

# How Reproductive Health Laws Help to Explain the Gap Between Contraceptive Use and Fertility Decline: The Curious Case of Ghana<sup>1</sup>

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## **Abstract**

In this paper we explore the effect of the 1985 abortion law change in Ghana on fertility outcomes. The coincidence of the abortion law liberalization and the start of the fertility decline lead us to question the role of abortion and reproductive health laws more generally in explaining the fertility decline in Ghana. Changes in reproductive health laws provide a potentially exogenous change in access to family planning services that might affect fertility. Through a mixed methods approach we conducted key informant interviews in Ghana and complemented this with statistical analysis using the Ghana World Fertility Survey and the Ghana Demographic and Health Surveys. Empirical results indicate that the liberalization of the abortion law played a significant role in explaining the fertility decline in Ghana. The key informant interviews suggest that the reasons for the liberalization of reproductive health laws were largely exogenous to women's changing preferences for family planning.

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## Introduction

Following a period of a relatively stable total fertility rate in Ghana, 1985 marked the tipping point and a sharp downward trend in total fertility, which continues through to today. Coincidentally, or causally, Ghanaian abortion laws were liberalized in February 1985. In this paper we use a mixed-methods approach to explore the relationship between this legal change and subsequent fertility decline.

In explaining the fertility decline that most countries around the world have experienced, social scientists have either attributed this decline to changing preferences over the number of children (Pritchett 1994a; Pritchett 1994b) or access to contraception (Bongaarts 1994; Bongaarts, Maudin and Phillips 1990; Knowles, Akin and Guilkey 1994), or the relative weight that each contributes to the fertility decline. In the stylized demand-side argument, women who desire to control their fertility will find a way to do so regardless of the availability of modern contraception either through increased use of traditional methods or other social changes that lead inadvertently to fertility decline such as rising age at first marriage (Pritchett 1994a; Pritchett 1994b). Social and economic changes are therefore the passive drivers of fertility decline in the demand-side model rather than the active provision of modern family planning methods. In the stylized supply-side argument, excess supply (or saturating the market) might be said to induce demand in the absence of an initial preference for contraception (e.g. (Bongaarts 1978, 1984)). In the middle ground approach, women with unmet need who wanted to control their fertility but were previously unable now have the means to do so, whereas women whose preferences have not changed slowly take up modern contraception as demand changes.

This question has critical policy implications since if the main barrier to uptake of contraception is access and supply-side factors, this implies that increased investments in making contraception affordable and available are necessary for fertility decline. If, however, the demand side argument is correct, increasing supply will do little to increase uptake if women's preferences over fertility have not changed and family planning programs can at best either wait until preferences change or try to promote changes in preferences.

For there to even be a debate about the relative role of preferences compared with access to modern contraception, modern contraception needs to first be made legally available. In the absence of a legal supply of modern contraception and family planning services, women and couples will be substantially constrained in their ability to control their fertility regardless of their preferences (1980). Examination of reproductive health laws therefore provides a potentially exogenous change to access to reproductive health services that affect fertility. Examination of reproductive health laws can provide a counterfactual to the supply-demand debate-what would the fertility rate have been in the absence of the supply of services? As data relying on self reported contraceptive use and incidence of abortion may not fully reflect the actual use of services since respondents may be reluctant to reveal such private information, a revealed response through an exogenous shock may be more informative.

That the liberalization of reproductive health laws is exogenous is not immediately obvious. An exogenous change in reproductive health laws could come about if, for example, a champion in government pushes through a reform with the support of only a narrow constituency. The timing of the change should therefore be discontinuous with changing preferences over family planning. On the other hand, changes in reproductive health laws may reflect underlying social changes in society. For instance, taking the example of the sexual revolution in the U.S., researchers have questioned the relative contribution of technology in regulating the supply of births versus other concurrent demographic, social and economic changes that may explain the decline in fertility following the introduction of oral contraceptives (Bailey 2010). First, we need to establish whether the legal change can be viewed as truly exogenous to changing preferences or whether changing sexual mores led to pressures to liberalize laws, which passively contributed to fertility decline? If the legal change was exogenous, then we can more readily claim an independent effect of supply-side factors (access to contraception). If the legal change is endogenous to other changing social conditions and mobilization pushing for greater access, then it is more difficult to disentangle supply-side factors from demand-side factors. Bailey

(2010), for instance, exploits idiosyncratic variation in the language of statutes related to sexual conduct enacted in the late 1800s in the U.S. that had substantial consequences for subsequent access to the pill once it was technically legalized at the national level in the 1960s.

In this paper we aim to outline the role of reproductive health law changes on fertility outcomes in Ghana. In determining the exact role of the reproductive health law changes, we explore in detail how the legal changes came about and what the practical implications were as a result of the legal change. For this analysis we employ a mixed methods approach. In addition to the empirical work using the Demographic and Health and World Fertility Surveys, we conducted a series of key informant interviews in Ghana to gain insight from experts in the reproductive health field regarding the legal changes and their precipitous effects.

**Empirical Motivation: Law Change and Fertility Decline.** In Ghana, fertility has declined substantially since the mid-1980s and more steeply than the Sub Saharan African average (Table 1). It presently has one of the lowest total fertility rates in SSA and is on par with other African countries that are well known for their fertility declines such as Kenya and Zimbabwe. Previous studies have established that Ghana is among a select group of high performing African countries in fertility decline (see for example Garenne and Joseph (2002)).

**Table 1: Total Fertility Rate for Women Age 15-34 in Select African Countries using Data from the Demographic and Health Surveys**

	1985-89	1990-94	1995-99	2000-04	2005-09
<b>Total Fertility Rate 15-34 Year Olds</b>					
DHS Americas	3.3	3.1	3.0	2.8	2.4
DHS Asia	2.2	3.2	2.8	2.5	2.4
DHS Europe		1.4	2.4	1.3	1.6
DHS Northern Africa	3.4	3.0	3.1	2.5	2.7
DHS Sub Saharan Africa	4.7	4.4	4.2	4.1	4.1
Ghana	4.6	3.9	3.3	3.2	3.1
<b>DHS Total</b>	3.7	3.8	3.4	3.3	3.2

Notes: Source: DHS Stat Compiler, Macro International Inc, 2010. Regions are representative of the countries covered by the Demographic and Health Surveys which are not necessarily a comprehensive list of all countries in that region. See Appendix for a list of DHS countries by region.

