

THE ECONOMICS OF ABORTION: A COMPARATIVE
ANALYSIS OF MEXICO AND THE UNITED STATES

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Abstract: An extensive body of literature suggests that abortion is a normal economic good and that legal restrictions may reduce the rate at which it occurs by increasing its cost relative to alternative forms of family planning or to unwanted childbirth. However, this expectation is challenged by supranational data showing that developing regions tend to exhibit rates of abortion similar to those observed in more developed parts of the world despite having generally more restrictive laws. This article seeks to explain these seemingly contrary observations by arguing that the ability of legal restrictions to reduce the rate at which abortions occur depends in part on the national and economic contexts within which they operate. Legal restrictions tend to be less effective in countries where economic circumstances reduce the affordability of abortion alternatives such as family planning prior to an unplanned pregnancy or to unwanted childbirth because it becomes harder to adequately incentivize women to incur the costs entailed by choosing these options. This theory is ultimately tested and largely substantiated by a comparative analysis of the United States and Mexico. Results indicate that legal restrictions are an effective way to reduce abortion in the developed world but that they may not be in middle or lower income countries. Secondary analyses indicate that more restrictive abortion policies do not increase maternal mortality, but that they do reduce overall levels of sexual activity in developed countries. Taken together these findings suggest that while economic models of fertility control are largely applicable to countries like the United States, new theories are necessary in order to explain abortion in the developing world.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION.....	1
II. REVIEW OF LITERATURE, HYPOTHESIS AND THEORY	6
Abortion in America	7
International Analyses	11
Overview, Theory and Hypothesis	16
III. DATA AND METHODS	20
Measuring Induced Abortion in Mexico.....	23
Measuring Abortion Policy in Mexico	25
Abortion Rates and Policies in the United States	27
Contraception and Family Planning.....	29
Economic Control Variables.....	31
Education, Fertility and Demographics	33
Access to Services.....	36
Methodology.....	38
Limitations	41

Chapter	Page
IV. FINDINGS.....	44
The Law, Abortion and the United States.....	44
The Law, Abortion and Mexico.....	48
Piecing Together the Puzzle.....	55
Ancillary Analyses.....	57
Conclusion	69
V. CONCLUSION	72
REFERENCES	79
APPENDICES	103

LIST OF TABLES

Table	Page
1 Results from Selected Models by Measure of Contraception, U.S.....	46
2 Results from Selected Models by Measure of Contraception, Mexico	50
3 Results Showing UNFP Significance in Time Delayed Model	51
4 State Policies and Maternal Mortality, Mexico	61
5 State Policies and Forward Lagged Maternal Mortality, Mexico.....	62
6 NARAL Index and Birth Rates, United States	64
7 Medicaid and Birth Rates, United States	64
8 NARAL Index and Women in Need of Contraception, United States	65
9 Medicaid and Women in Need of Contraception, United States	66
10 State Policies and the Unmet Need for Family Planning, Mexico	67
11 State Policies and Forward Lagged Contraceptive Prevalence, Mexico	68
12 Independent Variables and Expectations for Primary Analyses, Mexico.....	103
13 Independent Variables and Expectations for Primary Analyses, U.S.....	104

CHAPTER I

INTRODUCTION

Over the past several decades activists and political leaders have engaged in a prolonged debate over the implications of abortion restrictions for women, society and the global community. Although proponents of such policies argue that they play an important role in protecting women and their ‘unborn children,’ opponents posit a different narrative. Basing their argument in large part upon a pair of nonacademic but nevertheless influential reports published by the Alan Guttmacher Institute (AGI)¹, they maintain that restrictive policies make abortion more dangerous but not any less common (Rosenthal 2007). Within the public domain, then, there are at least two competing viewpoints about the effectiveness of abortion restrictions: one perspective suggesting that they work and a second indicating that they do not. Among Americanist scholars attempting to explain geographical variations in the abortion rate across the United States, however, a very different discussion has begun to take place. Within this literature the dialogue has shifted away from *whether* legal restrictions reduce the abortion rate to *how* they manage to do so. Some scholars postulate that they act on the probability that

¹ The AGI is a pro-choice lobbying organization and the semi-official research division of Planned Parenthood. The research behind these reports was conducted in conjunction with the World Health Organization (WHO).

existing pregnancies will end in birth by affecting the demand for or the availability of abortion services (Hansen 1980; Medoff 1988). More recently, however, literature has begun to suggest that they reduce the affordability of abortion as an ‘insurance policy’ and thereby incentivize women and their partners to take extra precautions in order to avoid an unplanned pregnancy in the first place (Levine 2004b). Modeling abortion and other fertility decisions as normal economic choices (Michael 1973; Kane and Staiger 1996), all of these studies suggest that legal restrictions mitigate incidences of abortion by increasing the cost of termination relative to other forms of family planning or to unwanted childbearing (Levine et al. 1996; Haas-Wilson 1996; Medoff 1998, 2008a, 2008b). Yet, as abortion proponents correctly observe, the expectations of this economic model of fertility control are not substantiated by data collected at the international level (AGI 1999, 2009).

One possible explanation for this puzzle is that the relationship between the laws governing abortion and the rate at which it occurs is mediated by the context within which the law has to operate. According to the economic model, legal restrictions may alter a woman’s fertility behavior by acting on the cost of abortion relative to the alternatives of family planning prior to an unplanned pregnancy or unwanted childbirth. If this is the case we should expect that the law is a more effective way to limit the termination of pregnancies in settings where the costs of these other options are lower. Conversely, it is also reasonable to presume that the law becomes a less effective way to reduce abortion in contexts where the costs of alternative options are higher because it becomes more difficult to adequately incentivize women to pay the price for those alternatives or because women are less able to adjust their behavior in response to public

policy so as to reduce the risk of unplanned pregnancy. For example, if policies connect to the abortion rate by encouraging women to be more careful in their use of contraception (Felkey and Lybecker 2011) then this relationship will become less significant where women are less able to afford such methods of family planning or are less willing to do so. Only where women can access and afford to use contraception may they begin to employ such methods of fertility control as an alternative to abortion. When they cannot do so the only reliable method of family planning left to them is a reduction in sexual activity or outright abstinence.

However, the aggregate costs of abstinence can reasonably be assumed to supersede the cost of birth control because it necessitates a more fundamental and invasive change to the individual's lifestyle. A married woman wishing to avoid an unwanted birth and who might be willing to exercise safe sex in light of policy induced increases in the cost of abortion may not be willing to avoid intercourse with her husband altogether. Furthermore, if that woman becomes pregnant while living in a setting where the consequences of unwanted child bearing are especially severe the law may not be enough to raise the aggregate cost of abortion above that of giving birth.² In such a scenario, a forward thinking, rational individual would choose to obtain an abortion even if doing so is illegal. Where economic circumstances or limited accessibility make abortion alternatives more costly, the law may not help to mitigate the number of

² Here it is worth pausing to note that the term 'cost,' is not conventionally understood by the academic literature as being limited to monetary expenses. Consistent with prior works it is here used in a more comprehensive manner and taken to include not only financial burdens but any moral, social, psychological or opportunity costs that a woman might expect to incur in making a fertility decision. For example, a woman might entail nonmonetary costs in delivering an unwanted child if she is forced to take time off work, if a baby will interfere with her education or limit her ability to provide for other dependents.

pregnancies ending in induced termination because women may be less willing or able to pay the prices associated with other options.

This line of theoretical argumentation helps to explain why the expectations of the economic model of fertility control are not substantiated by international data. After all, the regions of the world with the most restrictive abortion policies tend to be those comprised of lower and middle income countries where a greater proportion of women will experience more significant costs in accessing family planning or delivering an unwanted child (AGI 1999, 2009). Despite this, no study to date has attempted to integrate economic context into a comparative analysis of the relationship between the legality and frequency of abortion. The primary purpose of this thesis is therefore to advance the existing literature by providing one such study. Thus the central concern of my research is *whether legal restrictions of abortion reduce the rate at which it occurs in different economic and national settings*. I seek to make this determination through a comparative analysis of two countries with distinctive economic settings: the United States and Mexico. While my analysis is not without its own limitations, it may nevertheless help to advance our understanding of abortion by weighing in on an existing debate and testing the broader applicability of the economic model of fertility control. At the same time, my thesis posits a novel theoretical explanation for why Americanists have tended to find that the law is an important factor in shaping overall abortion rates whereas researchers focusing on international data have not.

The remainder of this thesis thus progresses as follows. First, in the second chapter I provide a comprehensive survey of the existing literature and utilize its insights in order to identify the empirical puzzle that serves as the basis for my research. At the

same time I also utilize this existing literature in order to generate a theoretical explanation for this puzzle and, in turn, to generate a testable hypothesis. In the third chapter I provide a detailed methodology describing the design and data sources utilized in my empirical analyses. Significant time and attention is dedicated to describing the methods utilized in generating my estimates of induced abortion in Mexico as well as to delineating the exact nature of my variables. Finally, Chapter IV details the results of my analyses and Chapter V wraps up with a discussion of my central conclusions, their implications for policy and what they mean for future research. Ultimately it is argued that greater caution should be exercised in future analysis. Recognizing limitations with existing methods of estimating induced abortion in countries with restrictive policies, the academic community should seek to generate superior techniques. It must also be mindful of the possibility that there is no universal relationship between abortion laws and abortion rates but that the interactions of these variables are mediated by intervening factors such as economic and national context.

CHAPTER II

REVIEW OF THE LITERATURE, HYPOTHESIS AND THEORY

While scholars have dedicated a great deal of time and attention to the relationship between the legal status of abortion and the rate at which it occurs, very little by way of consensus has been reached. Instead, distinctive communities of academics and researchers have produced at least two broad categories of literature, each with its own scope, focus, and theoretical narrative. The first of these consists of a substantial body of research produced primarily by Americanist scholars³ focusing on mostly subnational policies in the United States. These studies have produced substantial evidence for the proposition that abortion is a normal economic good and that it can be made less common by legal restrictions because these policies may increase its cost or reduce its availability (Hansen 1980; Medoff 1988; Levine 2004a). The latter literature has a more global scope and is partly comprised of nonacademic but nevertheless influential reports produced by a nonprofit organization known as the Alan Guttmacher Institute (AGI). Unlike the academic studies discussed above, the works here argue that legal restrictions on abortion do not reduce the rate at which it occurs but rather lead

³ While scholars in the Americanist subfield are responsible for the bulk of the research in this area, it should be noted that some of the most influential contributions have been made by economists. See for example Medoff (1988) or Levine (2004b).

to an increase in maternal mortality and morbidity by driving women to dangerous, self-induced and “back-alley” terminations (AGI 1999, 2009; Sedgh et al 2012).

The existing literature thus presents something of an empirical puzzle. Studies conducted on data from the United States suggest that the abortion rate is at least somewhat responsive to legal restrictions, whereas data collected at the international level fails to illustrate any such association. It also presents a pair of competing narratives with primarily Americanist scholars and economists theorizing that legal restrictions may mitigate abortion and the AGI arguing that while such policies influence the safety of abortion they are not relevant to its overall prevalence.

Abortion in America

Given the keen interest with which the academic community has engaged in the abortion debate, it is no surprise that Americanists have produced a sizeable body of studies addressing virtually every aspect of the issue. Abortion policies have been examined as both dependent variables (Meier and McFarlane 1992; Wetstein and Albritton 1995; Norrander and Wilcox 1999) and independent variables (Levine et al. 1996; Medoff 2002; New 2007). Scholars have examined their impact on everything from the use of contraception (Kane and Staiger 1996; Felkey and Lybecker 2011) and the spread of sexually transmitted diseases (Klick and Stratmann 2003, 2008; Klick and Neelsen 2012) to the availability of infants for adoption (Gennetian-1999; Bitler and Zavodny 2002; Medoff 2008b) and, notoriously, rates of crime (Levitt and Donahue 2001).

Through this analysis, Americanists have produced a number of valuable insights. One such insight has to do with the inadequacy of national policy as an explanation for the abortion rate within a country. Not only is national policy dependent on state and local populations and policy makers for implementation (Rosenberg 1991; Craig and O'Brien 1993; Cannon and Johnson 1999), but variations in key variables may occur at a subnational level. The uneven distribution of abortion service providers, for example, helps to account for divergent rates of abortion utilization across different states (Brown and Jewell 1996; Brown et al. 2001). Similarly, in federal countries abortion policy is not likely to be uniform. Consequently, most Americanists have focused on subnational analysis to account for geographical variations in the rate of abortions within and across the United States. At times this has involved aggregate measures of overall restrictiveness (Gober 1994; Medoff 2002) while in other instances scholars have been more discerning (Haas-Wilson 1993; Matthews et al. 1997; Guldi 2008). For example, a great deal of attention has been paid to parental involvement policies (New 2004, 2007, Guldi 2008), mandatory counseling laws (New 2011a, b) and limitations on public funding for abortion services (Trussell et al. 1980; Haas-Wilson 1996, 1997; Matthew et al. 1997).⁴

Americanist have also generated a general theoretical framework for studying the relationship between legal restrictions on abortion and the rate at which it occurs. Adapted from an economic model of fertility control pioneered by Michael (1973), this framework characterizes abortion as a normal economic good and abortion rates as a product of "demand-side variables." These variables include such factors as household

⁴ For a more comprehensive review of the literature on these respective restrictions, readers are referred to Dennis et al. (2009), Joyce et al. (2009) and Henshaw et al. (2009), respectively.

income and, according to the model, affect the posterior "...decision of a woman who is pregnant not to have the child"(Medoff 1988, p. 354) by mediating the cost of abortion.⁵

More recent versions of the model have been adapted in at least two important ways. First, scholars have begun to factor in 'supply-side' variables originally highlighted by Hansen (1980). In her study, Hansen modeled abortion as a product of the forces influencing its accessibility⁶. While the academic community originally treated this framework as an alternative to the demand-side model described in preceding paragraphs, more recent studies employing path modeling have found that "...the debate over the importance of supply versus demand...does not appear to be one of either/or..." (Gober 1994, 247). Rather, supply-side variables help to indirectly explain variations in the abortion rate over time and space by increasing the ancillary costs of abortion (Jones et al. 2008). For example, geographical variations in the abortion rate appear to emanate in part from availability-induced differences in the travel costs associated with terminating an unwanted pregnancy (Brown et al. 2001). In this way, both supply and demand side variables can be adapted into a single theoretical framework for explaining the abortion rate (Gober 1994, 1997).

