
Year of Birth 1973	0.151 (0.168)	0.053 (0.113)	-0.120 (0.155)	0.114 (0.131)	0.090 (0.148)	0.009 (0.127)
Year of Birth 1974	0.228 (0.148)	0.055 (0.136)	0.132 (0.137)	0.046 (0.158)	0.272** (0.131)	-0.026 (0.154)
Year of Birth 1975	0.033 (0.148)	0.183* (0.109)	0.192 (0.137)	0.086 (0.126)	0.242* (0.131)	-0.064 (0.123)
Year of Birth 1976	0.051 (0.130)	0.074 (0.104)	0.084 (0.120)	0.073 (0.121)	0.142 (0.114)	-0.028 (0.117)
Year of Birth 1977	0.044 (0.144)	0.193** (0.097)	-0.021 (0.133)	0.097 (0.112)	0.207 (0.128)	0.051 (0.109)
Year of Birth 1978	0.223 (0.142)	0.125 (0.101)	0.125 (0.132)	0.151 (0.117)	0.138 (0.126)	-0.038 (0.114)
Year of Birth 1979	0.112 (0.123)	0.193** (0.085)	0.118 (0.114)	0.100 (0.099)	0.280** (0.109)	0.044 (0.096)
Year of Birth 1980	0.254* (0.152)	0.120 (0.095)	0.117 (0.141)	0.168 (0.111)	0.221 (0.134)	0.028 (0.108)
Year of Birth 1981	0.113 (0.160)	0.103 (0.105)	-0.017 (0.148)	0.131 (0.123)	0.196 (0.142)	-0.108 (0.119)
Year of Birth 1982	0.027 (0.123)	0.079 (0.095)	0.052 (0.114)	0.125 (0.111)	0.126 (0.109)	0.011 (0.107)
Year of Birth 1983	-0.209 (0.159)	0.152 (0.094)	0.171 (0.147)	0.191* (0.110)	-0.065 (0.141)	0.233** (0.106)
Year of Birth 1984	0.108 (0.114)	0.111 (0.091)	-0.039 (0.105)	0.031 (0.105)	-0.039 (0.100)	-0.142 (0.102)
Year of Birth 1985	-0.006 (0.123)	0.191** (0.088)	0.048 (0.113)	0.225** (0.102)	0.096 (0.108)	0.112 (0.099)
Year of Birth 1986	-0.040 (0.134)	0.203** (0.079)	0.043 (0.124)	0.141 (0.092)	0.014 (0.118)	0.068 (0.090)
Year of Birth 1987	-0.082 (0.178)	0.248*** (0.090)	0.185 (0.164)	0.211** (0.105)	0.226 (0.157)	0.030 (0.102)

Year of Birth 1988	-0.117 (0.131)	0.213** (0.087)	-0.037 (0.121)	0.192* (0.101)	0.037 (0.115)	0.160 (0.098)
Year of Birth 1989	-0.074 (0.122)	0.088 (0.083)	0.048 (0.113)	0.166* (0.096)	-0.012 (0.108)	-0.062 (0.093)
Year of Birth 1990	-0.101 (0.140)	0.278*** (0.102)	-0.024 (0.129)	0.341*** (0.119)	-0.024 (0.123)	0.158 (0.115)
Year of Birth 1991	-0.161 (0.138)	0.301*** (0.094)	-0.107 (0.127)	0.371*** (0.109)	0.083 (0.122)	0.035 (0.106)
Year of Birth 1992	0.001 (0.140)	0.232*** (0.084)	-0.013 (0.129)	0.165* (0.097)	-0.190 (0.124)	0.008 (0.094)
Year of Birth 1993	-0.007 (0.142)	0.192** (0.096)	-0.073 (0.131)	0.262** (0.112)	-0.007 (0.125)	0.112 (0.109)
Year of Birth 1994	-0.112 (0.157)	0.178** (0.083)	-0.141 (0.145)	0.139 (0.096)	0.095 (0.138)	-0.004 (0.093)
Year of Birth 1995	0.057 (0.132)	0.173* (0.096)	-0.114 (0.122)	0.126 (0.112)	-0.103 (0.116)	0.022 (0.109)
Year of Birth 1996						
Constant	-0.964** (0.477)	0.068 (0.202)	0.204 (0.441)	0.162 (0.235)	-0.678 (0.422)	0.240 (0.228)
Observations	1,918	2,446	1,918	2,446	1,918	2,446
R ²	-0.542	-0.079	-0.155	-0.230	0.075	-0.140
Adjusted R ²	-0.568	-0.093	-0.174	-0.245	0.060	-0.155
Residual Std. Error	0.774 (df = 1886)	0.597 (df = 2414)	0.715 (df = 1886)	0.694 (df = 2414)	0.684 (df = 1886)	0.673 (df = 2414)

Note:

* p<0.1; ** p<0.05; *** p<0.01

Table 5: IV regression analysis table (authors' analysis of SIGI data)