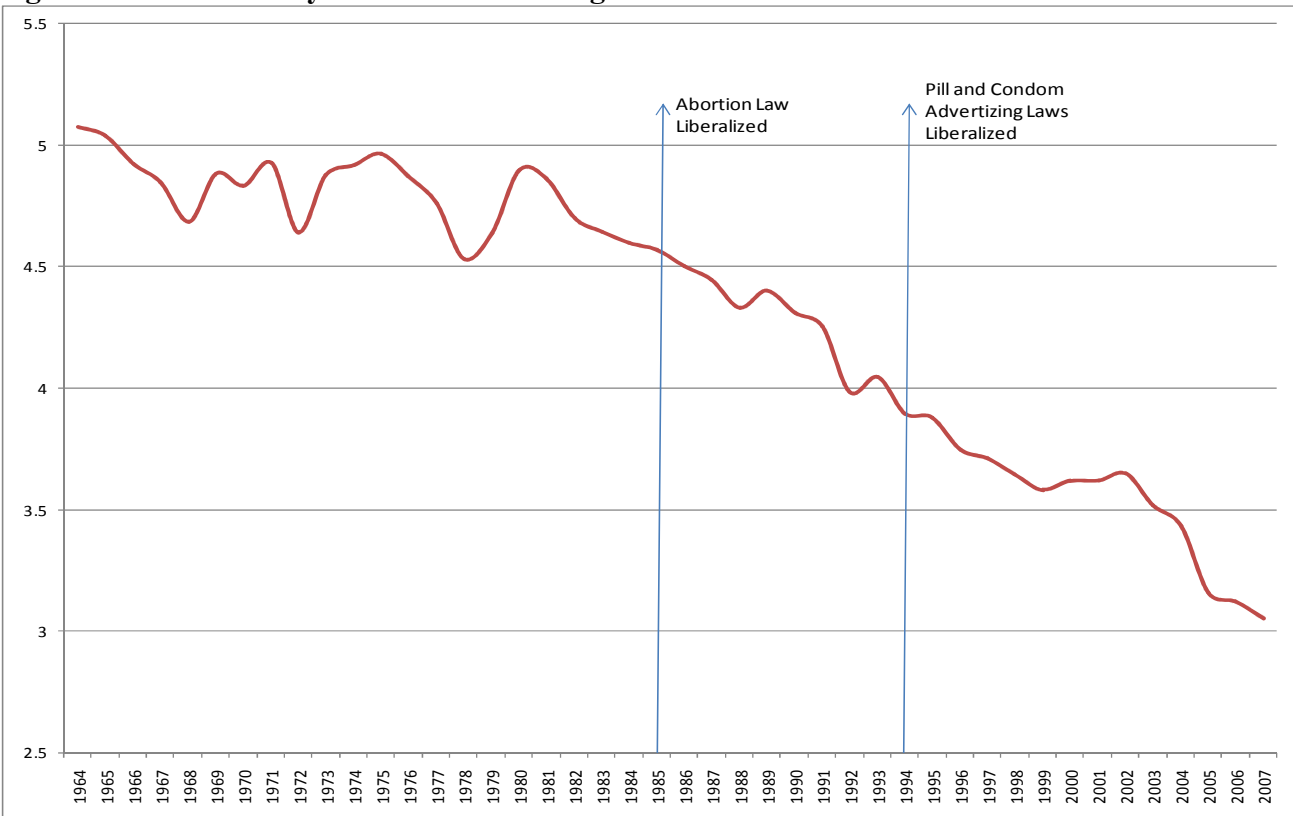
Between 1960 and 2008 Ghana experienced two major reforms in their reproductive health laws. Prior to 1985 laws associated with abortion, pill, condom, IUD and sterilization were relatively strict (Kellogg, Kline and Stepan 1975; United Nations Population Division 2002). Abortion was not legally available for any reason, not even in the case when the pregnancy was life threatening to the mother. The pill was available for contraceptive purposes but a prescription was required and had to be purchased in a pharmacy. There was no subsidy on the pill, and advertising was strictly prohibited. Condoms were available for contraceptive purposes, but there was no subsidy to consumers and advertising was strictly prohibited. IUD was available, but had to be installed by a physician (and not by a nurse or other trained health care provider). There were no laws associated with sterilization.

In 1985, the Criminal Code was amended and abortion was legalized and became available for five of the seven standardized reasons (United Nations Population Division 2002): to save the life of the mother, the physical health of the mother, mental health of the mother, fetal impairment, or rape. Abortion was not available on the grounds of economic hardship or on request. In the same year, sterilization became legal (Boland 2002; Ross, Hong and Huber 1985; Stepan and Kellogg 1974) . There have been no further changes to the abortion or sterilization laws since these changes in 1985.

In 1994 the National Population Policy was released, and this had legal implications for the pill and condom – both could now be legally advertised, albeit with restrictions. The policy included changes that permitted “the provision of information to allow couples to space or limit their reproduction;” and “sex and family planning education” . A social marketing campaign called Life Choices was also launched with the support of the government to promote various family planning options (United Nations Fund for Population Activities et al. 1978-1994) . Since 1994 there have been no further changes to the reproductive health laws in Ghana (Boland 1974-).

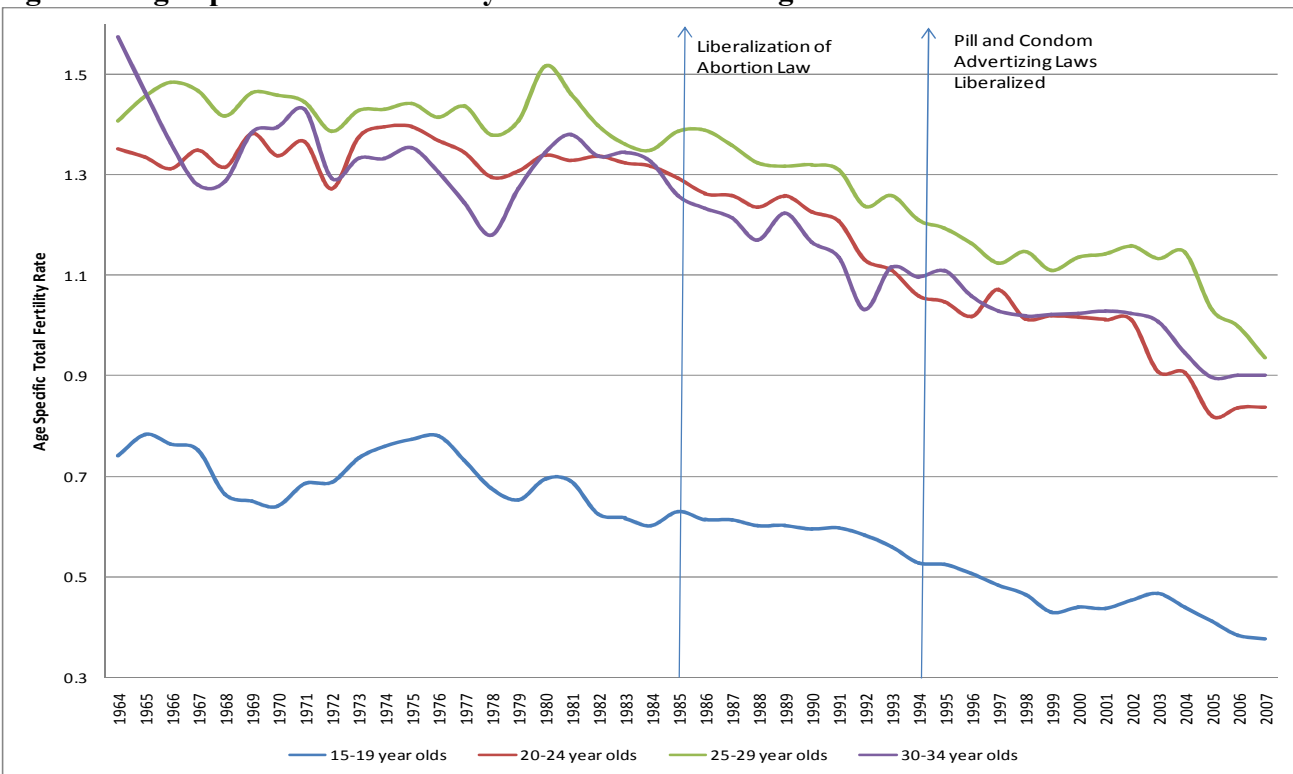
Subsequent to the liberalization of the abortion law in 1985, fertility declined steeply and discontinuously compared with prior trends and continued to decline subsequent to 1994. Using data from the World Fertility Survey (1979) and Demographic and Health Survey (1988, 1993, 1998, 2003, 2008) we examine the effect of changes in the reproductive health laws on fertility outcomes. We reconstruct the Ghanaian birth rate by year. The birth rate is defined as the number of children born in a given year relative to the number of women who are between the ages of 15 and 34 in that same year. There is much variation in the birth rate from year to year, but if we consider the trends over the 1964-2007 period we gain a much more informative picture of fertility outcomes over the 43 year period. In Figure 1, it appears that the birth rate had a relatively constant average just above 4.5 children per woman age 15-34. Then from 1985 onwards, the birth rate began to decline. The timing of this decline coincides with liberalizations of reproductive health laws in Ghana. In Figure 2, we illustrate the fertility rate by age groups and this illustrates that the downward trend in fertility rates is systematic across the age groups and not confined to the very young or the older women.

**Figure 1: Total Fertility Rate for Women Age 15-34 in Ghana 1964-2007.**



Note: Long vertical arrows indicate the years in which there were major reproductive health law changes in Ghana. Data are from the Ghana World Fertility Survey of 1979 and the Demographic and Health Surveys 1988, 1993, 1998, 2003, 2008.

**Figure 2: Age Specific Total Fertility Rates for Women Aged 15-34 in Ghana 1964-2007**



**The Curious Case of Ghana: Fertility Decline without Substantial Contraceptive Uptake.** The case of fertility decline in Ghana presents a puzzle, which leads us to believe that undocumented abortion following the liberalization in 1985 may be a major source of fertility decline: Although Ghana has had among the lowest total fertility rates in Africa since the 1980s (see **Table 1**), it has consistently had very low rates of modern contraceptive use compared with other African countries, and still has below the 20% modern contraceptive use that is believed to be necessary for sustained fertility decline (see **Table 2**) (Caldwell et al., 1993). Compared with other low- and middle-income countries in Sub Saharan Africa and around the world that have substantially reduced their fertility since the 1980s, Ghana has a much lower use of modern contraceptives (**Table 2**).