The second significant modification expands the original model to cover a broader range of reproductive outcomes. While still acknowledging that abortion is a normal economic good subject to the laws of supply and demand, more recent studies do not limit their attention to the decisional calculus of women who are already pregnant and considering termination. In this broadened theoretical framework, the accessibility of

⁵ See also Garbacz 1990; Gohmann and Ohsfeldt 1993; Medoff 2002.

⁶ Among the variables considered by the author are Medicaid funding for family planning services and the number of abortion service providers.

abortion can be seen as a sort of ‘insurance policy’ reducing the potential costs of unprotected sexual conduct and therefore some of the incentive to exercise family planning.⁷ According to this research, then, public policies may reduce the abortion rate in at least two ways.

First, consistent with previous studies, outright bans on abortion may raise its cost so high that it becomes preferable for many women to carry the child through to term (Levine 2004a). Second, by reducing the affordability of the ‘insurance policy,’ both blanket bans and more modest restrictions may encourage sexual partners to exercise additional caution prior to a potential unwanted pregnancy and thereby prevent pregnancies that otherwise would have been aborted (Levine and Staiger 2004). While this reasoning may seem counterintuitive to some readers, it has nevertheless been overwhelmingly supported by the empirical record (Kane and Staiger 1996; Levine et al. 1996; Levine 1999, 2002, 2003, 2004; Levine and Staiger 2004; McNabb 2007; Medoff 2008a, b; Felkey and Lybecker 2011; Jacobs and Stanfors 2015).⁸ Furthermore, it helps to resolve an empirical puzzle whereby past studies have found that, unlike sweeping bans which lead to unwanted births, modest restrictions reduce the abortion rate without increasing the birth rate⁹. It is also consistent with previous findings that the legalization of abortion is associated with an increase in the spread of sexually transmitted diseases

⁷ Whether this involves overall abstinence or the use of contraception is not completely clear. However, most of the evidence seems to suggest that the primary affect is to encourage the use of contraception (Levine 2004b; Medoff 2008a, b; Felkey and Lybecker 2011; Jacobs and Stanfors 2015).

⁸ Although the AGI affiliated authors Jacob and Stanfors do not interpret their findings in this way, the results of their models are largely consistent with hypotheses of these theoretical frameworks. The authors did find that this support dwindles when fixed-state affects are introduced, but this does not address evidence for the model found in cross-country analyses in Levine and Staiger 2004 or Levine 2004b. Similarly, Klick and Neelsen (2012) found evidence that restrictive abortion policies reduce the spread of STDS in an international analysis. This cannot be accredited to fixed state affects.

⁹ See for example Trussel et al. 1980, Matthews et al. 1997.

(Kick and Stratmann 2003) and with studies looking at the impact of abortion policy on the availability of children for adoption (Gennetian 1999; Bitler and Zavodny 2002; Medoff 2008b).

International Analyses:

Another literature of interest in this study investigates the relationship between the legality and frequency of abortion at a more international level. In stark contrast to what we have seen in the preceding section of this review, the AGI and its contributors--who are largely responsible for the literature in this category--reject the notion that legality plays a role in mediating the frequency with which abortion occurs. Rather than incentivizing the use of contraception or affecting the decisional calculus of pregnant mothers considering termination, the AGI argues that legal restrictions on abortion serve only to make it more dangerous. The validity of this narrative, however, relies on an underlying, untested and recently challenged assumption that legal restrictions on abortion simply lead women to switch relatively safe, legal terminations with dangerous and illegal self-induced or 'back-alley' abortions. Furthermore, the often nonacademic publications that populate this category of literature fail to integrate pertinent insights of Americanist scholars into their analyses and are characterized by a number of methodological limitations which suggest the need for less sweeping conclusions.

Take, for example, the series of reports published by the AGI in 1999 and 2009, respectively. As with other contributions in this category of literature, these publications are largely atheoretic and descriptive rather than scientific in the sense of performing a theoretically guided statistical analysis. For example, in order to reinforce the argument

that there is no “...inherent relationship between the prevalence of abortion and its [legality]...” the reports simply point to data purportedly showing that “...the abortion rate in the less developed world, where the procedure is legally restricted in many countries, is quite similar to that in the more developed world, where abortion is largely permitted...” (AGI 2009, p. 18). Without any effort to control for potentially confounding factors such as economic development or access to contraception, the absence of correlation is automatically and uncritically interpreted as conclusive proof that there is no causal relationship between the legality of abortion and the rate at which it occurs (AGI 1999, 2009; Grimes et al. 2006; Sedgh et al. 2007a, 2012; Shah and Åhman 2009).

Similarly, the preponderance of unsafe abortions in the developing world is interpreted as evidence of a causal relationship linking legal restrictions to higher levels of unsafe abortion and, subsequently, an increase in maternal mortality and morbidity (AGI 1999, 2009). It should be noted, however, that this argument is somewhat tautological because the Alan Guttmacher Institute utilized the World Health Organization’s (WHO) definition of the term ‘unsafe abortion.’ Although this definition is not conceptually synonymous with ‘illegal abortion’ (Ganatra et al. 2014)¹⁰ it does operationalize unsafe abortions as those “...done in countries with highly restrictive abortion laws, and those that do not meet legal requirements in countries with less restrictive laws” (Sedgh et al. 2012, p. 626). More importantly, the mere presence or

¹⁰ The overall safety of abortion is not always a product of its legal status (Rossier 2003). For example, a 1955 conference of academics studying the phenomenon of illegal abortion in the United States prior to *Roe v. Wade* found that “90 per cent of all illegal abortions are presently being done by physicians...trained as such; and many of them in good standing in their communities.” (Calderon 1960, p. 949). Similarly, dangerous and clandestine abortions continue to occur in at least some countries with generally liberal laws (Westoff 2008).

absence of correlation is not an adequate basis from which to draw causal conclusions because it does not account for the influence of potentially confounding covariates of abortion policy that play an important role in mediating maternal health as well as overall and unsafe abortion rates. For example, the AGI data shows that restrictive abortion policies are most prevalent in less economically developed countries that have higher levels of poverty and lower levels of contraceptive access despite recognizing that both play a vital role in explaining rates of unplanned pregnancy and abortion (AGI 1999, 2009). Since economic variables and contraceptive access are both understood to shape the overall and unsafe abortion rates as well as maternal mortality (Singh and Sedgh 1997; Marston and Cleland 2003; Westoff 2005, 2008)¹¹ it is possible that systematic variation in these factors are masking causal relationships where they exist or fabricating them where they do not.

For example, it is broadly argued that elevated levels of unplanned pregnancy in developing countries can be accredited to their disproportionately high level of unmet need for family planning and that the best way to resolve this problem is to promote contraception (Juarez et al. 2005; Sedgh et al. 2007b; Singh et al. 2010). This is pertinent because, as the AGI correctly asserts in both of its reports, unplanned and unwanted pregnancies are the cause of abortion in any country. Greater contraceptive use and availability may thus reduce the number of women seeking abortions by mitigating the number of unplanned pregnancies that occur in the first place (Grimes et al. 2006). Hence, the AGI and its affiliated scholars have almost universally argued in all of their articles and publications that the best way to reduce unplanned pregnancy and therefore

¹¹ See also: Jones and Kavanaugh 2011; Hubert 2013; Sonfield et al. 2013; Reeves and Venator 2015.

the number of women at risk of abortion regardless of its legal status (Forrest 1994; AGI 1999, 2009; Juarez et al. 2005; Grimes et al. 2006)¹². We should thus expect higher abortion in countries with greater need for contraception or lower levels of contraceptive prevalence.

Furthermore, the underlying assumption of the AGI narrative is that legal restrictions on abortion simply replace safe, legal terminations with an equal number of dangerous self-induced and back-alley abortions that increase the maternal mortality rate (MMR)¹³. Or, conversely, that "...liberalization of the abortion law...[replaces] dangerous...and costly illegal abortions [with] legal abortions performed under medical auspices" (Tietze 1973, p. 41).As Koch et al. (2012a) observes, however, this assumption has never been directly tested and is not entirely consistent with the empirical record, especially as it pertains to maternal mortality and morbidity. The lowest MMRs in Europe, for example, occur in Poland, Malta and Ireland--countries with severe limitations on abortion in an area where it is otherwise accessible under generally liberal laws (Mundial 2010; Hogan et al. 2010). In Central America, Koch et al (2015) finds no relationship between the restrictiveness of state policies on abortion in Mexico and maternal mortality, while a time series analysis of Chile¹⁴ failed to show any relationship

¹² See also Marston and Cleland 2003; Sedgh et al. 2007a, 2007b, 2012; Shah and Åhman 2009; Kott 2011; Ahmed et al. 2012. Alternatively, it is also possible that contraception may be linked to an increase in sexual activity and subsequent increase in pregnancies as well as abortions (Akerlof, Yellen, and Katz 1996; Khwaja, and Ouyang 2012). Indeed, some surveys have found that as many as 65% of unplanned pregnancies occurred among women using contraception (Bajos et al. 2003).

¹³ An earlier AGI scholar expresses this argument in converse when he writes "significant effect of liberalization of the abortion law has been the replacement of dangerous...and costly illegal abortions by legal abortions performed under medical auspices." (Tietze 1973, p. 41).

¹⁴ As the authors point out, Chile has had some of the most restrictive abortion policies in the world since 1989 but nevertheless boasts the lowest MMR in Latin America and the second lowest MMR on the American continent.

between historical changes in abortion policy and either maternal mortality or abortion related hospitalizations (Koch et al. 2012a).

Systematic analyses of abortion in Eastern Europe challenge the AGI narrative more directly. Consistent with the expectations of the economic model of fertility control, these studies have indicated that legalizing abortion where it was previously restricted leads to a real reduction in the overall birth rate and an increase in the spread of STDs. Conversely, sweeping bans of abortion have the opposite effects (Levine and Staiger 2004; Klick and Neelsen 2012). Similarly, Koch et al. (2012d) found that the legalization of abortion in Mexico's federal district (DF) led to a significant increase in the overall prevalence of abortion. While this is not sufficient grounds to dismiss the AGI literature, it is consistent with the expectations of Americanist scholars in that it indicates a relationship between the legal status of abortion and its overall frequency. The Eastern European analyses are further consistent with the economic model of fertility control and suggest that sweeping bans on abortion reduce its prevalence both by incentivizing the use of contraception and affecting the posterior decision of a pregnant woman on whether to terminate or carry the child to term (Levine and Staiger 2004; Klick and Neelsen 2012). Each of these studies and the MMR data discussed previously challenge the validity of the AGI narrative, indicating that policy changes lead to significant alterations in the overall abortion rate, rather than simply exchanging safe with unsafe abortions as would be expected under the narrative expressed by AGI scholars such as Tietze (1973).

Another limitation with the AGI literature has to do with its unit of analysis. Although its data is drawn from country-specific estimates of abortion generated

primarily by official statistics and descriptive case studies,¹⁵ the AGI aggregates these estimates up to the level of world region for a supranational unit of analysis (AGI 1999, 2009; Grimes et al. 2006; Sedgh et al. 2007a, 2012; Shah and Åhman 2009). In this way it ignores the insights of the Americanist literature, failing to account for important variation that exists between countries within the same region to say nothing of variation within the boundaries of a given nation. At the same time, the high level of granularity reduces the number of observations to an extremely small N unfit for quantitative analysis. One observation for each of the sub-regions identified by the United Nations provides these publications with a total N ranging from 18 (AGI 1999) to 48 (Sedgh et al. 2012)¹⁶. While the more recent sample size is not significantly smaller than that of a single-year cross sectional study of the United States,¹⁷ its limited scope nevertheless biases the analysis towards negative findings and restricts the conclusions that can be drawn from the analysis.

None of this should be taken to mean that the literature in this category is without value, but it suggests the need for further analysis. In short, although this literature is best seen as preliminary it nevertheless raises some interesting questions about the applicability of the Americanist literature in a broader context.

Overview, Theory and Hypothesis

In summation, the research on the relationship between the prevalence and legality of abortion can be divided into two broad categories. On the one hand, the

¹⁵ See, for example, Sign et al. (2006), Juarez et al. (2008) or Bankole et al. (2015).

¹⁶ The increase in observations between AGI (1999) and Sedgh et al (2012) stems from the collection of data for two additional years, effectively tripling the N.