**Table 2: % Use of Modern Contraception in Low- and Middle Income Countries in the DHS**

	1985-89	1990-94	1995-99	2000-04	2005-09
<b>Currently Using Any Contraceptive Method (% women)</b>					
DHS Americas	31.0	32.4	39.8	42.5	46.6
DHS Asia	54.7		38.8	31.3	33.0
DHS Europe			57.8	50.5	50.4
DHS Northern Africa	30.9	22.9		33.3	
DHS Sub Saharan Africa	16.5	15.8	18.3	19.2	21.8
Ghana	12.3	18.9	18.0	20.7	19.3
<b>DHS Total</b>	<b>28.2</b>	<b>21.0</b>	<b>28.9</b>	<b>28.3</b>	<b>31.4</b>
<b>Currently Using Any Modern Contraceptive Method (% women)</b>					
DHS Americas	24.3	23.8	33.3	35.4	40.7
DHS Asia	46.4		28.5	17.6	21.1
DHS Europe			33.5	5.6	35.6
DHS Northern Africa	25.7	19.7		29.0	
DHS Sub Saharan Africa	9.3	8.9	12.0	14.2	16.2
Ghana	3.7	9.3	10.7	15.3	13.5
<b>DHS Total</b>	<b>21.3</b>	<b>13.7</b>	<b>20.6</b>	<b>20.6</b>	<b>24.1</b>

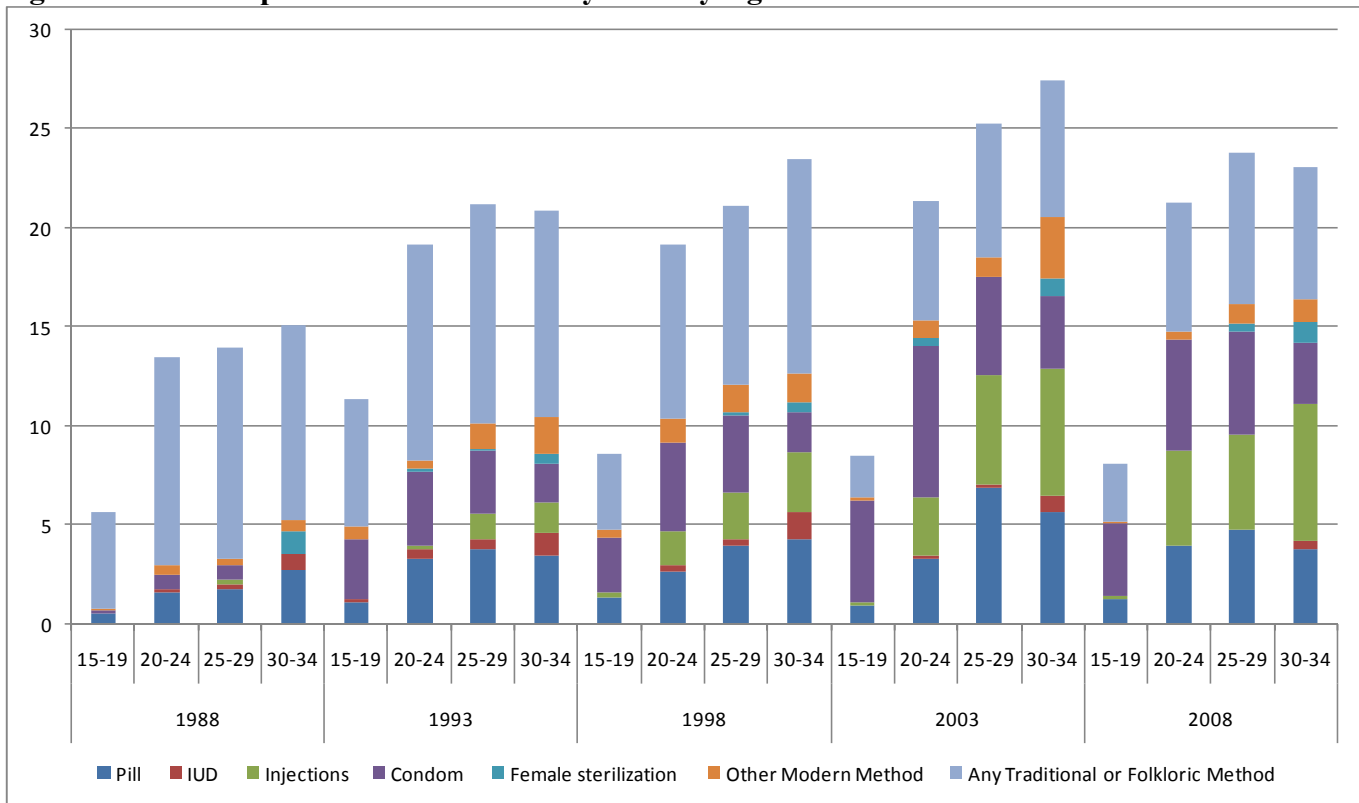
Notes: Source: DHS Stat Compiler, Macro International Inc, 2010. Regions are representative of the countries covered by the Demographic and Health Surveys which are not necessarily a comprehensive list of all countries in that region. See Appendix for a list of DHS countries by region.

What is striking is the strong association between the timing of the legal changes and fertility outcomes in **Figure 1**. From the data, use rates of some of the most common forms of modern contraception are very low (**Table 2**). In addition, in **Figure 4**, we can see that use-rates of pill and condom increase between the 1988 survey and the 1993 survey. Thus the large climb in pill and condom use preceded the change in the pill and condom advertising laws that occurred in 1994, but still cannot explain the fertility decline post-1985. This leads us to believe that the change in the abortion law may have led to an increase in abortion, but there is under-reporting due to social desirability.

Both the demand side and supply side access scenarios theoretically lead to an increase in contraceptive use and abortions. Thus, empirically we should be able to observe a change in the law leading to an increase in contraceptive use and abortion rates, and this increase in use then explaining the decline in fertility. In fact, we do not observe this, and if we take the data on contraceptive use and terminations without question, these use rates fall short of explaining the observed fertility decline. But self reporting of a reproductive health method used (getting an abortion, regularly taking the pill, regularly using condoms, having an IUD fitted, being sterilized) carries with it the obvious problem of under-reporting due to the fact that practicing birth control, and

the choice of method, remains stigmatized in many countries. With Ghana being a particularly religious country, we would expect this to be an issue.

**Figure 4: Contraceptive Use in DHS Survey Year by Age in Ghana**



Aside from underreporting for social desirability reasons, a second explanation that still treats changes in the reproductive health laws as exogenous is that legal changes do cause changes in fertility outcomes, but it is not through the obvious channel of modern methods. Instead, the legalization of reproductive health methods brings with it a broader awareness of reproductive health issues, which leads to an increased use of traditional birth spacing methods. This explanation could be especially plausible if substantive access to family planning remains constrained even once legal barriers are taken away.

Alternatively, the endogenous argument would find that changes in reproductive health laws may have been spurred by the same forces that led to fertility decline -- changing attitudes towards women's role in society reflected in increased educational attainment among women, increased age at first marriage, reduced rates of polygamy, or increased traditional birth spacing methods. These changing social trends may have happened concomitantly with the change in the abortion law, which gives the appearance that the change in the law had a causal effect when in fact fertility would have declined regardless of the change in the law.

The curious case of Ghana and the observation that fertility decline is not fully explained by contraceptive use and abortion rates has not gone unnoticed. Hollander, Ahiadeke, Hill, Oliveras (2008) have conducted meticulous field work in the endeavor to find further detail on abortion rates and contraceptive use. Citing hospital records, following the course of pregnancy of women there still appears to be a shortfall. Agyei-Mensah (2005) has also looked in detail at the factors that might explain the gap between fertility and modern contraceptive use. Unable to fully explain the gap with available data, he concludes: "A nation-wide survey on induced abortion is therefore needed to explain the gap between the current level of fertility and the low rate of modern contraception" (p. 16). Blanc and Grey (2002) find that early pregnancy losses (which likely include induced abortion) accounted for around 12% of the total number of pregnancies women experienced between



1988-1998. Thus, unreported abortion plausibly explains the gap between reported contraception and termination rates and fertility decline.

There is a good deal of evidence that despite being common practice, abortion rates are substantially underreported in Ghana since data comes mainly from hospital records, which are unreliable because record-keeping is poor and induced abortions are often classified inaccurately (Vitolo et al. 2008). Data from the 1998 Ghana Youth Reproductive Health Survey showed that 11% of males and 16% of females aged between 12 years and 24 years who were sexually active indicated some involvement in terminating a pregnancy (reported in Hesse & Samba, (1983)). Ahiadeke (2001) confirmed this finding with a study that tracked pregnant women using fieldworkers which found an abortion prevalence rate of 19 per 100 pregnancies for women in Southern Ghana aged less than 30 years. Fifty-eight of abortions presenting to Korle-Bu Teaching Hospital over a period in 1998 were found to have been performed outside legally designated health institutions (Ahiadeke 2001).

One plausible explanation for the decline in fertility subsequent to the liberalization of the abortion law is therefore that demand for safe, legal abortion increased subsequent to the change in the law. With the liberalization of the abortion law, women and couples know that they can go to the clinic and obtain a safe abortion (or an abortifecient). In the instance that a woman finds herself with an unwanted pregnancy, she may now more easily take up this option of going to the clinic. At the clinic, she may or may not procure an abortion. But while at the clinic she will also learn about other forms of contraception and receive counseling regarding various options to avoid unplanned or unwanted pregnancies in the future. Through the liberalization of abortion laws, women and couples seek out reproductive health services more readily. With a greater supply of reproductive health services and products, fertility rates decline.

Yet, evidence suggests that in spite of the change in the law, women and couples did not know about the abortion law. In the Ghana Maternal Health Survey of 2007, 22 years after the liberalization of the abortion law, only 3.9 percent of the respondents reported that they think abortion is legal. With such low rates of knowledge regarding the legal change, this limits the appeal of explaining the fertility decline by way of an increase in use of legal abortion. Furthermore, available evidence suggests that illicit abortion rates were potentially equally high prior to the legal reform. It is nevertheless possible that an increase in undocumented abortion (de jure licit but de facto illicit) could account for at least some of the initial reduction in fertility subsequent to 1985.

For instance, consider a hypothetical chain of events that result from the legal change and affect demand. Providers - those who profit from the business of reproductive health - have a vested interest to stay informed about changes to the legality of their business functions. With the liberalization of the abortion law, service provision of clinical abortions may increase. Women and couples seek out reproductive health services when needed, and will do so irrespective of their knowledge of the law. Women who attempt to access reproductive health services after the legal change will find it easier. Thus, with access facilitated by an increase in provision, women seeking reproductive health services now do so with greater success. Thus with no knowledge of the legal change, the same number of women may try to access reproductive health services, but it is because of the legal change that more of these women are able to achieve their reproductive goals.

***Mechanisms and Hypotheses.*** Following from this discussion, we propose three plausible alternative explanations for the decline in fertility following liberalization of reproductive health laws include:

1. Providers began providing more access to abortion/contraception upon request, but women and providers have continued underreporting on surveys for social desirability reasons.
2. Still unable to access modern contraception and clinical services, women increased their use of more traditional birth spacing methods due to increased word of mouth about availability of services.
3. Fertility decline was coincidental with the liberalization of the law and has resulted from other social changes unrelated to the availability of abortion or modern contraception (e.g., changes in

underlying economic conditions, other aspects of women's status), which were occurring concomitantly with the change in the law that may lead indirectly to a decline in fertility without a change in contraceptive use (e.g., reduced polygamy, higher age at first sex/marriage/birth).

The first two explanations would imply that an exogenous change in reproductive health laws enabled women to actualize their preferences for fewer children. The third explanation, on the other hand, would imply that the legal change was not itself a direct or indirect cause of fertility decline. Rather, the liberalization of reproductive health laws may reflect broader social changes taking place such as the increased participation of women in government and the labor force, which precipitated the changes in the law and also led to a decline in fertility. If this were the case, then reproductive health laws cannot be thought of as an exogenous factor and changing preferences for children may be a better explanation for fertility decline than increased availability of contraception. We therefore aim to assess whether: 1. The change in the law was independent of social pressure, and driven by insider champions within the government and discontinuous with changing demand for family planning in society (exogenous argument); or, 2. The legal changes were made in response to growing pressure from women's advocacy groups demanding better access to reproductive health methods to meet the evolving needs of women and their desire to control family size to pursue education and employment (endogenous argument).

## **Methods**

The causal pathways leading from the liberalization of reproductive health laws, changes in provider behavior, increased availability of reproductive health options and changes in women's preferences for more children remain sketchy and ill understood. Working with the assumption that women may under-report abortions and contraceptive use, we take a qualitative approach to the investigation of the mechanism by which the liberalization in the abortion law led to a change, if any, in the fertility rate. To answer this question we explore in detail the political and social environment surrounding the legal change. In determining the exact role of the reproductive health law changes in declining fertility, we propose to explore in detail how the legal changes came about and based on this finding to assess the plausible sources of decline in fertility.

**Key Informant Interviews.** In order to understand the reasons behind the changes in reproductive health laws, we conducted a series of key informant interviews in Ghana from late September 2010. Through these interviews we aimed to uncover how the legal change came about, any other policies that may have affected fertility that came in around the same time, what the effects were of the legal change that we may not see in the statistical analysis, and alternative explanations for fertility decline unrelated to the change in the abortion law.

Semi-structured key informant interviews were conducted with policy makers, academics, government officials and representatives of international governmental and non-governmental organizations that are knowledgeable about family planning and legal changes in Ghana. Key informant interviews involve identifying members of a community with specialized knowledge about a topic (i.e., "key informants"), and asking them questions about their experiences relevant to the research question at hand. Key informants have above average knowledge of the topic under investigation. Interviews are usually conducted face to face and vary in length (Sofaer 1999). In addition, key informants can help to identify data sources and other resources and individuals that may assist in answering research questions.

We began with an initial list of key informants based on literature reviews and our initial knowledge base. Subsequently, we employed "snowball sampling" to identify and interview further key informants. This involved asking initial interviewees and other experts to recommend other key informants, until such suggestions begin to duplicate informants already identified. Interviews were open-ended, but followed an interview guide that helped ensure key research goals were met. Prior to the interviews, each key informant was contacted and given a brief explanation of the project and its purposes. The in-person interviews were semi-structured and were tailored to the specific key informant. The two authors conducted all of the key informant

interviews together over a one week period. All interviews were digitally recorded. Ethical approval for the key informant interviews was provided through the Institutional Review Board of the Harvard School of Public Health (Protocol number 19609-101, Expiry September 20 2011).

Systematic content notes were taken following each interview and the recordings were subsequently analyzed by a research assistant not involved in the interviews and coded for thematic content. The balance of different explanations and their recurrence were used to assess the reliability of each explanation and its saliency. Saturation was considered to have occurred once themes began to repeat themselves.