¹⁷ See for example Felkey and Lybecker (2010).

academic literature has yielded substantial evidence that abortion is a normal economic good that can be made less common through more restrictive policies. On the other hand, descriptive case studies and supranational reports published by the Alan Guttmacher Institute have failed to substantiate the expectations of Americanist scholars and have been interpreted to suggest that there is no relationship between the legality of abortion and the frequency with which it occurs. Although methodological and theoretical limitations suggest that this interpretation of the data is too sweeping, the absence of correlation is nevertheless suggestive of a need for further analysis in order to determine whether or not the economic model of fertility control is applicable in a broader context.

Thus, there is room to advance the existing literature through a theoretically guided comparative analysis testing the applicability of Americanist insights in varied contexts. Such a study offers an opportunity not only to weigh in on an academic disagreement and address seemingly conflictual findings, but also to tackle an important question. Why is it that the abortion rate seems responsive to legal policy in one case, the United States, but not when looking at data collected in a broader context? Does the economic model of abortion have the potential for broader application, or is it unique to the United States? This research proposal seeks to advance the existing literature as well as our understanding of abortion and the knowledge of policy makers by testing a possible answer to these questions.

More particularly, it is argued that the economic model of fertility control's expectations about the relationship between legal restrictions and the abortion rate are more likely to be reflected by empirical observations in the developed world than they are in developing or middle income countries. As has already been discussed, Americanist

insights indicate that legal restrictions on induced abortion may effectively reduce the rate at which it occurs when they increase the cost of termination enough to sufficiently incentivize women to either take additional precautions to avoid an unplanned pregnancy or to choose birth in the event that an unplanned pregnancy has already occurred (Levine and Staiger 2004). The ability of the law to do so, however, is dependent not only upon its own restrictiveness but on the costs associated with the available alternatives. Studies have found, for example, that it is easier for restrictions to change the expected utility of abortion enough to incentivize the relatively inexpensive use of contraception (Felkey and Lybecker 2011, 2014, 2015) than it is for those policies to convince pregnant mothers that an unwanted birth is preferable to termination (Levine 2004b).

Implicit in this argument is the notion that when the alternatives to abortion are more costly or difficult to access it is more challenging to reduce the rate at which abortion occurs. Thus we should expect that the law becomes a less impactful mechanism for the reduction of abortion in poorer, more rural or developing regions of the world where it is more costly and difficult for women to access contraceptive services (AGI 1999, 2009; Green 2002). None of this should be taken to mean that women in the developing world are powerless to control their own fertility. As Levine (2004b) points out, birth control is not the only way to prevent an unplanned pregnancy and it is not clear whether legal restrictions are linked to fewer unplanned pregnancies through an increase in contraception or a reduction in overall levels of sexual activity. However, it seems reasonable to assume that the aggregate costs of abstinence supersede the costs of birth control because it necessitates a more fundamental and invasive change to the individual's lifestyle. Hence, levels of unplanned pregnancy tend to be higher in the

developing world and, even in developed countries, poorer women are more likely to be sexually active and unprotected than more well-to-do counterparts (Frost et al. 2007; Sedgh 2007b; Finer and Zolna 2011).

The costliness of an unwanted birth is also likely to be higher for poorer women like those that disproportionately live in developing regions. This is true not only because the economic realities of their countries may exacerbate the negative consequences of unplanned parenthood or mitigate a woman's confidence in her ability to care for a dependent but because women in these areas are less likely to be able to afford or access maternal health services as well as more likely to experience potentially life threatening complications (AGI 1999; 2009; Ahmed et al. 2010). We should thus expect that legal policies in developing countries are less able to impact the expected utility of abortion substantially enough to incentivize either additional caution prior to a potential pregnancy or unwanted birth after the fact because these options are both more expensive in that setting. Conversely, the law should be better able to achieve these goals in developed countries. Based on all of this information, I generate the following hypothesis which will be discussed and tested in subsequent chapters:

Hypothesis: More restrictive abortion policies should display a strong inverse relationship with the abortion rate in developed countries (the United States) but should have either a weak inverse or no relationship with abortion rates in Mexico.

CHAPTER III

DATA AND METHODS

Although the academic community has produced a number of techniques for generating estimates of induced abortion in countries with restrictive policies (Rossier 2003), the reliability of these methods is in part dependent on the level of economic development in the country to which they are being applied. Higher levels of economic development tend to be associated with more accurate estimates due to more complete in-hospital records; furthermore, the most broadly accepted methods of estimation have been found to generate implausibly high numbers of induced abortion when applied to countries that fall into the least developed category where hospital records are less complete and multipliers based on medical judgment might not be as reliable (Westoff 2008).^{18, 19} In order to minimize this biasing effect and to account for variation in key variables at the subnational level I therefore test my hypothesis with a comparative analysis of data from both the United States and Mexico. The United States, for its part,

¹⁸ See also Koch et al. 2012A, C, D.

¹⁹ Westoff's (2008) classifies each country into one of three economic categories based on their per capita income: the most developed countries (such as the United States), less developed countries (such as Mexico) and the least developed countries (such as Bangladesh, Guatemala or Uganda). This classificatory scheme is comparable to that of the United Nations Development Policy and Analysis Division (UNDESA) in its annual World Economic Situation and Prospects (WESP) report, which also classifies Mexico in the middle of three economic categories (UNDESA 2015).

has already been the subject of extensive research and is an obvious choice due to the availability and virtual completeness of its statistics on abortion (Sedgh et al 2011; WHO 2011). While we know a great deal about the interactions between abortion's legal status and its frequency in the United States, however, comparatively little has been done to investigate this relationship in middle and low income countries. By including Mexico in this analysis, my research offers a unique opportunity to fill this gap and to expand our understanding of the factors influencing abortion rates in the developing world. As a middle income country, Mexico's level of economic development is both sufficiently low to distinguish it from the United States and yet sufficiently high to minimize the biasing effects that occur when accepted methods of estimating induced abortion are applied to the least developed countries. This makes it possible to test the impact of abortion policies on the number of pregnancies ending in induced termination in a new economic context that has been hitherto left largely unexplored.

Mexico also presents an ideal candidate for comparison to the United States for the purposes of my research. Not only is it the closest developing country to the U.S. in terms of geographical proximity but the two countries also share important commonalities in terms of government structure. In particular, the nature of federalism in Mexico is similar to that of the United States in that it provides a chance to account for substantial variation in the values of key variables with a subnational level of granularity. Available data also suggest significant similarities in the fertility intentions of women in Mexico and the United States. For example, roughly equivalent proportions of women of reproductive age in each country would like to stop or delay childbearing, 62% in the case of Mexico versus 64% in the United States (Bankole et al. 1998). Some estimates

have also found that the abortion rate in Mexico is more similar to that of the United States than in any other country (Singh and Wulf 1994). Furthermore, Mexico's economic status is once again an important factor. As a middle income country it is not as far removed from the United States as are countries which, like Guatemala, fit into the 'least developed' category (Westoff 2008). If the expectations of the Americanist literature are to be substantiated anywhere in the developing world, then, it is likely going to be in Mexico. Taken together, these factors make Mexico and the United States uniquely well suited for a comparative analysis examining differences in the determinants of abortion at varying levels of development and in divergent economic and national settings.

Having thus delineated the basis of my comparison as well as the rationale of my case selection, the remainder of this methodology proceeds as follows. First, I begin by describing the quantification of my primary dependent and independent variables in Mexico and the United States, respectively. In the case of Mexico, substantial attention is dedicated to describing the methods utilized in generating estimates of induced abortion. Second, I enumerate my control variables and associated data sources. Control variables are grouped based on general theme and fall into one of four broad categories: contraceptive controls, economic controls, demographic controls and proxy variables designed to capture the general accessibility of abortion services. Since a simple count of abortion providers is not attainable in the case of Mexico and may create issues of endogeneity (Medoff and Dennis 2011), some consideration is given to the selection of an appropriate proxy for the accessibility of abortion services. Finally, I provide a comprehensive overview of my broader comparative analysis and its limitations before

concluding with a brief synopsis. It should be noted, however, that in addition to this chapter readers may refer to Appendix Tables One and Two for an overview of the primary explanatory variables used in this analysis to capture the restrictiveness of state policies as well as contraception and family planning.

Measuring Induced Abortion in Mexico

Consistent with the existing literature (Singh and Wulf 1994; Juarez et al 2008, 2012), I generate my estimates of induced abortion in Mexico by utilizing the hospitalization complications method (HCM). In this approach, the overall number of induced abortions is calculated by applying a multiplier to official statistics on the number of individuals receiving treatment for abortion related complications. Multipliers range from 2-7 according to the relative safety of abortion in a given area and are designed to compensate for under/misreporting and incidences in which illegal abortions were obtained without subsequent hospitalization.²⁰ The multipliers utilized in this analysis are derived from Juarez et al (2008) and were calculated utilizing a Health Professionals Survey (HPS)²¹ administered, edited, analyzed and coded by the Alan Guttmacher Institute (AGI). The base data to which these multipliers are applied is comprised of official statistics on inpatient and outpatient discharges. This data was derived from the General Directorate of Health Information (Dirección General de Información en Salud or DGIS) and accessed through the National Health Information System (Sistema Nacional de Información en Salud or SINAIS) on the website of the

²⁰ For example, in cases where an illegal abortion did not result in complications or in which complications did occur but treatment was not obtained. For more information on the HCM and other techniques for the estimation of induced abortion, readers are referred to Rossier 2003, Westoff 2008, WHO 2011, AGI 2010, Koch et al. 2012d.

²¹ Further information on the survey can be found in Singh and Wulf 1994 and, Juarez et al 2008, 2012.

Ministry of Health (Secretaría de Salud). To identify the number of patients treated for abortion related complications, I utilize the appropriate diagnostic codes from the WHO's International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10).

Here it should be noted that while ICD-10 is the standard diagnostic tool for epidemiological, health management and clinical purposes, there has been some disagreement about which codes should be utilized as indicators of post-abortion complications. Schiavon, Troncoso and Polo (2012), for example, employ all ICD-10 codes associated with abortive outcomes (O00-O08). However, this range of diagnostic codes encompasses a diverse etiology of conditions unrelated to *induced* abortion.²² A more reliable indicator is proposed by Koch et al. (2012d) and includes only those diagnostic codes "...associated with medical abortion (O04), other abortion (O05), unspecified abortion (O06), and failed attempted abortion (O07)" (p. 619). The inclusion of ICD-10 codes O05 and O06 help to account for cases of misreporting in which doctors may try to protect the privacy of their patients by categorizing treatment under an ICD-10 code that does not incriminate them in an illegal abortion. At the same time, excluding codes O00-O03 limits the upward biasing effect created by including spontaneous miscarriages and other conditions unrelated to induced abortion²³.

²² For example: ectopic pregnancies and other abnormal products of conception (O00, O02), hydatidiform moles (O01) and miscarriages (O03).

²³ Note that any naturally occurring loss of a fetus within a certain gestational timeframe be classified as a 'spontaneous abortion,' and that this would include miscarriages. However, the research conducted here as well as that conducted by Schiavon, Troncoso and Polo and by Koch et al. is interested specifically in induced abortion, i.e., the deliberate termination of a pregnancy after, accompanied by, resulting in, or closely followed by the death of the embryo or fetus. For the purpose of this project, the term abortion is used as a synonym for induced abortion unless otherwise specified.

For these reasons, I utilize the indicator of abortion-related complications proposed by Koch et al. (2012d) and apply the multipliers of Juarez et al. (2008)²⁴ to the overall number of patients treated under ICD-10 codes O04-O07 in order to calculate the total incidence of abortion by year and the mother's state of residence.²⁵ This number is then divided by the total population of women of reproductive age (15-44) for the corresponding state-year in order to calculate the abortion rate. The population data for these calculations was derived from The National Population Council (Consejo Nacional de Población or CONAPO),²⁶ which collects demographic data for Mexico.

Measuring Abortion Policy in Mexico

My indicator of abortion policy in the states of Mexico is a simple binary variable measuring the presence (1) or absence (0) of a constitutional provisions recognizing the right to life from the moment of conception. After the 2007 legalization of abortion on demand in Mexico's Federal District (Mexico DF), several states moved to bar further liberalization of abortion policies by amending their constitutions to contain such provisions (Boland and Katzive 2008; Cuddehe 2012; Olavarrieta, Becker 2013). In addition to protecting the right to life of the unborn, because these amendments have sweeping implications for the accessibility of abortion in cases that might otherwise be

²⁴ Although these multipliers are from a few years prior to the analysis of this paper, more recent research provides literary precedent suggesting that they remain valid (Juarez et al. 2012).

²⁵ It is necessary to measure incidences of abortion by the mother's state of residence rather than by the place of occurrence in order to account for abortions obtained by out-of-state residence. It is possible that some women respond to restrictive abortion laws by traveling to neighboring states with more liberal policies (Medoff and Dennis 2014). Although evidence from the United States indicates that the biasing effect introduced by this problem is not statistically significant (Levine et al. 1995), that the vast majority of abortions are obtained by in state residence (Henshaw and Van Vort 1990) and that women do not generally travel out of state to circumvent abortion policy (Medoff 2002), it is unclear whether this dynamic applies to middle-income countries such as Mexico.

²⁶ data accessible at: http://www.conapo.gob.mx/es/CONAPO/Proyecciones_Datos

permitted under the law (GIRE 2013), they shed light on the general legislative environments in which Mexican abortion policies operate at the state level. While abortion is generally illegal throughout Mexico, for example, Koch et al. (2015) identifies seven exemptions from criminal prosecution in abortion cases that exist at the state level. These exemptions include exceptions allowing for abortion in cases of rape, imprudent conduct, risk to maternal life, risk to maternal health, fetal malformation and artificial insemination without consent as well as for economic or social reasons.²⁷ However, advocates of liberalized abortion laws such as Claudia Díaz Olavarrieta with the Mexican population council, (Becker and Olavarrieta 2013)²⁸ Fatima Juarez with the AGI (Juarez et al. 2013) and the Information Group on Reproductive Choice (Grupo de Información en Reproducción Elegida or GIRE)²⁹ argue from journalistic and anecdotal evidence that constitutionally protecting prenatal life limits the ability of women to obtain abortions even in cases that fall within these categories.