**Empirical Estimation.** In conducting the empirical analysis a mother-year panel was created using the Ghana Demographic and Health Surveys. Although the DHS are a repeated cross section, there is sufficient retrospective information of the respondent regarding birth history, schooling, and where she lived to construct a woman-year panel. We examine how legal changes in 1985 and 1994 affected fertility decisions for women. We control for the age of the mother, her marital status, how many children she has in a given year, whether she is in school, her partner's education, and if she lived in a rural or urban area.

$$\begin{aligned}
 \Pr(b_{it} = 1) = & \beta_1(\text{abort}_t) + \beta_2(\text{pill}_t) \\
 & + \beta_3(\text{mothers\_age}_{it}) + \beta_4(\text{mothers\_age\_sq}_{it}) \\
 & + \beta_4(\text{in\_school}_{i,t-1}) + \sum_s \beta_{4s}(\text{siblings}_{sit}) + \beta_5(\text{child\_mort}_{c,t-1}) \\
 & + \beta_6(\text{married}_{i,t-1}) + \sum_e \beta_{7e}(\text{educ\_h}_{eit} | m) + \beta_8(\text{ag\_h}_{it} | m) \\
 & + \sum_r \beta_{9r}(\text{place\_of\_residence}_{rit}) \\
 & + \beta_{10}(\text{year\_history}_t) + \sum_y \beta_{11y}(\text{year\_survey}) + \varepsilon_{it}
 \end{aligned}$$

The above equation illustrates the probability of a birth,  $b$ , to woman  $i$  in year  $t$  is a function of the abortion law, abort in time  $t$ , and the law associated with the contraceptive pill, pill in time  $t$ . In determining the effect of the legal changes on the probability of a birth, we also control for a series of social determinants of fertility as outlined by Schultz (1997). Mother's age at time  $t$ , and her age squared as we expect fertility to peak mid-way through her fertile life rather than increase linearly with age. We also have an indicator for each woman in each year for if she were in school. As school attendance is likely to be endogenous to a birth, we lag school attendance by one year to  $t-1$ . We have a dummy variable for the number of siblings 0 to 4+, and cluster average child mortality rates (again lagged one year due to endogeneity with the probability of a birth). Deaths to woman  $i$  are excluded from woman  $i$ 's cluster average. An indicator for each the woman's marital status, lagged by one year to take account of marriages that may occur due to the event of a birth. Then if the woman is married or in union the highest level of education achieved by the partner is controlled for. An indicator of whether the partner works in agriculture is also accounted for. The DHS have information regarding place of residence when the woman is a child, her previous place of residence her current place of residence and how many years she has been in her current residence. From this information we can back out an approximation of her urban/rural living status: taking residence when a child as up to the age of 15, and then using the information on her current and previous place of residence and how many years she has been in the current residence to track her subsequent movements. A time trend,  $\text{year\_history}$ , is included to control for linear trends in fertility in Ghana, and survey year dummies are added as separate controls as fertility information in the year of the survey can be incomplete if, for example, the survey discontinued mid-year.

In addition to the pooled analysis across all of Ghana, we stratify by age to examine any patterns in contraceptive use or abortion prevalence unique to these stratum.

Through the empirical strategy we attempt to uncover what the data can tell us about the causal effect of the liberalization of the abortion law and the pill advertising law on fertility rates in Ghana.

When examining a shock, such as the liberalization of the abortion law, empirically the results are confounded by two main issues. The first is that the liberalization of the abortion law may coincide with another shock that had a significant effect on fertility making the statistical association between the legal change and fertility a spurious one. The second issue is that the legal change may have been brought about by a social movement that itself had a direct effect on fertility. While literature reviews can inform us to some extent to address these empirical issues, historical information on Ghana is not as detailed as, say, the US, and thus relying on published material may be insufficient. Thus, we turn to the key informants to address these concerns that arose in estimating the effect of the legal change on fertility outcomes in Ghana.

## **Results: Key Informant Interviews**

*Reasons for the liberalization of the abortion law.* The key informant interviews lent support primarily to the exogenous explanation for legal change. Concurrent events that may have equally affected fertility were also addressed.

Each respondent was asked explicitly about the potential role of women's movements and popular demand for the change in the law, but no one supported this explanation. Rather, a good deal of discussion focused on the continued stigma surrounding abortion and religiosity that makes discussion of abortion taboo even if tacitly tolerated. The main explanation provided and validated by multiple key informants for the liberalization of the abortion law in 1985 concerned the effects of a famine that led the military government to liberalize the abortion law. An additional explanation concerned the role of physicians in pressing for liberalized abortion laws to reduce unsafe abortions. Finally, a second indirect liberalization in the abortion laws was also uncovered that was previously unknown to the researchers. At the same time that medical abortion was liberalized, there was a concurrent liberalization of advertising laws surrounding abortifacient tonics.

*Famine.* In 1985, Ghana was under military rule following the military coup in 1981 that brought Flt.-Lt. Jerry Rawlings to power under the Provisional National Defense Council (PNDC). The interviews revealed that the change in the abortion law was precipitated by a famine that spanned throughout West Africa beginning in 1983. The military government believed that by liberalizing the abortion law, they could offset some of the popular discontent from the famine and provide families a means of regulating fertility during this economic and environmental blight. The law liberalized abortion in the case of rape, incest, to save the life of the mother, possible birth defects and importantly also to preserve a woman's mental health, which has been interpreted quite liberally.

Because the government was under military rule in 1985, deliberation over the change in the abortion law was limited to the inner council of the president and achieved through fiat rather than popular legislative vote. In addition to the key informant interviews, in trying to reconstruct the events leading to the liberalization of the abortion laws, the two authors tried to attain the hanzard (official public record) from the session in which the abortion law was legalized in 1985, which are stored in Ghana's National Archives in Accra. The hanzard does not exist for the years under the military regime, including 1985, and key informants suggested that closed door sessions were the norm at that time. Therefore, widespread debate over the law was likely limited. One key informant mentioned that Rawling's decision to liberalize the abortion law came about due to concern over rapid population growth. The famine may therefore have presented a window of opportunity to justify the liberalization.

*Physicians & Targeted Advocacy.* Although the legal change itself appears to have resulted from a closed door session, a couple of key informants mentioned that physician-advocates tired of seeing failed induced abortion

cases in their hospital wards, pushed for reform for clinical reasons. Fred Sai, a well-known reproductive health advocate and Ghanaian physician, was said to have spearheaded this effort. This explanation for the change in the abortion law is also supported by Hesse and Samba (1983) who claim that it was doctors in the Ghana Medical Association, that spearheaded the amendment of the criminal code on abortion in 1985. This legal change came about as a result of lobbying by medical doctors, particularly those working at the Korle-Bu Teaching Hospital. Although brought about by popular lobbying in response to a social problem, we still interpret this explanation for the legal change as exogenous to other social changes going on in Ghana, since this group of medical providers does not represent wider social groups that reflect women's interests. The explanation that the liberalization of the law was brought about by the same forces that may have led to fertility decline- changing underlying social and economic conditions- is not supported by the explanation that physicians were responsible for the change.

*Liberalization of Advertising of Abortifacient Tonics.* One key informant also identified an additional liberalization in a law that had implications for abortion. In addition to the famine leading to a liberalization in the abortion law, simultaneously in 1985 there was a liberalization in the law concerning the advertising of popular cleansing tonics with known abortifacient properties. The advertisements, which are purported to have been widely posted following the liberalization of the law, contained a disclaimer that women who are pregnant should not use the tonics, thereby advertising widely their abortifacient properties. This law was also presumably liberalized in response to the famine to promote abortion and population control. Thus, although even the more liberalized abortion law explicitly forbade women from obtaining an abortion without the assistance of a trained professional, this law was interpreted as giving tacit acceptance of the use of tonics for abortifacient purposes and it is believed that the tonics were widely used for these purposes. The potentially wide-spread use of these tonics following the liberalization of the advertising law was documented in an article published by Anarfi (2003). For exogenous reasons, the liberalization of the abortion law led to the proliferation of the advertising of these tonics which appears to have stimulated demand.

*Reasons for the liberalization of Condom and Pill Advertising.* As with abortion, the explanation given for the liberalization of advertising around pills and condoms was largely exogenous. The liberalizations occurred in the aftermath of the International Conference on Population and Development (ICPD) conference held in Cairo in 1994. Delegates from Ghana to the conference in the MOH recognized the need to update Ghana's outmoded Reproductive Health Code in line with international standards. This included the updating of laws around advertising of contraceptives and was followed by the launching of a social marketing campaign called Life Choices. This explanation substantiates the notion that the legal change was largely exogenous and not driven by growing pressures from below.

***Effects of the Liberalization of Reproductive Health Laws and Reasons for the Gap between Fertility Decline and Modern Contraceptive Use.*** We have found support for the explanation that changes in the reproductive health laws were exogenously driven. However, the gap between knowledge of the change in the laws/utilization of modern methods and subsequent fertility decline remains to be explained. Key informants confirmed that modern contraceptive use remains low and that abortion is a popular means of family planning that is substantially underreported. If abortion laws changed exogenously, but individuals were unaware of the change, how might this change have led to increased uptake? In addition, an increase in condom and pill use appears to have occurred prior to the liberalization of advertising even though the change in the law was primarily elite driven.