For example, while the state of Yucatán does allow some abortions on social and economic grounds, the legality of these abortions is currently unclear as a result of a constitutional amendment passed in 2009 (Juarez et al. 2013). Furthermore, journalistic evidence suggests that legal protections for the right to life during the prenatal stages of development increase the difficulty of obtaining an abortion in exempted cases by creating confusion among medical practitioners and potential consumers of abortion

²⁷ The overall prevalence of each exception varies tremendously. For example, while every state in Mexico allows for abortions in cases of rape, only Yucatán allows abortions on economic or social grounds.

²⁸ Davida Becker served as the Regional Project Coordinator at the Population Council's Mexico City whereas Claudia Olavarrieta has served as the country director for the Population Council since 2013. The Population Council is a pro-choice interest group dedicated to the expansion of legal abortion in Mexico and abroad.

²⁹ GIRE is an abortion rights organization campaigning for an expansion of legal abortion throughout Mexico and abroad.

services (Cuddehe 2012). This argument has been reiterated by GIRE (2013) and suggests that the presence of constitutional provisions safeguarding the right to life from the moment of conception is an ideal indicator of the overall restrictiveness of state policies in Mexico. As a secondary measure of abortion policy I also utilize data from Koch et al. (2015) which categorizes states as either more (1) or less (0) permissive based on the presence or absence of legal exceptions allowing for terminations in cases of fetal malformation. A negative relationship with this variable would thus indicate that more restrictive, less permissive, policies reduce abortion. A positive relationship would suggest that less restrictive, more permissive policies increase abortion.

Abortion Rates and Policies in the United States

For the purposes of my analysis of the United States, I retain my primary dependent variables. Abortion rates were measured utilizing data from the Alan Guttmacher Institute's State Data center. As is the case with Mexico, the abortion rate provides a measure of the overall number of abortions per woman of reproductive age. The abortion ratio, by contrast, places the number of abortions over the total number of live births registered by the appropriate government agencies in both countries. Furthermore, I continue to control for the possibility that women obtain out-of-state abortions by measuring incidences of abortion by the mother's state of residence rather than by the state of occurrence. In this sense my primary dependent variables are measured in much the same way on either side of the border. Since the United States retains virtually complete statistics on induced abortion, however, it is not necessary to generate estimates based on indirect techniques like those utilized in Mexico. However, the utilization of indirect estimation techniques for countries with restrictive laws for

comparison against direct statistics for countries with more permissive policies is consistent with the existing literature (AGI 1999, 2009; Sedgh et al. 2012).

Similarly, although my primary explanatory variable continues to measure the restrictiveness of subnational abortion policies, the precise nature of this indicator is somewhat distinctive. Again following literary precedent I utilize an aggregate measuring the restrictiveness of state abortion policy as an ordinal variable based on the cumulative burden it places on the ability of its citizens to exercise reproductive healthcare and obtain abortions. The data for this variable is derived from the National Abortion and Reproductive Rights Action League's (NARAL) annual report on state abortion policies. For the purposes of my research numerical values were substituted for the letter grades of NARAL's report card so that the policy of each state is ranked on a scale of 1-5 where 1 is equal to an "A" and 5 is equal to an "F." Higher scores are thus attached to states with more restrictive policies.

I utilize the abortion hostility index of Jacobs and Stanfors (2015) as my primary independent variable. Within the index, states are categorized as less hostile (two or fewer restrictions), moderately hostile (three restrictions) or hostile (four or more restrictions).³⁰ As a supplementary measure of abortion policy a separate, dichotomous variable gauging whether (1) or not (0) a state places legal restrictions on Medicaid funding for elective abortions is also employed. This indicator was selected because a robust literature has found that Medicaid funding restrictions "...are concentrated in states

³⁰ Jacobs and Stanfors (2015) identify eight categories of restrictive abortion policy including: parental involvement laws, mandatory delay periods, Medicaid funding restrictions, laws requiring an extra premium for or prohibiting insurance coverage of abortions, unconstitutional bans on abortions throughout pregnancy, unconstitutional bans on abortions prior to fetal viability, mandated non-medically necessary ultrasounds prior to abortions and requirements that medication abortions be performed by physicians.

that are politically more conservative and more likely to impose other measures to limit access to abortion" (Henshaw et al. 2009 p. 7)³¹ and are therefore a generally reliable indicator of overall policy environment. Furthermore, there is virtually universal agreement that such restrictions have broad implications for the overall accessibility and utilization of abortion services in the states where they are enacted (Haas-Wilson 1993; Levine et al. 1996 Kane and Staiger 1996; Henshaw et al. 2009). Other legal restrictions such as parental notification requirements or mandatory counseling laws were excluded either because there is substantial disagreement over their effect³² or because there was limited theoretical reason to believe that they would serve as an accurate indicator of overall restrictiveness in state abortion policies.

Contraception and Family Planning

Another variable which is broadly theorized to play a role and which is critical to my own narrative has to do with the level of access women have to contraception within a given state-year (AGI 1999, 2009; Marston and Cleland 2003; Westoff 2005, 2008). The two most commonly utilized measures of contraceptive accessibility in the academic community are the contraceptive prevalence rate (CPR) and the unmet need for family planning (UNFP). The former indicator measures the proportion of married women of reproductive age currently utilizing at least one form of contraception and the latter gauges the percentage of women who want to stop or delay childbearing but who are not using any method of contraception (Alkema et al. 2013). These indicators are the

³¹ Although Medoff (2014) correctly notes that a state's population of women eligible for Medicaid are the most directly impacted by such policies, other research has suggested that such restrictions may have more sweeping implications for overall accessibility even to women who are not eligible because abortion providers may rely on Medicaid funding in order to stay open (Korenbrodt et al. 1990).

³² See for example New 2011, 2014; Medoff and Dennis 2011, 2014.

measures of contraceptive accessibility utilized by the United Nations Millennium Development Goal and by U.S. Aid in its Demographic and Health Surveys (Westoff 2009; U.N. 2015). Unfortunately, CPR and UNFP data aggregated at a subnational level of granularity is not always available, especially in the United States where geographic indicators are often excluded from public-access survey data in order to protect the privacy of respondents. Consequently, while there is data on at least some indicators of contraceptive access available on both sides of the national border, there is no consistent way to measure this variable in both the United States and Mexico. It is therefore necessary to run a number of separate models in both the United States and Mexico in order to adequately test my hypothesis.

First, a single pooled-time series analysis is performed for each country including only those variables that have been discussed in preceding sections of this methodology and that may be consistently measured across national boundaries. These models allow us to scrutinize some of my key hypothesis while making certain that the examinations conducted in the United States and Mexico are comparable and that we are measuring the same phenomenon. In order to account for the role of contraception, however, further statistical analyses are required. For the country of Mexico, I perform a pooled time series analysis of the relationship between abortion policies and abortion rates in Mexico while controlling for CPR and UNFP by capitalizing on data made available for a number of years ranging between 1992 and 2014 through the Interior Ministry (Secretaría de Gobernación or SGOB), a subset of CONAPO. Although this data is not available for every year, missing data points can be reasonably filled by interpolating from existing observations.

In the United States I also run separate models measuring contraceptive accessibility in different ways. In both cases I utilize the data made available on a biannual basis by the Alan Guttmacher Institute for a number of years ranging between 2000 and 2013 in order to generate counts of the total number of women needing contraceptive services and supplies.³³ This number is then divided by the total population of women in each state that fits into the AGI's definition of reproductive age (13-44) to generate my first variable and by the total number of women fitting into the traditional definition of reproductive age (15-44). Each of these variables is then added into a series of iterative regression in order to account for the impact of a state's need for contraceptive goods and services.

Economic Control Variables

A sizeable body of literature has documented financial considerations as among the primary motives cited by women in explaining why they decide to abort (Bankole, Singh and Haas 1998; Finer et al 2005; Kirman et al. 2009). Furthermore, evidence indicates that women who are poorer, less well educated or living in poverty are more likely to obtain abortions (Jones, Darroch and Henshaw 2002; Jones and Kavanaugh 2011). The disproportionate share of abortions obtained by indigent women can, in turn,

³³ Women are defined as in need of contraceptive services and supplies if they are between the ages of 13 and 44, are sexually active, are not either contraceptively sterilized/infecund or with a partner who is, and are neither pregnant nor trying to become pregnant (Henshaw et al. 2002). While this data is not ideal because it does not capture some important aspects of a woman's contraceptive status (i.e., the pill or inter uterine devices) it is the best available data for a pooled time series analysis with the state-year level of granularity. Furthermore, as Levine (2004b) points out, a reduction in sexual activity is simply one method of birth control that women can use to avoid an unwanted pregnancy when laws become more restrictive. My analysis therefore adds to the existing literature by account for an aspect of family planning not captured by authors such as Felkey and Lybecker (2011, 2014, 2015). The full reports providing this data are collected in the AGI's State Information Center and are accessible on the AGI website as are detailed methodological documents.

be accredited in part to a heightened chance of experiencing unplanned pregnancy, which itself stems at least in part from lower levels of contraception (Kozinszky, Boda and Bártfai 2001; Reeves and Venator 2015). The economy may thus play a role in shaping the overall abortion rate in at least two ways. First, it might be that women facing economic hardship are less able to access alternative methods of fertility control than their more well-to-do counterparts. This proposition has certainly found support within the international literature (Creanga et al. 2011), and it indicates that financial considerations may indirectly influence abortion by acting on family planning practices prior to a potential pregnancy.³⁴ An AGI analysis of the 2008 economic recession provides further evidence of this proposition, indicating that periods of economic hardship may make it more difficult for women to access contraception (AGI 2009). A second possibility is that the economy influences the posterior decisions of pregnant women whether to abort or carry a child to term. As the AGI (2009) points out, financial realities may lead women to conclude “...that they are in no position to have and raise a child” (p. 37-8). In other words, economic hardship might influence the decisional calculus of pregnant mothers by increasing the perceived costs of an unintended child and thus making it more likely that the mother will choose to terminate. This same sentiment is echoed by Jones and Kavanaugh (2011), who notes that women who might feel

³⁴ Another possibility is that poorer women are more likely to utilize traditional methods when they do employ contraception. Recent evidence, however, has indicated that the opposite might be true (Ram et al. 2014).

confident in their ability to afford a child during times of prosperity might think otherwise during an economic downturn.³⁵

It is therefore necessary to account for the influence of the economy in gauging the relationship between abortion's frequency and its legal status. I achieve this goal by utilizing data from the Organization for Economic Co-Operation and Development (OECD)³⁶ to measure both female and overall labor force participation, gross domestic product (GDP), GINI coefficients and infant mortality as an indicator of development. I also utilize data from the appropriate government agencies to measure each state's median household income as a proportion of the national average. As with all of my variables, I utilize indicators aggregated to the level of state-years and impute any missing data by assuming a fixed rate of change in order to interpolate or extrapolate values from existing observations.

Education, Fertility and Demographics

Other variables commonly understood to play a role in shaping the abortion rate include overall fertility, family-size preferences, racial demographics and education (Bankole et al. 1999; Pazol et al. 2015).³⁷ General fertility trends,³⁸ for example, might influence both the abortion rate by serving to shape both the overall number of women

³⁵ At the same time, it is equally possible that poorer women or those living in a period of economic hardship may place higher priority on maintaining consistent contraceptive use, as recent experiences in the United States would suggest (American College of Obstetricians and Gynecologists 2009).

³⁶ The OECD data is collected every year on a global basis and is aggregated to the level of first-order administrative subdivisions. This makes the OECD indicators especially appropriate for the purposes of this study in that it provides consistent measures of variables across borders while maintaining the appropriate level of granularity.

³⁷ Women's education has also been found to play an important role in reducing maternal mortality (Koch et al. 2012b), Hubert (2013), Koch et al. (2014).

³⁸ For Mexico data derives from the Dirección General de Información en Salud con base en las Proyecciones de Población del CONAPO (2013) and Hubert (2013). For the United States, data derives from U.S. Census natality data.

faced with the decision of whether or not to terminate and the proportion of pregnancies that are planned (New 2011). The fertility rate for each state-year is therefore included in my analysis. Similarly, the AGI (1999, 2009) indicates that local trends in family size may also influence abortion rates by affecting the preferences of pregnant mothers as well as the incentives that they might have to terminate or carry a child to term. I account for this utilizing the OECD's child-to-mother-ratio. Furthermore, I control for the influence of racial demographics by including measures of the proportion of each state's population that belongs to any racial or ethnic group shown by the literature to be at a heightened risk of abortion. In the case of Mexico this means accounting for indigenous populations which have been observed to face heightened risk of abortion and abortion related complications as well as higher fertility and general trends of marginalization (Wurtz 2012). In the case of the United States it means accounting for the proportion of each state's African American and Hispanic populations which are also responsible for a disproportionately large portion of the overall number of induced abortions (New 2011; Pazol et al. 2015).