*Increasing provision of legal abortions and fertility decline.* Several key informants who were also practicing physicians suggested that the provision of legal abortion did increase subsequent to the liberalization even though knowledge of the legalization of abortion remained low. One key informant feared that if knowledge of Ghana's liberalized abortion was widespread, there may well be pressures to reverse this liberal interpretation, though he believed this would be difficult to accomplish. The respondent also did not believe that abortion would be able to be liberalized today through a democratic process.

Although the general public may not have been aware of the change in the law, key informants confirmed that many though perhaps not all physicians knew about the liberalization of the law and were willing to offer medical abortions upon request. There is some evidence that after the liberalization of the abortion law, hospitals saw fewer cases of failed induced abortions (Hesse and Samba 2006). Thus it is possible that although general knowledge of abortion liberalization was not high, that women may nevertheless have received more safe abortions than in the past when physicians were prohibited from providing abortions.

*Increasing use of Illicit Abortifacients.* Increased use of abortifacient tonics may have also made a substantial undocumented contribution to falling fertility, though its effects are difficult to quantify. The liberalization of the advertising law around these tonics may well have increased women's use of these products as abortifacients.

The morning after pill and misoprostole also constitute popular means of fertility control, which key informants suggested are frequently abused. Traditional methods, such as the use of abortifacient herbs were also mentioned. It is plausible that in spite of the legal changes access to services remained low but women heard through word of mouth that if they used traditional methods, tonics, or other abortifacients that they would be treated at the hospital without legal consequences. We heard on several occasions that even though the law was liberalized, little was done by the government to improve access reproductive health services.

A common but unfortunate practice of "fertility testing" that may result in abortion was also identified by several informants. Young couples who wish to test a girl's fertility before marriage frequently rely on abortion or abortifacients once fertility has been established with the sometimes tragic consequence that infertility results from the abuse of illicit means of abortion. Thus, underreporting of both licit and illicit abortion may constitute a significant source of fertility decline following the liberalization of the abortion law.

*Demand-Side Explanations for Fertility Decline.* We heard a number of alternative explanations for fertility decline apart from the changes in reproductive health laws. Most of these explanations have been addressed in previous analyses and are still unable to explain the gap between modern contraceptive use and fertility decline, e.g., (Agyei-Mensah 2005; Blanc and Grey 2002). These included: a rise in girls' education, later age at first marriage, reduced infant mortality, reduced polygamy, an increase in postpartum abstinence, economic hardship/famine and more births outside of marriage in urban settings.

An increase in girls' education around the same time as the liberalization of the abortion law, which was frequently cited by key informants, was believed to have resulted in a later age at first marriage for girls. The increased age of first marriage was thought to be potentially offset by increased non-marital fertility among adolescent girls, though that fewer births with different partners may be more common compared with many births with the same partner. Reduced infant mortality was another reason commonly given. A few key informants mentioned that the famine and the economic austerity of the 1980s may have had a direct effect on fertility, reducing the demand for more children.

One key informant mentioned the possibility of an increase in traditional forms of fertility regulation through lengthened periods of postpartum abstinence. A previous study that has attempted to untangle the gap between contraceptive prevalence and fertility in Ghana has argued that the purposeful adjustment in coital frequency may explain a large portion of the fertility decline that is unaccounted for by contraceptive prevalence, other proximal determinants of fertility and available estimates of induced abortion (Blanc & Grey, 2002). However, this study links coital frequency to declines in fertility beginning in the 1960s, not specifically to the accelerated decline beginning in the mid-eighties.

## **Results: Empirical Analysis**

In Table 3 we show the mean number of births to a woman in a given year by the explanatory variable. For example we show that the mean number of births to women under the strict abortion law is higher than the mean number of births under the more liberal abortion law. Average birth rates of 0.21 in 1980 and 0.204 in 1985 drop to 0.189 by 1990 (five years after the legal change) and continue to fall. The associate between the pill advertising laws and birth rates is not as clear, and the downward trend in birth rates seems to precede the liberalization of the pill advertising laws.

We see that on average women who are in school have far fewer children than women who are not in school. This is partially an age effect as older women are likely to have more children and also more likely to have completed school to their highest desirable level. But it is also partially an effect of being in school acting as a deterrent to child birth. In the adjusted models, we separate out the age effects from the school attendance effect.

In Table 4 we examine the associate of mean births with the explanatory variables by age of women. The liberal abortion laws had a much greater effect on the birth rates of women older than 20 than those aged 15-19. This was also illustrated in Figure 2 where the decline in fertility appeared equal for the 20-34 year old women but weaker for the 15-20 year olds.

In Table 5 we show the results for the pool Ghana sample and stratifications by the age of the woman. In column (1) we see that more liberal abortion laws are associated with a lower birth rate. Being in school reduces the chance of having a birth, and being married increases the chance of having a birth. When the husband is working in agriculture the woman is more likely to have a birth in a given year. When stratifying by the age of the woman, we see that for the younger women the change in the law had no significant effect on their fertility. However, for the women aged 25-34, the liberalization of the abortion law had a significant effect on the probability of a birth in a given year.

## **Conclusions**

In the case of Ghana, changes to reproductive health laws were not driven by popular demand and in fact occurred in spite of the unpopularity of the policy change. The changes were largely elite-driven and catalyzed by exogenous events. Yet, in spite of establishing the exogeneity of the legal changes, there still exist difficulties in linking the legal changes to fertility decline given that knowledge of the change in the law remained low. Nevertheless, we establish that increased rates of undocumented legal and pseudo-legal abortion is a plausible explanation for the empirical gap between reported family planning use and observed rates of fertility decline.

other references (Geelhoed et al. 2002)