The proportion of each Mexican state's population belonging to an indigenous group is measured in terms of the overall population over the age of three that speaks an indigenous language. The data for this variable was derived primarily from the 2000 and 2010 Mexican census³⁹ as well as the 2005 intercensal survey and acquired via the replication data for Hubert (2013). Furthermore, since Hubert's (2013) analysis did not go beyond the year 2010, this data was supplemented and updated utilizing the 2015

³⁹ Censo de Población y Vivienda.

intercensal survey.⁴⁰ These measures are largely consistent with those utilized by Hubert (2013) but with one significant modification. Although it does not appear in her manuscript, Dr. Hubert assumed that the proportion of a state's population speaking an indigenous language was constant between census and survey years.⁴¹ I adjust this method by assuming a fixed annual rate of change and interpolating data for non-survey years based on the observed values recorded by the censuses and intercensal surveys.

For the United States, similar measures focusing on African Americans and Hispanics/Latinos are developed using data from the United State Census' WONDER system.

The final demographic controls included in this analysis are all related to state-level trends in education. The relevance of education has been substantially demonstrated by prior analyses (Bankole et al. 1999; Gennetian 1999; Jones and Kavanaugh 2011). In addition to this empirical evidence, there is strong theoretical reason to believe that variation in state education levels may influence the number of pregnancies ending in abortion since concerns about child bearing interrupting education are commonly cited by women as reasons for why they have decided to obtain an abortion (Bankole et al. 1998). Education has, furthermore, been shown to influence women's contraceptive behavior (Nketiah-Amponsah et al. 2012) which provides another avenue through which a state's education trends may influence pregnancy outcomes such as abortion. In order to account for this I employ three variables derived from the OECD database: one measuring the

⁴⁰ Encuesta Intercensal

⁴¹ I.E., Hubert's value for the proportion of indigenous speakers in Aguascalientes does not change after the year 2000 until 2005. After changing to reflect the intercensal count of 2005 it again remains constant for each year until 2010.

percent of the state's population enrolled in elementary schooling, another measuring the percent of the state's population enrolled in secondary education, and a third measuring the percent of the state's population enrolled in tertiary education. Since this data is compiled by the OECD, it applies to both the United States and Mexico.

Access to Services

As has been previously discussed, one factor which may influence abortion is the relative ease with which women can access abortion services. Indeed, some scholars have speculated that a gradual decline in the number of pregnancies being terminated throughout the United States can be partially explained by a concomitant reduction in the number of abortion providers available to women seeking their services (Jones et al. 2008). One way to control for accessibility is to measure the number of abortion providers operating within a given state during the appropriate year (New 2011). Even where such data is available, however, it may create issues of causality due to a high degree of endogeneity between abortion rates and the availability of abortion services (Medoff and Dennis 2011). Since abortionists may tend to locate themselves in states where there is a greater demand for their services, it is necessary to find a proxy that correlates with the number of abortion providers but that does not itself directly impact the number of abortions. Towards this end, I follow Levine et al. (1996) and include a variable that measures the number of physicians per 100,000 residents.⁴² Similar measures have also been utilized by Medoff (2009) and Medoff and Dennis (2011).

⁴² As with my economic indicators, the data for this variable was derived from the OECD.

Of course, all of these studies have focused largely on the United States and one may question whether the physician-to-resident ratio is a reliable indicator of abortion service availability in the context of Mexico's current legal environment. There is reason to believe, however, that qualified healthcare professionals continue to serve as the primary abortion providers even when their services are generally illegal. This was certainly the case in the United States prior to *Roe v. Wade* where "...90 per cent of all illegal abortions [were]...done by physicians...trained as such; and many of them in good standing in their communities" (Calderon 1960, p. 949). Similar trends have also been observed in developing countries with highly restrictive policies. In Nigeria, for example, abortion is a crime punishable by up to fourteen years in prison (Okagbue 1990). Yet, approximately six in ten abortions are carried out in hospitals or clinics with an additional twenty-two per cent being induced through treatments and medication provided by chemists⁴³ dispensing registered patent medicines (Bankole et al. 2006). Similarly, surveys and studies focused on women treated for post-abortion complications throughout Latin America (Singh and Wulf 1994) and the Philippines (Sigh et al. 2006) have found that a significant proportion of such patients were being treated for complications that resulted from abortions obtained by qualified medical professionals. All of which is to say that there is substantial evidence to suggest that the availability of abortion services may be reasonably proxied with a measure of general medical access not only in the United States but in Mexico. Data recording the physician-to-resident ratio of each state provides just such a measure and is available through the OECD at the appropriate level of granularity for both of the countries in my analysis.

⁴³ While some of these chemists have limited training on the appropriate use of medications, many are medical or pharmaceutically trained training and/or have backgrounds in midwifery and nursing (Bankole et al. 2006).

Still, it seems appropriate to utilize a secondary measure of abortion access as a sort of robustness check. One possible indicator may be the level of urbanization within a given state. Past studies have found disparities between the accessibility of abortion services in rural and urban areas both within the United States (Henshaw and Van Vort 1990; Wetstein 1996; Matthews et al. 1997) and around the world (Kulczycki 2009). Even in Latin American countries where abortion is generally restricted, for example, scholars have found evidence of widespread access to clinic based abortion services in urban areas (Singh and Wulf 1994). Not surprisingly, within the Americanist literature it has become customary to control for the presence of urban and metropolitan populations within cross-sectional and longitudinal studies of the states (Garbacz 1990; Gohmann and Ohsfeldt 1993; Levine et al. 1996; New 2011, 2014). Although data on the proportion of women within each state maintaining an urban or metropolitan residence is not available, I incorporate a measure of population density similar to that utilized by Klick and Neelsen (2012). Previous studies have found that population density may be related to the likelihood of a pregnancy ending in termination (Barbieri 2004), and the OECD collects consistent subnational data measuring this indicator.

Methodology

Altogether I run a series of nine primary regressions: six in the United States and three in Mexico. In the case of Mexico my analyses include an entry for each state and the federal district for thirty two observations per year and a total n of 224 over the period of 2007-2013. For the purpose of comparison to the United States, the first of my three regressions only includes those controls that can be consistently measured across national borders. In order to account for the impact of contraception and family planning,

however, two additional analyses are also run: one including CPR and another including UNFP. Pooled data was also collected for the United States at the same level of granularity and over the same period of time. In this case however a total of fifty states plus the District of Columbia yields a total n of 357. As with Mexico, initial regressions included only those controls that could be measured in the same way for both countries, and subsequent regressions added my respective gauges of contraception and family planning. However, theoretical and empirical overlap between my measures of policy in the United States required that separate regressions be run for Medicaid and NARAL. This resulted in a doubling of the overall number of models being run in the United States.

It should also be noted that all regressions were repeated with a one-year forward lag attached to the dependent variable in order to test for a time-delayed relationship and to account for an “...important distinctions between when a law is enacted versus when it is enforced...” (Medoff and Dennis 2014, p. 209). This was an especially critical step in the case of Mexico because individual states made important changes to their policy at various points throughout the period of interest in this study. The only state displaying a personhood amendment in 2007, for example, was Chihuahua. By the end of the second year in my analysis, however, three additional states (Baja California, Morelos and Sonora) had also passed personhood amendments. Campeche, Chiapas, Colima, Durango, Guanajuato, Jalisco, Nayarit, Oaxaca, Puebla, Querétaro, Quintana Roo, San Luis Potosí, and Yucatán all enacted their amendments in 2009 followed by Tamaulipas in 2010. Furthermore, at least one state that enacted a personhood amendment within the timeframe of my study (Campeche) also revoked this amendment within the same period

(Koch et al. 2015). Similar albeit less frequent variations in state policies were also observed in the United States, and in both countries the utilization of additional models employing a forward lag helped to compensate for this. Furthermore, it is not unreasonable to expect that the impact of a state policy will be delayed if abortion policies do in fact operate by influencing the fertility behavior of women and couples prior to a potential pregnancy. After all, individuals in society are not always immediately aware of changes in public policy and may take time to adjust their behavior in response to new restrictions on abortion. While a forward lag is attached to the dependent variable in secondary analyses, however, it is possible there is evidence to indicate that legal restrictions on abortion may affect the fertility decisions of couples even if they are enjoined or otherwise unenforced because they influence the level of anti-abortion sentiment and therefore the psychological and/or social costs of abortion (Haas-Wilson 1996; Blank et al. 1996). Testing my hypothesis both with and without the forward lag therefore serves not only to provide a robustness check testing the sensitivity of my results to model specifications but to potentially capture and distinguish between multiple functions of abortion policy.

Since my dependent variable is a continuous measure of abortion rate for each country, I utilize simple linear regressions as they provide the most appropriate mechanism for testing my hypothesis in each model. The results of these regressions are then compiled and compared in order to deduce broader conclusions about the generalizability of the economic model of abortion and the prevailing validity of my theory. Comparing the state-level determinants of abortion rates in each of these countries allows me to circumvent some of the limitations inherent within previous

applications of the economic model of fertility to abortion and to make some more general deductions. At the same time, utilizing data from both the United States and Mexico introduces a greater deal of diversity into the pool of cases against which I can test my hypothesis and helps yield insights about abortion and abortion policy in less developed countries.

Limitations:

At this point it is worth pausing to note that there are at least three important limitations to my study. As has been previously discussed, while existing methods of estimating induced abortion "...provide valuable information in settings where direct measurement techniques are unavailable...they are highly sensitive to the assumptions underlying the estimation approach, particularly as they relate to the multiplier used..." (Edmeades et al. 2010, p. 178). The HCM, for example, is a broadly accepted methodology that has been applied to Mexico in a number of recent approaches and is generally believed to yield reasonable estimates (Juarez et al. 2008, 2012). Yet, it also utilizes multipliers which are ultimately subjective (Rossier 2003) and have been found to cause systematic over-estimation of abortion in areas with more restrictive policies and lower levels of economic development (Westoff 2008; Koch et al. 2012a, d).⁴⁴ This may make it more difficult to verify a negative relationship between the restrictiveness of state abortion policy and the abortion rate/ratio. At the same time, it might help to explain why abortion laws appear to be less effective in countries such as Mexico than the empirical evidence suggests they are in the United States. These caveats notwithstanding, the results of this analysis may yet generate valuable insights into the relationship between

⁴⁴ See also, Haghenbeck (2012).

abortion's frequency and legal status, most notably if a negative relationship between my independent and dependent variables is observed. My research also provides a promising first step towards testing the broader applicability of the economic model of abortion so robustly substantiated in the United States. Furthermore, while the possibility of systematic over-estimation cannot be ruled out altogether, some steps have been taken to account for this factor. Most notably, I conduct my primary analyses utilizing the lower-range conservative multipliers proposed by Juarez (2008).⁴⁵

The second potential limitation in my study has to do with the quantification and comparability of my explanatory variables. For example, it might be argued that any divergent results in my comparison of the United States and Mexico emanate not from differences in the overall restrictiveness of state abortion policies but from the particular policies selected for consideration on each side of the border. While further research is necessary to adequately address this concern, I have argued here that the specific laws taken into consideration serve as indicators of the overall restrictiveness in each states aggregate policy environment. The goal of these indicators is not to measure the impact of specific policies such as personhood amendments or Medicaid funding restrictions but to look at aggregate policy environments. Furthermore, I have already taken some steps to address this limitation by utilizing multiple indicators of subnational abortion policies in both the United States and Mexico. Doing so provides something of a robustness check and may help to alleviate concerns that the observed relationships are peculiar to specific measures of abortion policy.

⁴⁵ As a robustness check, secondary analyses are also conducted employing the more liberal estimators, although these are believed to be of reduced value and serve only to test for the possibility of systematic variation between the two results. As will be described in subsequent chapters, results are largely robust across both the conservative and liberal estimates.

Unfortunately, even with these precautions it is not possible to rule out the potential for divergent national contexts to confound my analyses in unforeseen and immeasurable ways. In other words, it is possible that similar measures of key concepts and relationships capture qualitatively distinctive phenomenon when applied across national borders. One way to illustrate this concern is to consider the explanatory variables used as controls for economic influence in my analysis. While the utilization of OECD data made it possible to employ consistent quantifications of these factors in both the United States and Mexico, it is not clear that they capture the same information about the economy or people's financial circumstances in both countries. For example, because informal employment comprises a significant proportion of the Mexican economy (Marcouiller et al. 1997) it is possible that labor force participation is a less reliable indicator of economic conditions south of the border than it is in the United States.

Consequently, it is difficult to be certain about the degree to which my measures of various variables gauge the same forces in different national settings.

CHAPTER IV

FINDINGS

This chapter delineates the results of my analysis and discusses their implications for the theories and the hypothesis presented in Chapter II. However, because my research utilized multiple regressions and a comparative design examining data collected from both the United States and Mexico, it is necessary to proceed in a series of four sections in order to ensure clarity. I therefore begin by outlining and deliberating the findings of my pooled-time series analyses of the United States before proceeding to those of my regressions on Mexico. Taken together these two steps provide the first and second sections of this chapter. The third section is dedicated to comparing the results from the United States and Mexico in order to draw broader conclusions about the overall validity of my theory and whether the economic model of abortion is applicable to the developing world. Finally, I conclude with some final thoughts and secondary analyses designed to provide a foundation for future research.

The Law, Abortion and the United States

As is the case with Mexico, my analyses in the United States involved a series of iterative regressions involving multiple combinations of variables to test the impact of

subnational policies on state abortion rates. For the purpose of comparability to Mexico both Medicaid and NARAL were first tested against the abortion rate utilizing only those controls that could be consistently measured across national borders. In order to account for the role of family planning, additional models were then executed pairing each of these independent variables with each of my measures gauging contraceptive need among female populations. To avoid multicollinearity, my contraceptive variables were paired with each of my policy variables one at a time. Consistent with my hypothesis, all of the regressions showed a substantively and highly statistically significant inverse relationship between policy restrictiveness and abortion rates. These findings were constant across multiple combinations of controls, different quantifications of policy, the inclusion or exclusion of a forward lag on the dependent variable to test for time delayed relationships and the use or disuse of robust clusters to address issues of heteroscedasticity. As can be seen in the columns of Table One, the level of significance was also quite impressive with p values fixed at .000 for NARAL and ranging from .014-.018 for Medicaid.

Findings on the role of contraception were, however, somewhat mixed. In this case statistical significance was responsive to whether measures of employment included overall or just female labor force participation. Furthermore, once I controlled for heteroscedasticity with robust clusters, both measures of contraception lost significance in all models. This can also be seen in the regression outputs reported in Table One. On the whole, then, empirical tests provide consistent support for my first hypothesis but do not provide any evidence of a link between contraception and abortion. One possible explanation for this is that a reduced need for contraception is linked to pregnancy via two competing mechanism. While contraception certainly reduces the risk that copulation

will result in pregnancy at the individual level, it may also thereby lower the potential costs of intercourse and thus create an offsetting increase in sexual activity at the aggregate level. This logic is not necessarily supported by the results of my analysis, but it is a possible way to explain my results and does have some support in the existing literature (Akerlof, Yellen, and Katz 1996; Arcidiacono, Khwaja, and Ouyang 2012).

Variable Name:	Model 1	Model 2	Model 3
NARAL	.000 *** (-1.74)	0.00 (-1.704)	.000
Medicaid	0.008** (-3.825)	.011 (-3.692)	.152 - .286 (14.408) – (19.088)
Con13	--	.158 - .234 (-.471) – (18.507)	--
Con15	--	--	.233 - .315 (14.408) – (19.088)
Black Population	.064-.147 (1.54e) – (2.14e)	.013* - .106 (1.72e) – (2.26e)	.003** - .012** (1.76e) – (2.29e)
Hispanic Population	.003** - .001** (.000) – (.000)	.002** - .008** (.003) – (.005)	.003** - .010** (.000) – (.000)
Population Density	.000***-.003* (.003) – (.006)	.000*** - .005** (.003) – (.005)	.000*** - .005** (.003) – (.005)
Fertility rate	.266-.964 (-.161) – (.004)	.137 - .362 (-.143) – (-.024)	.107 - .271 (.560) – (.775)
Tertiary Education Enrollment	.172 - .618 (-.3378)– (-1.056)	.142 - .541 (-1.143) – (-.414)	.143 - .540 (-1.133) – (-.412)
Secondary Education Enrollment	.403 - .586 (.848) – (1.293)	.414 - .602 (.807) – (1.235)	.435 - .626 (.743) – (1.158)
Elementary Education Enrollment	.580 - .601 (-.364) - (-.366)	.499 - .553 (-.462) – (-.432)	.491 - .544 (-.475) – (-.446)
R-squared values: P < .05 = *, P < .025 = **, P < .001 ***	.5908 - .6433 N = 306	.4949 - .6453 N = 306	N = 306

⁴⁶ The results reported here are compiled from six iterative and robust clustered regressions that contained a forward lag on the dependent variable and paired each of my policy variables with each of my contraceptive variables or else did not account for measures of family planning for the purpose of comparison to Mexico. Due to the large number of models and result similarity, regressions using other variables were excluded. Model one is the basis of my comparison to Mexico.

Infant Mortality	.108 - .285 (.546) – (.767)	.105 - .268 (.561) – (.775)	.107 - .271 (.560) – (.775)
Labor Force Participation	.738 - .782 (-.049) – (-.037)	.753 - .795 (-.045) – (-.034)	.761 - .803 (-.043) – (-.032)
GINI Coefficient	.146 - .459 (-74.603) – (-31.689)	.168 - .399 (-71.669) – (1.132)	.175 - .488 (-71.022) – (-30.007)
R-squared values: P < .05 = *, P < .025 = **, P < .001 ***	.5908 - .6433 N = 306	.4949 - .6453 N = 306	.5954 - .6459 N = 306

Nevertheless, it is more likely that the insignificance of my contraceptive measures has to do with how the AGI quantifies the number of women in need of contraception. Although it is excluded from their primary reports, methodological documents reveal that the AGI defines women’s contraceptive status based on the use of contraceptive sterilization, fecundity and pregnancy status as well as whether they are sexually active (Henshaw and Frost 2008). While this is the best measure of family planning available for a pooled time series analysis of abortion rates in the United States, it may nevertheless miss critical aspects of contraception. It does not necessarily capture the use of oral contraception, for example, or account for the growing popularity of injectables or inter uterine devices.

Despite this, abortion policy continued to maintain the correct sign as well as statistical and substantive significance across models. This was true both in cases that controlled for contraception and those that did not. Results were also consistent across multiple combinations of variables, at least two quantifications of policy and irrespective of model specifications. Neither variable lost significance when the dependent variable was either logged or forward lagged, for example, or when robust clusters were added to address heteroscedasticity. Furthermore, it is worthwhile to note that the r-squared values

of each model were generally high. These values never dropped below 64 when policy was measured by a state's NARAL score or 57 when using Medicaid as an indicator. This suggests that my models have a great deal of explanatory power and are largely able to account for variations in the values of the dependent variable without the addition of more variables. It is therefore unlikely that the results in my model stem from any sizeable failure to account for other important covariates. These results are therefore quite strongly supportive of my hypothesis. They are also fairly robust with both policy variables maintaining their signs and significance across a battery of empirical tests. It is worth noting, however, that the variable measuring the restrictiveness of each state's abortion policy by its NARAL grade had consistently lower p. scores than the variable measuring policy by the presence or absence of Medicaid funding restrictions. Given the binary nature of the latter indicator, the most likely explanation for this is that NARAL captures some pertinent aspects of abortion policy not encompassed by Medicaid. In either case, however, policy plays a big role in shaping the abortion rate whereas my measures of family planning do not.

The Law, Abortion and Mexico

The next step in my research was to examine the impact of subnational abortion policies in Mexico. Once again, this involved a series of iterative regressions pairing my primary independent and dependent variables with different combinations of controls. Where possible, these analyses were kept as similar to those conducted in the United States as possible. There were, however, some small differences beyond those discussed in the preceding chapter. While none of these alterations should undermine the comparability of my results and although robustness checks show that they do not

significantly change the results of my regressions they are nevertheless worth some attention.

First, my overall analysis south of the border was somewhat simplified because fewer of my variables displayed multicollinearity. This minimized the number of regressions necessary to test my hypothesis. Since my measures of abortion policy were neither conceptually nor empirically overlapping, for example, it was possible to include both in the same model rather than examining each in a separate iteration for every combination of controls and dependent variables.⁴⁷ Second, Mexican regressions were performed against two somewhat distinct measures of abortion rate. Both measures were calculated consistent with the process described in Chapter III. However, because the hospitalization complications method (HCM) is known to overstate the total number of abortions, my primary measure of abortion rate was calculated using the lower end of the range of multipliers presented by Juarez et al. (2008). As a robustness check, a more liberal estimate was also generated utilizing the higher end of the multiplier-range reported by Juarez and her colleagues. However, outputs were largely similar regardless of which measure was employed. Finally, once correlating explanatory variables were removed or separated, Mexican models no longer displayed heteroscedasticity. It was therefore not necessary to robust cluster observation by state, although doing so did not change the results in a series of unreported regressions. Altogether, none of these differences seems to have meaningfully altered the output of my empirical tests. The

⁴⁷ Separate models including only one or the other variable were also run as a robustness check. However, because this did not significantly impact the results of these regressions, only those models including both measures of policy are reported here.

findings shown in Tables Two and Three may therefore be interpreted as generally representative of those that are not explicitly reported here.

As with the United States, I began by examining the impact of abortion policies on abortion rates using only those controls that could be consistently measured across national borders. This provides the basis for my comparison of the two countries. I then ran two additional sets of analyses: the first controlling for contraceptive prevalence rates (CPR) and the second controlling for the unmet need for family planning (UNFP). Unlike my policy variables, it was not possible to include both contraceptive measures in the same model due to significant level of conceptual and empirical overlap. Contraceptive variables were therefore tested separately and were never included in the same model. Therefore, Table Two reports the results of each set of analyses according to the variable used as a gauge for family planning. It should be noted, however, that regression outputs were meaningfully altered for models including UNFP when a forward lag was attached to the dependent variable. Table Three therefore reports the results of one such regression.

Variable Name:	Model 4	Model 5	Model 6
Personhood	.755 (-.110)	.786 (-.105)	.862 (-.067)
More/less permissive(Koch 2015)	.655 (-.198)	.657 (-.197)	.685 (-.180)
R-squared value: P < .05 = *, P < .025 = **, P < .001 ***	.3796 N = 224	.3798 N = 224	.3833 N = 224

⁴⁸ As with the United States, the results reported here are not comprehensive but may be interpreted as broadly representative of the excluded outputs. Unlike the United States it was possible to include both of my policy variables in a single regression for each measure of contraception. Therefore, Table Two is distinct from Table Two in that it was not necessary to include a range of coefficients and p values. Model four is the basis of my comparison to the United States.

CPR	--	.803 (-.007)	--
UNFP	--	--	.266 (.055)
Fertility rate	.020** (2.999)	.023** (2.965)	.028 (2.851)
Physicians	.000*** (3.679)	.000*** (3.668)	.000*** (3.771)
Population	.410 (-9.10e)	.414 (-9.05e)	.462 (-8.13e)
Population Density	.025* (.000)	.028* (.000)	.041* (.000)
Infant Mortality	.728 (-.030)	.728 (-.030)	.657 (-.038)
Elementary Enrollment	.221 (.136)	.228 (.135)	.279 (.121)
Secondary Enrollment	.244 (-.484)	.247 (-.483)	.244 (-.485)
Tertiary Enrollment	.000*** (-2.395)	.000*** (-2.379)	.000*** (-2.367)
Indigenous Population	.789 (.522)	.775 (.561)	.732 (.668)
Labor Force Participation	.002*** (-.162)	.002* (-.164)	.001** (-.171)
GDP	.876 (-.063)	.861 (-.072)	.843 (-.081)
GINI	.181 (-12.742)	.178 (-12.860)	.146 (-13.905)
R-squared value: P < .05 = *, P < .025 = **, P < .001 ***	.3796 N = 224	.3798 N = 224	.3833 N = 224

Personhood	.462 (-.307)
More/less permissive (Koch 2015)	.688 (-.188)
UNFP	.035* (.106)
Fertility rate	.035* (2.783)
R-squared value: P < .05 = *, P < .025 = **, P < .001 ***	.4028 N = 192

Table 3 Continued: Results Showing UNFP Significance in Time Delayed Model, Mexico	
Physicians	.000*** (3.856)
Population	.281 (-1.26e)
Population Density	.089 (.000)
Labor Force Participation	.001** (-.189)
Infant Mortality	.630 (-.043)
Elementary Enrollment	.320 (.117)
Secondary Enrollment	.973 (-.015)
Tertiary Enrollment	.000*** (-2.54)
Indigenous Population	.435 (1.608)
GDP	.846 (.083)
GINI	.030* (-21.721)
R-squared value: P < .05 = *, P < .025 = **, P < .001 ***	.4028 N = 192

As can be seen from the above tables, the results of my Mexican regressions are largely in compliance with theoretical expectations. As predicted, the relationship between abortion laws and abortion rates observed in the United States is not replicated in Mexico. Although signs are consistently in the right direction, at no point in any of the models did either Koch et al.'s (2015) measure of more or less restrictive abortion laws or the presence of a personhood amendment approach statistical significance. This indicates that subnational abortion policies do not significantly alter abortion rates in the country of Mexico. Table Two also shows that the values of UNFP and CPR do not seem to exert an impact on the abortion rates for the current year. Attaching a forward lag on the

dependent variable does not change this for CPR, but it does lead UNFP to obtain statistical significance at the .035 level. The sign is also in the right direction, indicating that a higher unmet need for family planning leads to a subsequent, albeit delayed, increase in the abortion rate. These results persisted when utilizing the more liberal estimates of induced abortion and were not significantly altered by switching variable combinations or attaching robust clusters. Even in these models, however, policy variables continue to lack significance.

In summation, then, the Mexican analysis couples with my analysis of the United States in yielding substantial support for my hypothesis. Results were robust across multiple quantifications of abortion policy as well as the abortion rate, different combinations of control variables and model specifications as well as the inclusion or exclusion of varied measures of contraception and family planning. However, it is worth noting that the r-squared values of my models in Mexico were consistently lower than those observed in the United States. The regression reported in Table Three, for example, only explained about forty percent of the variation in the time lagged dependent variable. As can be seen in Table Two, other r-squares were even lower. While these are still significantly high to yield some valuable insights, some modesty is advised in interpreting these results as evidence for any kind of a sweeping conclusions. Readers should also recall that while the HEC method of estimating abortion rates is the best available option, it has nevertheless been found to systematically overestimate abortion in areas with more restrictive policies (Koch et al. 2012A). As a result, these results are not altogether surprising even though they are consistent with my hypothesis. Future efforts

to examine the impact of abortion laws in countries with generally restrictive policies should thus seek to identify more reliable methods of estimating incidences of abortion.