**Table 3: Mean number of children born by year and explanatory variable**

	1975		1980		1985		1990		1995		2000		2005		2008		Total				
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
<b>Abortion Law Index</b>																					
Low (0)	0.192	0.394	0.210	0.407	0.204	0.403	0.189	0.391	0.170	0.376	0.166	0.372	0.135	0.341	0.165	0.371	0.199	0.399	0.172	0.378	
High (5)																					
<b>Pill Law Index</b>																					
Low (7)	0.192	0.394	0.210	0.407	0.204	0.403	0.189	0.391	0.170	0.376	0.166	0.372	0.135	0.341	0.165	0.371	0.192	0.394	0.155	0.362	
High (8)																					
<b>Mother's Age</b>																					
15	0.037	0.189	0.025	0.157	0.020	0.141	0.036	0.187	0.017	0.131	0.027	0.163	0.017	0.129	0.005	0.068	0.027	0.163	0.057	0.232	
16	0.061	0.239	0.055	0.228	0.058	0.233	0.062	0.241	0.062	0.241	0.062	0.241	0.062	0.241	0.062	0.241	0.062	0.241	0.062	0.241	
17	0.108	0.310	0.113	0.316	0.112	0.315	0.091	0.288	0.099	0.299	0.090	0.302	0.090	0.299	0.090	0.302	0.091	0.287	0.091	0.287	
18	0.177	0.382	0.142	0.349	0.163	0.369	0.157	0.364	0.121	0.326	0.113	0.318	0.119	0.325	0.105	0.308	0.139	0.346	0.139	0.346	
19	0.167	0.374	0.208	0.406	0.167	0.373	0.152	0.360	0.139	0.347	0.140	0.348	0.149	0.357	0.115	0.320	0.155	0.362	0.155	0.362	
20	0.263	0.441	0.231	0.422	0.223	0.417	0.210	0.407	0.177	0.382	0.178	0.384	0.132	0.340	0.142	0.349	0.202	0.401	0.202	0.401	
21	0.204	0.404	0.240	0.428	0.210	0.408	0.189	0.392	0.213	0.410	0.192	0.395	0.128	0.336	0.160	0.368	0.210	0.407	0.210	0.407	
22	0.245	0.431	0.297	0.457	0.236	0.425	0.214	0.410	0.223	0.417	0.191	0.394	0.114	0.318	0.176	0.381	0.224	0.417	0.224	0.417	
23	0.242	0.429	0.257	0.438	0.265	0.442	0.205	0.404	0.221	0.416	0.169	0.376	0.159	0.367	0.164	0.371	0.235	0.424	0.235	0.424	
24	0.251	0.435	0.279	0.449	0.290	0.454	0.239	0.427	0.209	0.407	0.234	0.424	0.174	0.380	0.295	0.458	0.247	0.431	0.247	0.431	
25	0.305	0.461	0.292	0.455	0.274	0.447	0.242	0.429	0.209	0.407	0.246	0.432	0.195	0.398	0.291	0.455	0.245	0.430	0.245	0.430	
26	0.315	0.466	0.286	0.453	0.264	0.442	0.266	0.443	0.158	0.366	0.234	0.425	0.165	0.373	0.205	0.405	0.253	0.434	0.253	0.434	
27	0.326	0.470	0.307	0.462	0.304	0.460	0.262	0.440	0.255	0.436	0.242	0.432	0.176	0.381	0.217	0.414	0.245	0.430	0.245	0.430	
28	0.266	0.444	0.305	0.462	0.253	0.435	0.288	0.454	0.236	0.425	0.193	0.396	0.222	0.418	0.247	0.433	0.245	0.430	0.245	0.430	
29	0.244	0.431	0.279	0.450	0.269	0.444	0.251	0.434	0.221	0.415	0.261	0.441	0.168	0.375	0.289	0.455	0.240	0.427	0.240	0.427	
30	0.268	0.445	0.313	0.464	0.268	0.444	0.222	0.416	0.139	0.347	0.199	0.400	0.118	0.324	0.229	0.421	0.246	0.430	0.246	0.430	
31	0.295	0.459	0.250	0.434	0.195	0.397	0.239	0.427	0.234	0.425	0.239	0.429	0.210	0.409	0.244	0.432	0.227	0.419	0.227	0.419	
32	0.288	0.455	0.258	0.438	0.248	0.433	0.218	0.413	0.247	0.432	0.235	0.425	0.196	0.398	0.159	0.367	0.221	0.415	0.221	0.415	
33	0.237	0.429	0.275	0.449	0.243	0.430	0.204	0.404	0.173	0.379	0.161	0.370	0.159	0.367	0.164	0.372	0.219	0.414	0.219	0.414	
34	0.176	0.385	0.244	0.431	0.220	0.415	0.215	0.412	0.213	0.411	0.240	0.429	0.192	0.396	0.226	0.421	0.209	0.407	0.209	0.407	
35	0.295	0.459	0.277	0.449	0.243	0.429	0.192	0.395	0.157	0.364	0.107	0.311	0.130	0.337	0.190	0.394	0.205	0.403	0.205	0.403	
<b>In School (t-1)</b>																					
No	0.206	0.405	0.224	0.417	0.216	0.411	0.206	0.404	0.193	0.394	0.197	0.398	0.159	0.366	0.202	0.401	0.202	0.402	0.202	0.402	
Yes	0.069	0.254	0.090	0.286	0.075	0.264	0.059	0.236	0.053	0.224	0.038	0.190	0.040	0.196	0.024	0.152	0.055	0.227	0.055	0.227	
<b>Number of Siblings</b>																					
0	0.083	0.277	0.105	0.307	0.095	0.294	0.091	0.287	0.083	0.275	0.080	0.271	0.065	0.246	0.065	0.247	0.088	0.283	0.088	0.283	
1	0.378	0.485	0.345	0.476	0.323	0.468	0.285	0.452	0.268	0.443	0.316	0.466	0.200	0.401	0.289	0.454	0.296	0.456	0.296	0.456	
2	0.375	0.485	0.384	0.487	0.323	0.468	0.299	0.458	0.269	0.444	0.279	0.449	0.233	0.423	0.321	0.467	0.303	0.460	0.303	0.460	
3	0.358	0.480	0.367	0.482	0.333	0.472	0.323	0.468	0.304	0.460	0.252	0.435	0.274	0.447	0.354	0.479	0.319	0.466	0.319	0.466	
4	0.435	0.496	0.406	0.491	0.406	0.491	0.364	0.481	0.331	0.471	0.353	0.479	0.291	0.455	0.364	0.482	0.371	0.483	0.371	0.483	
<b>Married (t-1)</b>																					
No	0.030	0.169	0.037	0.190	0.035	0.183	0.038	0.191	0.030	0.171	0.031	0.172	0.022	0.147	0.029	0.169	0.032	0.177	0.032	0.177	
Yes	0.303	0.460	0.307	0.461	0.284	0.451	0.262	0.440	0.246	0.430	0.253	0.435	0.210	0.408	0.272	0.445	0.266	0.442	0.266	0.442	
<b>Highest Education Level Achieved by Partner</b>																					
Completed Secondary or Higher	0.155	0.362	0.164	0.370	0.153	0.360	0.075	0.263	0.086	0.281	0.071	0.257	0.060	0.238	0.089	0.285	0.122	0.328	0.122	0.328	
Completed Primary	0.269	0.444	0.279	0.449	0.269	0.444	0.245	0.430	0.208	0.406	0.236	0.425	0.212	0.409	0.252	0.434	0.243	0.429	0.243	0.429	
No Education or Incomplete Primary	0.284	0.451	0.300	0.459	0.289	0.453	0.300	0.458	0.286	0.452	0.295	0.456	0.232	0.422	0.308	0.462	0.277	0.447	0.277	0.447	
<b>Husband in Agriculture</b>																					
No	0.135	0.342	0.153	0.360	0.150	0.357	0.132	0.339	0.116	0.321	0.113	0.317	0.097	0.296	0.122	0.328	0.131	0.338	0.131	0.338	
Yes	0.293	0.455	0.309	0.462	0.295	0.456	0.285	0.451	0.271	0.444	0.274	0.446	0.227	0.419	0.297	0.457	0.280	0.449	0.280	0.449	
<b>Place of Residence</b>																					
City	0.158	0.365	0.178	0.382	0.158	0.365	0.131	0.338	0.111	0.315	0.111	0.314	0.099	0.298	0.114	0.318	0.133	0.339	0.133	0.339	
Town	0.180	0.384	0.176	0.381	0.188	0.390	0.155	0.362	0.146	0.354	0.158	0.365	0.125	0.330	0.175	0.380	0.164	0.370	0.164	0.370	
Countryside	0.209	0.407	0.240	0.427	0.228	0.419	0.230	0.421	0.210	0.407	0.216	0.411	0.172	0.378	0.207	0.405	0.216	0.412	0.216	0.412	
<b>Total</b>	0.192	0.394	0.210	0.407	0.204	0.403	0.189	0.391	0.170	0.376	0.166	0.372	0.135	0.341	0.165	0.371	0.184	0.387	0.184	0.387	



**Table 4: Cross Tabulation of Age Groups by Explanatory Variables**

	Child Born to 15-19 year olds		Child Born to 20-24 year olds		Child Born to 25-29 year olds		Child Born to 30-34 year olds		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<b>Abortion Law Index</b>										
Low (0)	0.104	0.305	0.247	0.431	0.268	0.443	0.260	0.439	0.198	0.399
High (5)	0.080	0.272	0.203	0.402	0.231	0.421	0.208	0.406	0.172	0.377
<b>Pill Law Index</b>										
Low (7)	0.098	0.297	0.234	0.423	0.256	0.436	0.239	0.427	0.192	0.394
High (8)	0.067	0.249	0.180	0.384	0.212	0.409	0.190	0.392	0.154	0.361
<b>In School (t-1)</b>										
No	0.112	0.316	0.226	0.418	0.246	0.431	0.226	0.418	0.202	0.402
Yes	0.055	0.228	0.048	0.213					0.055	0.227
<b>Number of Siblings</b>										
0	0.073	0.260	0.119	0.324	0.087	0.281	0.056	0.229	0.088	0.283
1	0.599	0.490	0.373	0.484	0.217	0.412	0.132	0.338	0.299	0.458
2	0.712	0.454	0.473	0.499	0.293	0.455	0.169	0.375	0.309	0.462
3	0.744	0.442	0.537	0.499	0.366	0.482	0.233	0.423	0.328	0.469
4	0.750	0.463	0.636	0.482	0.463	0.499	0.344	0.475	0.385	0.487
<b>Married (t-1)</b>										
No	0.025	0.155	0.051	0.219	0.058	0.233	0.049	0.215	0.032	0.177
Yes	0.295	0.456	0.291	0.454	0.263	0.441	0.231	0.421	0.269	0.443
<b>Highest Education Level Achieved by Partner</b>										
Completed Secondary or Higher	0.048	0.214	0.163	0.369	0.216	0.411	0.209	0.407	0.121	0.326
Completed Primary	0.234	0.424	0.272	0.445	0.247	0.431	0.210	0.407	0.245	0.430
No Education or Incomplete Primary	0.244	0.429	0.294	0.456	0.289	0.453	0.266	0.442	0.278	0.448
<b>Husband in Agriculture</b>										
No	0.057	0.232	0.174	0.379	0.207	0.405	0.185	0.388	0.131	0.337
Yes	0.250	0.433	0.300	0.458	0.291	0.454	0.266	0.442	0.281	0.450
<b>Place of Residence</b>										
City	0.062	0.242	0.154	0.361	0.193	0.395	0.171	0.377	0.133	0.339
Town	0.084	0.277	0.207	0.405	0.226	0.418	0.203	0.402	0.164	0.370
Countryside	0.111	0.314	0.261	0.439	0.276	0.447	0.256	0.436	0.216	0.411
<b>Total</b>	<b>0.092</b>	<b>0.289</b>	<b>0.223</b>	<b>0.416</b>	<b>0.246</b>	<b>0.431</b>	<b>0.226</b>	<b>0.418</b>	<b>0.183</b>	<b>0.387</b>

**Table 5: Regression Results Pooled and Stratified by Age of Mother**

	(1) Pooled	(2) 15-19 year olds	(3) 20-24 year olds	(4) 25-29 year olds	(5) 30-34 year olds
<b>Dependent Variable Variable: Birth of a child (1=yes, 0=no)</b>					
<b>Odds Ratios Reported</b>					
<b>Abortion Law Index</b>	-0.00259*** (-0.00356 - -0.00163)	-0.000128 (-0.00132 - 0.00106)	-0.00158 (-0.00353 - 0.000367)	-0.00379*** (-0.00610 - -0.00147)	-0.00458*** (-0.00744 - -0.00172)
<b>Pill Law Index</b>	-0.00340 (-0.00850 - 0.00171)	-0.00277 (-0.00893 - 0.00339)	-0.000904 (-0.0114 - 0.00956)	-0.00768 (-0.0204 - 0.00506)	-0.00970 (-0.0244 - 0.00499)
<b>Mother's Age</b>	0.0298*** (0.0278 - 0.0318)	0.171*** (0.135 - 0.206)	-0.0236 (-0.0988 - 0.0515)	0.0191 (-0.0936 - 0.132)	-0.166** (-0.321 - -0.0106)
<b>Mother's Age Squared</b>	-0.000947*** (-0.000990 - -0.000904)	-0.00497*** (-0.00605 - -0.00390)	-2.92e-05 (-0.00174 - 0.00168)	-0.000806 (-0.00289 - 0.00128)	0.00229* (-0.000137 - 0.00472)
<b>In School (t-1)</b>	-0.0211*** (-0.0242 - -0.0179)	-0.00705*** (-0.0102 - -0.00391)	-0.0383*** (-0.0499 - -0.0268)		
<b>Number of Siblings</b>					
<b>Omitted Category: Zero Children</b>					
One Child	0.170*** (0.166 - 0.174)	0.374*** (0.358 - 0.389)	0.214*** (0.206 - 0.221)	0.116*** (0.107 - 0.124)	0.0690*** (0.0577 - 0.0804)
Two Children	0.216*** (0.211 - 0.221)	0.478*** (0.438 - 0.519)	0.321*** (0.310 - 0.332)	0.195*** (0.186 - 0.204)	0.104*** (0.0930 - 0.115)
Three Children	0.269*** (0.262 - 0.275)	0.500*** (0.399 - 0.600)	0.392*** (0.372 - 0.412)	0.274*** (0.263 - 0.285)	0.166*** (0.154 - 0.177)
Four Children	0.375*** (0.367 - 0.382)	0.504*** (0.283 - 0.726)	0.497*** (0.458 - 0.536)	0.380*** (0.368 - 0.393)	0.279*** (0.268 - 0.290)
<b>Married (t-1)</b>	0.164*** (0.160 - 0.168)	0.194*** (0.187 - 0.200)	0.129*** (0.123 - 0.136)	0.0704*** (0.0603 - 0.0805)	0.0418*** (0.0256 - 0.0579)
<b>Highest Education Level Achieved by Partner</b>					
<b>Omitted Category: '</b>					
Completed Primary	0.00788*** (0.00408 - 0.0117)	0.0329*** (0.0259 - 0.0399)	0.0119*** (0.00444 - 0.0194)	-0.00422 (-0.0136 - 0.00516)	-0.00983* (-0.0208 - 0.00112)
No Education or Incomplete Primary	0.0153*** (0.0106 - 0.0199)	0.0180*** (0.00904 - 0.0270)	0.0121*** (0.00304 - 0.0211)	0.0132** (0.00244 - 0.0240)	0.0111* (-0.00160 - 0.0238)
<b>Husband in Agriculture</b>	0.0183*** (0.0147 - 0.0218)	0.0185*** (0.0114 - 0.0256)	0.000607 (-0.00636 - 0.00757)	0.0102** (0.00239 - 0.0181)	0.0234*** (0.0141 - 0.0326)
<b>Place of Residence</b>					
<b>Omitted Category: City</b>					
Town	-0.00214 (-0.00526 - 0.000975)	0.00114 (-0.00239 - 0.00467)	0.0107*** (0.00426 - 0.0172)	-0.00764* (-0.0164 - 0.00111)	-0.00898 (-0.0198 - 0.00179)
Countryside	0.00262 (-0.000535 - 0.00577)	0.00227 (-0.00130 - 0.00583)	0.0160*** (0.00945 - 0.0226)	-0.00251 (-0.0112 - 0.00622)	0.00479 (-0.00609 - 0.0157)
<b>Cluster Average</b>					
<b>Proportion of Children Died (t-1)</b>	-0.0113* (-0.0241 - 0.00155)	-0.00837 (-0.0239 - 0.00714)	-0.0138 (-0.0414 - 0.0137)	-0.0130 (-0.0498 - 0.0238)	-0.0207 (-0.0660 - 0.0246)
<b>Year Trend</b>	0.000134 (-0.000247 - 0.000515)	-0.000115 (-0.000577 - 0.000346)	0.000253 (-0.000553 - 0.00106)	0.000950* (-3.77e-05 - 0.00194)	-0.000359 (-0.00162 - 0.000906)
<b>Constant</b>	-0.416 (-1.148 - 0.316)	-1.174** (-2.106 - -0.242)	0.0719 (-1.672 - 1.816)	-1.726 (-4.147 - 0.695)	3.755** (0.347 - 7.163)
Observations	238,467	79,691	65,646	50,894	36,340
Number of survey_mother_id	21,238	18,525	15,422	12,122	8,785
Survey Year FE	Yes	Yes	Yes	Yes	Yes

Robust ci in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Notes: Outcome Variable: Had a Child or not (1/0)

Ghana 1974-2008, panel of women aged 15-35 by year (from year of interview back to the year the woman was 15).

Pooled results, and results for stratified sample, where stratification is by the age of the mother

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Appendix 1  
DHS countries in regional groupings

Americas	Asia	Europe	Northern Africa	Sub Saharan Africa
Bolivia	Armenia	Albania	Egypt, Arab Rep.	Angola
Brazil	Azerbaijan	Moldova	Morocco	Benin
Colombia	Bangladesh	Romania	Sudan	Botswana
Dominican Republic	Cambodia	Ukraine	Tunisia	Burkina Faso
Ecuador	Georgia			Burundi
El Salvador	India			Cameroon
Guatemala	Indonesia			Cape Verde
Haiti	Jordan			Central African Republic
Honduras	Kazakhstan			Chad
Jamaica	Kyrgyz Republic			Comoros
Mexico	Maldives			Congo, Dem. Rep.
Nicaragua	Nepal			Congo, Rep.
Paraguay	Pakistan			Cote d'Ivoire
Peru	Philippines			Eritrea
Trinidad and Tobago	Sri Lanka			Ethiopia
	Thailand			Gabon
	Turkey			Ghana
	Turkmenistan			Guinea
	Uzbekistan			Kenya
	Vietnam			Lesotho
	Yemen			Liberia
				Madagascar
				Malawi
				Mali
				Mauritania
				Mozambique
				Namibia
				Niger
				Nigeria
				Rwanda
				Senegal
				Sierra Leone
				South Africa
				Swaziland
				Tanzania
				Togo
				Uganda
				Zambia
				Zimbabwe