When it comes to contraception, most of the evidence reviewed here suggests that family planning is not significantly related to the abortion rate. In this case, however, family planning is measured using two broadly recognized indicators that provide a more comprehensive overview of a woman's efforts at fertility control. It is therefore less likely that my negative findings are a relic of how my variables were quantified. Once more, the most likely explanation for this somewhat counterintuitive discovery is that contraception is linked to unplanned pregnancy and therefore abortion via two competing mechanisms. The protective benefits of contraception and family planning are likely offset by an aggregate increase in sexual activity. On the flip side, greater levels of unmet need for family planning were associated with more abortions in models utilizing a forward lag on the dependent variable. Further research is necessary in order to explain why results vary in this way. It does make some sense that family planning methods would act on abortion rates at a delay, but there is no satisfactory explanation for why UNFP achieves statistical significance whereas CPR fails to do so. Given my relatively low r-squares, it is possible that some intervening factor was excluded from consideration. A more likely explanation for the variation in output, however, has to do with the way in which these variables are defined. As can be seen in Appendix Table 1, UNFP is defined to include all women of reproductive age whereas CPR is limited to married women (Alkema et al. 2013). One way to account for these results, then, might be to suggest that the impact of contraception is mediated by a woman's marital status. In other words, the level of family planning among unmarried women may be more

important than the level of family planning among conjugal couples when it comes to shaping abortion rates. Another theoretical possibility might be that certain types of legal restriction are meaningful independent of their economic functions and that they operate in ways that are not captured by my regressions. Unfortunately, it is not clear what these alternative mechanisms might be. Further analysis is therefore necessary to fully understand why my results are mixed when it comes to the importance of contraception in middle income countries.

Piecing Together the Puzzle

The results of my analyses in the United States and Mexico are thus broadly supportive of my hypothesis, although they yield no or mixed support for the impact of contraception. As previously discussed, one possible explanation for the insignificance of family planning in many models is that contraception may simultaneously provide a woman with greater power over her own pregnancy status while at the same time leading to an aggregate increase in sexual activity that offsets this benefit when observing the population at large (Akerlof, Yellen, and Katz 1996; Khwaja, and Ouyang 2012). In the case of the United States it is more likely that results are an artifact of the measure of contraception and family planning that was employed, but this same argument is not as compelling when applied to the use of CPR in Mexico. Taken together, these findings are indicative of a countervailing factor that neutralizes the benefits of contraception in aggregate models. By contrast, however, there was fairly robust support of a time lagged relationship between the unmet need for family planning and abortion rates in at least some Mexican models. Given that pregnancy and abortion do not occur spontaneously subsequent to a sexual encounter, some delay should be expected between cause and

effect. Furthermore, it may take time for women and couples to adjust their fertility behavior in light of changes in their state's level of contraceptive-accessibility. Readers should note, however, that UNFP was more statistically than substantively significant. So while this suggests that, in aggregate, contraception helps prevent unplanned pregnancy and thus abortion, it does not undermine the notion that it can also increase sexual activity. If it did not increase sexual activity we would expect to see significantly larger declines in abortion than what is observed in the regressions previously discussed.

The primary focus of my analysis, however, has been on the economic model of fertility control and whether it can accurately predict the impact of abortion policies on abortion rates in a context broader than the United States. Perhaps not surprisingly, my results indicate that it cannot. While the economic model of fertility control displays expansive explanatory power and is widely supported in the United States, I find no evidence of a relationship between the laws governing abortion and the rate at which it occurs in Mexico. As per my theory this discrepancy may likely be explained by differences in the decisional calculus of women desiring to delay fertility. Women in middle income countries are likely to find the alternatives to abortion more costly than are women in the developed world. The economic and opportunity costs entailed in trying to exercise fertility control prior to an unplanned pregnancy are likely to be higher either because women lack easy access to or awareness of contraception or because they do not have the economic resources to consistently utilize them.⁴⁹ There is prior evidence for this postulate. A study of four developing regions around the world found that in even in

⁴⁹ Another possibility which may be addressed in future analysis is that the social costs of accessing contraception are different between most developed and developing nations. There is, for example, some evidence that unmarried women in developing countries were too concerned about social disapproval to risk being caught in the process of seeking contraception to do so (Sedgh and Hussain 2014).

countries where public provision of contraception is high there is a strong negative association between the ability of private citizens to pay for family planning services and contraceptive prevalence (Green 2002). As with fertility behavior prior to an unplanned pregnancy, the costs associated with an unwanted birth are likely to be higher for women seeking to delay fertility in the developing world because mothers will generally have fewer economic opportunities and resources at their disposal and are more likely to already be living in poverty.

When it comes to the relationship between the laws governing abortion and the rate at which it occurs, then, my analysis is broadly consistent with the theory presented at the end of Chapter II. Although it does not provide conclusive evidence that my theory sufficiently covers every aspect of abortion's determinants in the developing world it does indicate the need for a theoretical alternative to the economic model of fertility control in explaining abortion rates across the developing world.

Ancillary Analyses

Taken together, the results reported in the preceding sections of this chapter provide some evidence that legal restrictions of abortion are generally more impactful in the developed world than they are in middle or low income countries. As valuable as this insight might be, however, it leaves a number of important questions unanswered. For example, the failure of my regressions to substantiate a relationship between the law and abortion in Mexico is indicative of a need for an alternative to, or at least an adaptation of, the economic model if we are to understand abortion in developing nations. It does not, however, reflect the strengths or weakness of the main theoretical alternative to the

economic model that has been proposed by the AGI and its associated researchers (AGI 1999, 2009). On the contrary, the failure of these empirical tests to show a statistically significant relationship between family planning and abortion defies one key aspect of the AGI's argument--namely that contraception and other forms of fertility control are the best or only efficacious way to reduce unplanned pregnancy and abortion. Neither do the preceding analyses indicate in what ways the economic model may be altered in order to become applicable to the developed world except that it suggests the need for a greater emphasis on the costs of abortion alternatives. In other words, the results presented up to this point say more about which theories *do not* explain abortion in middle income countries than it does about which ones *do* achieve this goal.

The finding that legal restrictions are an effective way to reduce abortion in the United States also raises a number of important questions about how they are able to do so. As Falletti and Lynch (2009) have already observed, identifying the mechanisms by which variables are linked is a critical step in the social scientific endeavor to understand causation. In this case it is an especially important component for at least two major reasons. On the one hand, exploring causal mechanisms has the potential to expand the policy implications of my primary analyses as well as to inform political advocacy. For example, if legal restrictions reduce the abortion rate by mitigating unplanned pregnancy this would indicate that many advocacy groups are working at cross purposes when they campaign for both the liberalization of abortion policies and the prevention of unplanned pregnancy. On the other hand, while the previously reported findings have already shown that legal restrictions may reduce the abortion rate in the United States, they have not

provided evidence that they do so in the ways described by the economic model of fertility control.

In light of all this information, there remains room to expand upon the analysis described in preceding sections of this chapter in at least two ways. First, an empirical analysis utilizing data from Mexico to test the expectations of the AGI's theory may help to either identify or eliminate at least one more candidate with the potential to explain abortion in the developing world. Second, a more thorough investigation of the causal mechanisms linking legal restrictions of abortion to reduced abortion rates in the United States may provide an opportunity to test whether the economic model of fertility control truly describes abortion in the developed world or simply predicts the right outcomes for the wrong reason. Although these tasks are largely left up to future research, several sets of ancillary regressions were executed in order to provide a foundation of preliminary evidence upon which scholars may build subsequent studies. As with my primary analyses, issues of multicollinearity required models to be executed in a series of iterative regressions that employed different combinations of controls. I also continued to test for time delayed relationships and to compensate for uncertainty about how soon after enactment policies begin being enforced by repeating all models with a one-year forward lag attached to their respective dependent variables. Finally, as with the primary analysis, secondary regressions were run with robust clusters where it was necessary to control for heteroscedasticity. However, because results were largely consistent across all such specifications only those models with higher than average r-squared values and therefore greater explanatory power are provided.

Readers will recall from Chapter II that the primary argument of the AGI is that more restrictive policy environments increase maternal mortality rates (MMR) by making it harder for women to safely terminate their pregnancies without reducing the rate at which they choose to do so (AGI 1999; 2009). My first set of secondary regressions were therefore run to test for an association between (MMR) and state abortion policies in Mexico. Consistent with previous findings (Koch et al. 2015), however, the regressions run here yield no support for this hypothesis. Table Five shows that there was no statistically significant relationship between the presence or absence of a personhood amendment and maternal mortality. Strangely, however, the table also shows that more restrictive policies were found to reduce MMRs when measured with the indicator of Koch et al. (2015). These results are somewhat puzzling, but given the relatively low r -squared values of these models, the most likely explanation is that results are being skewed by an important and intervening variable that is not included in the analysis. Another possibility might be that some abortion policies are meaningful independent of their economic function. This assumption would help to explain why certain restrictions have been found to impact fertility behavior even if they are not enforced (Blank et al. 1996) and it might mean that there are certain functions of the law not adequately addressed in my analysis. These mechanisms, in turn, might help to explain my puzzling results. Ultimately, however, the narrative proposed by the AGI and other prochoice organizations does not perform any better than the economic model of fertility control when tested against abortion rates in the developing world. Preliminary evidence therefore indicates that the academic community should focus future efforts to understand abortion outside of the first world by developing a new theory rather than simply relying

on the story of prochoice lobbying groups or attempting to extrapolate insights from the United States.

Table 4: State Policies and Maternal Mortality, Mexico

Source	SS	df	MS			
Model	21883.4833	14	1563.10595	Number of obs =	224	
Residual	30038.7262	209	143.725963	F(14, 209) =	10.88	
				Prob > F =	0.0000	
				R-squared =	0.4215	
				Adj R-squared =	0.3827	
Total	51922.2095	223	232.83502	Root MSE =	11.989	

mmr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
personhood	2.406657	1.817463	1.32	0.187	-1.176253	5.989567
kochmvl	8.876169	2.099173	4.23	0.000	4.737904	13.01443
childtowoman	1.461186	.5181106	2.82	0.005	.4397938	2.482579
physicians	-.6280636	2.173119	-0.29	0.773	-4.912106	3.655979
population	-1.54e-06	5.16e-07	-2.99	0.003	-2.56e-06	-5.24e-07
populationdensity	.0069016	.0012372	5.58	0.000	.0044627	.0093406
lfp	-.4533387	.2268482	-2.00	0.047	-.9005426	-.0061349
infantmort	.5528977	.4076146	1.36	0.176	-.2506653	1.356461
elementary	.7017026	.521916	1.34	0.180	-.3271919	1.730597
tertiary	-11.85811	2.372497	-5.00	0.000	-16.5352	-7.181021
secondary	-1.577951	1.950366	-0.81	0.419	-5.422862	2.266961
indigenouspop	-1.13572	9.120798	-0.12	0.901	-19.11627	16.84483
GDP	6.720665	1.854318	3.62	0.000	3.065101	10.37623
gini	65.28775	42.92964	1.52	0.130	-19.34286	149.9184
_cons	-58.79181	36.91009	-1.59	0.113	-131.5556	13.97199

Table 5: State Policies and Forward Lagged Maternal Mortality, Mexico

Source	SS	df	MS			
Model	18354.5065	14	1311.03618	Number of obs =	192	
Residual	22939.2423	177	129.600239	F(14, 177) =	10.12	
				Prob > F =	0.0000	
				R-squared =	0.4445	
				Adj R-squared =	0.4005	
Total	41293.7487	191	216.197637	Root MSE =	11.384	

F.mmr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
personhood	1.209062	1.90432	0.63	0.526	-2.549031	4.967156
kochmvl	6.646804	2.161885	3.07	0.002	2.380417	10.91319
childtowoman	1.84525	.5229998	3.53	0.001	.813132	2.877368
physicians	-1.833306	2.39635	-0.77	0.445	-6.562401	2.895789
population	-1.70e-06	5.31e-07	-3.21	0.002	-2.75e-06	-6.55e-07
populationdensity	.0073797	.0012852	5.74	0.000	.0048435	.0099159
lfp	-.1795143	.2294904	-0.78	0.435	-.6324038	.2733752
infantmort	1.023281	.408139	2.51	0.013	.2178367	1.828726
elementary	.148019	.5362125	0.28	0.783	-.9101734	1.206211
tertiary	-11.7655	2.474171	-4.76	0.000	-16.64818	-6.882833
secondary	2.391387	2.0814	1.15	0.252	-1.716167	6.498941
indigenouspop	.5796621	9.335857	0.06	0.951	-17.84425	19.00358
GDP	6.993944	1.888255	3.70	0.000	3.267553	10.72034
gini	70.42914	43.83369	1.61	0.110	-16.07478	156.9331
_cons	-97.81016	37.84042	-2.58	0.011	-172.4866	-23.13371

Turning now to the ways in which legal restrictions reduce abortion in the United States, three possible mechanisms have already been identified. As explained in Chapter II, legal restrictions may lead more women who are pregnant to choose birth over abortion. If this is the case we should see more births in states with restrictive policies, a hypothesis which I test by regressing my explanatory variables. Surprisingly, the results shown in Table Six do provide some evidence that legal restrictions are associated with higher birth rates, at least when measured by a state's NARAL index. However, while signs are consistently in the right direction across models, Table Seven shows that statistical significance is lost when policy is measured by the presence or absence of Medicaid funding restrictions. The most likely explanation for this divergence is once again that a state's NARAL index provides a more complete representation of overall policy environment. This would also help to explain why my results conflict with past

research showing that state abortion policies reduce abortion but that they do not increase births (Trussel et al. 1980; Kane and Staiger 1996; Matthews et al. 1997; Levine 2004b). These studies have tended to disaggregate their policy variables to gauge the impact of individual restrictions such as parental consent or notification laws. By contrast, the NARAL index aggregates a wide swathe of different restrictions into a more comprehensive gauge of a state's overall policy environment. As a result of this, I join Trussel et al. (1980) and other scholars in finding that Medicaid funding restrictions do not increase births while at the same time producing evidence that the aggregate restrictiveness of state policies do. This also makes sense in light of Levine's (2004b) argument that modest legal restrictions like those popular in the U.S. increase the cost of abortion enough to encourage additional caution prior to a potential pregnancy but not enough to alter the decisional calculus of a pregnant mother considering termination. However, if each individual restriction adds its own set of additional costs to abortion then it would seem to follow that a large enough number of different restrictions could cumulatively drive up the price of abortion enough to replace terminations with deliveries.

Table 6: NARAL Index and Birth Rates in the United States

Linear regression

Number of obs = 306
 F(10, 50) = 1261.36
 Prob > F = 0.0000
 R-squared = 0.9790
 Root MSE = 1.091

(Std. Err. adjusted for 51 clusters in id)

F.birthrate	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
naral	.1217341	.0479241	2.54	0.014	.0254758	.2179925
fertilityrate	.9711925	.0173648	55.93	0.000	.9363143	1.006071
blackpop	-9.61e-08	1.02e-07	-0.94	0.350	-3.01e-07	1.09e-07
hisplatino	-1.16e-07	1.02e-06	-0.11	0.911	-2.17e-06	1.94e-06
populationdensity	-.0006624	.0001831	-3.62	0.001	-.0010302	-.0002946
tertiary	.2045969	.1017953	2.01	0.050	.000135	.4090588
secondary	.2805667	.4983768	0.56	0.576	-.7204525	1.281586
elementary	-.3747153	.1658076	-2.26	0.028	-.7077496	-.0416809
infantmort	-.0289642	.0372194	-0.78	0.440	-.1037216	.0457931
femlfp	.0158279	.0163105	0.97	0.337	-.0169327	.0485884
_cons	1.650613	1.75817	0.94	0.352	-1.880775	5.182001

Table 7: Medicaid and Birth Rates in the United States

Linear regression

Number of obs = 306
 F(10, 50) = 1160.04
 Prob > F = 0.0000
 R-squared = 0.9786
 Root MSE = 1.1009

(Std. Err. adjusted for 51 clusters in id)

F.birthrate	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
medicaid	.2459289	.1792235	1.37	0.176	-.1140521	.6059098
fertilityrate	.97925	.0162478	60.27	0.000	.9466153	1.011885
blackpop	-5.44e-08	1.09e-07	-0.50	0.621	-2.74e-07	1.65e-07
hisplatino	-7.17e-07	1.04e-06	-0.69	0.496	-2.81e-06	1.38e-06
populationdensity	-.0007984	.000207	-3.86	0.000	-.0012143	-.0003825
tertiary	.2880024	.1208908	2.38	0.021	.045186	.5308188
secondary	.2603725	.4916448	0.53	0.599	-.7271251	1.24787
elementary	-.4005482	.1638162	-2.45	0.018	-.7295828	-.0715136
infantmort	-.019561	.0395377	-0.49	0.623	-.0989748	.0598528
lfp	-.0044771	.0214708	-0.21	0.836	-.0476025	.0386483
_cons	2.614146	1.787006	1.46	0.150	-.9751616	6.203453

Another way that legal restrictions may reduce abortion is by preventing unplanned pregnancies. While there is extensive evidence to support this mechanism, Levine (2004b) was unsure of whether abortion laws operated by either a) increasing contraceptive usage or b) reducing sexual activity. Past studies have already shown a robust and positive association between restrictive policies and increased contraception (Levine 2002, 2003, 2004a, 2004; McNabb 2007; Medoff 2008a; Felkey and Lybecker 2011, 2014, 2015) but have not adequately addressed the impact of policy on the proportion of a state’s women of reproductive age that are sexually active. The AGI’s quantification of women in need of contraception provides a unique opportunity to fill this gap. As can be seen in Tables 8 and 9, I therefore ran a series of regressions testing the impact of abortion policy on each of my contraceptive variables.

Table 8: NARAL Index and Women in Need of Contraception, United States

Source	SS	df	MS			
Model	.082470743	10	.008247074	Number of obs =	356	
Residual	.186976501	345	.000541961	F(10, 345) =	15.22	
Total	.269447244	355	.000759006	Prob > F =	0.0000	
				R-squared =	0.3061	
				Adj R-squared =	0.2860	
				Root MSE =	.02328	

con13	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
naral	-.0031906	.0009925	-3.21	0.001	-.0051427	-.0012384
fertilityrate	-.0006989	.0002383	-2.93	0.004	-.0011677	-.0002302
blackpop	-1.02e-08	2.38e-09	-4.27	0.000	-1.49e-08	-5.49e-09
hisplatin	9.21e-08	2.18e-08	4.23	0.000	4.93e-08	1.35e-07
populationdensity	8.34e-06	3.54e-06	2.35	0.019	1.37e-06	.0000153
tertiary	.0056124	.0015732	3.57	0.000	.0025181	.0087066
secondary	.0067695	.0047807	1.42	0.158	-.0026335	.0161726
elementary	.0035296	.0019262	1.83	0.068	-.000259	.0073182
infantmort	-.0013993	.00112	-1.25	0.212	-.0036022	.0008036
lfp	-.0002936	.0003123	-0.94	0.348	-.0009079	.0003207
_cons	.5148138	.0330942	15.56	0.000	.449722	.5799057

Table 9: Medicaid and Women in Need of Contraception, United States

Source	SS	df	MS			
Model	.083662807	10	.008366281	Number of obs =	357	
Residual	.189274223	346	.000547035	F(10, 346) =	15.29	
				Prob > F =	0.0000	
				R-squared =	0.3065	
				Adj R-squared =	0.2865	
Total	.27293703	356	.000766677	Root MSE =	.02339	

con13	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
medicaid	-.0077993	.003174	-2.46	0.014	-.014042	-.0015566
fertilityrate	-.0008591	.000233	-3.69	0.000	-.0013174	-.0004008
blackpop	-1.15e-08	2.31e-09	-4.98	0.000	-1.60e-08	-6.96e-09
hisplativo	1.01e-07	2.13e-08	4.76	0.000	5.95e-08	1.43e-07
populationdensity	.0000108	3.39e-06	3.18	0.002	4.12e-06	.0000175
tertiary	.0043757	.0015397	2.84	0.005	.0013474	.007404
secondary	.0077289	.0048165	1.60	0.109	-.0017444	.0172022
elementary	.0032714	.0019363	1.69	0.092	-.0005371	.0070798
infantmort	-.0018734	.001099	-1.70	0.089	-.004035	.0002882
lfp	-.0002039	.0003226	-0.63	0.528	-.0008385	.0004306
_cons	.5239482	.0329535	15.90	0.000	.4591338	.5887626

Consistent with the expectations of the economic model of fertility control, I find that more restrictive policies lead to a reduction in the number of women classified by the AGI as sexually active.⁵⁰ Taken with the research of scholars such as Felkey and Lybecker, the findings of these regressions suggests Levine’s question about how abortion policies reduce unplanned pregnancy and, therefore, abortion is not an issue of either or. Rather, legal restrictions appear to reduce unplanned pregnancy via a set of complimentary and concomitant mechanisms. In other words, these results indicate that women are forward thinking in their sex lives and that they determine their level of sexual activity based at least in part on concerns about the risks and potential costs of copulation. The expectations of the economic model of fertility control thus continue to withstand empirical tests in the United States. Given that the primary goal of my research

⁵⁰ Since the AGI’s definition also takes into account a woman’s fecundity and whether she or her partner has been contraceptively sterilized, another possible but less compelling interpretation of these results might be that more restrictive policies lead to greater levels of infertility or increase reliance on sterilization.

is to test the applicability of the economic model of fertility control in different national and economic contexts, however, it may also be worthwhile to test whether or not legal restrictions impact fertility behavior prior to pregnancy in Mexico. As can be seen in Tables 10 and 11, however, the results do not carry over. There does not appear to be a relationship between the restrictiveness of abortion laws in Mexican states and either the unmet need for family planning or the contraceptive prevalence rate. Ancillary regressions thus provide further support of my theory that the economic model of fertility control does not apply as well to the developing world as it does to developed countries like the United States.

Table 10: State Policies and the Unmet Need for Family Planning, Mexico

Linear regression						
					Number of obs =	224
					F(14, 31) =	6.41
					Prob > F =	0.0000
					R-squared =	0.1911
					Root MSE =	3.5634
					(Std. Err. adjusted for 32 clusters in id)	

unfp	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
personhood	-.7865553	.4646886	-1.69	0.101	-1.734294	.1611833
kochmvl	-.3264174	.5376374	-0.61	0.548	-1.422936	.7701013
fertilityrate	2.671223	2.075224	1.29	0.208	-1.561224	6.90367
physicians	-1.672686	.5659791	-2.96	0.006	-2.827008	-.5183638
population	-1.74e-07	1.10e-07	-1.59	0.122	-3.98e-07	4.95e-08
populationdensity	.0008025	.0002607	3.08	0.004	.0002708	.0013342
lfp	.1689683	.0690028	2.45	0.020	.0282362	.3097003
infantmort	.1543045	.1489446	1.04	0.308	-.1494701	.4580791
elementary	.2717195	.1512302	1.80	0.082	-.0367165	.5801555
tertiary	-.510704	.5864141	-0.87	0.391	-1.706703	.6852954
secondary	.009668	.5838199	0.02	0.987	-1.181041	1.200377
indigenoupop	-2.638407	2.864056	-0.92	0.364	-8.479687	3.202872
GDP	.3186692	.5137273	0.62	0.540	-.7290847	1.366423
gini	21.0411	11.8372	1.78	0.085	-3.101037	45.18324
_cons	-24.9893	12.37077	-2.02	0.052	-50.21966	.2410551

Table 11: State Policies and Forward Lagged Contraceptive Prevalence, Mexico

Linear regression					Number of obs =	192
					F(14, 31) =	12.48
					Prob > F =	0.0000
					R-squared =	0.1002
					Root MSE =	5.4614
					(Std. Err. adjusted for 32 clusters in id)	

F.cpr	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
personhood	-.7804223	.911666	-0.86	0.399	-2.639777	1.078933
kochmvl	.3516609	.6870604	0.51	0.612	-1.049608	1.75293
childtowoman	-.4543931	.1765949	-2.57	0.015	-.8145607	-.0942255
physicians	-1.378641	.7415489	-1.86	0.073	-2.89104	.1337578
population	-1.40e-07	1.41e-07	-0.99	0.330	-4.28e-07	1.48e-07
populationdensity	-.0010654	.0003187	-3.34	0.002	-.0017153	-.0004155
lfp	-.1916175	.0942456	-2.03	0.051	-.3838327	.0005976
infantmort	-.0835011	.21058	-0.40	0.694	-.5129819	.3459797
elementary	.2236698	.3421514	0.65	0.518	-.4741526	.9214922
tertiary	.5238432	.9514148	0.55	0.586	-1.41658	2.464267
secondary	1.451276	1.029028	1.41	0.168	-.6474403	3.549992
indigenousspop	6.188864	4.413032	1.40	0.171	-2.811574	15.1893
GDP	-.3972967	.4613782	-0.86	0.396	-1.338284	.5436903
gini	-42.18629	19.06047	-2.21	0.034	-81.06039	-3.312201
_cons	114.2401	14.59275	7.83	0.000	84.47801	144.0022

This being said, the ancillary regressions reported in the present section of this chapter utilize the same data collected for the purposes of the primary analysis. In other words, the explanatory variables included in these models were originally intended to be regressed against the abortion rate rather than MMR, birth rates or any of my contraceptive variables. Consequently, in some of the secondary analyses r-squared values drop quite low. This is not always the case--maternal mortality models, for example, explained about forty-two percent of the variation in the values of my dependent variables. Even more impressively, my regressions of state birth rates displayed staggeringly high r-squared values in excess of .97. This was true regardless of which variable was used to gauge policy restrictiveness. Still, readers should pay careful attention to the r-squared values in interpreting the results reported in Tables 4-11.

Conclusion

Altogether, the expectations of the economic model perform very well when tested against data collected from the United States. The regressions reported in my primary analyses provide extensive evidence that legal restrictions are, for the developed world, an effective way to reduce abortion rates. They do not, however, adequately address the question of how abortion policy achieves this ends. Taken with prior research, however, ancillary tests indicate that it might do so in at least three ways: by replacing abortions with unwanted births, by increasing contraception or by reducing overall levels of sexual activity. The presence of three cooperating mechanisms may help to explain the substantive significance of legal restrictions in reducing abortion seen in the columns of Table One. These findings may also yield some valuable insights for political activists seeking to influence subnational policies in the developed world. Proponents of traditional family values for example, may take encouragement from results indicating that state policies can be an effective way to prevent abortions. They may also be happy to learn that legal restrictions on abortion work at least in part by mitigating overall levels of sexual activity as quantified by the AGI. However, conservatives should not be too quick rally around my results. The overwhelming support that my research yields for the economic model of fertility control also suggests that efforts to reduce abortion may be counteracted by cutbacks in welfare spending which increase the costs of unplanned childrearing. Similarly, because my results indicate that abortion restrictions may increase birth rates it is possible that the opposite is also true: legally restricting abortion may result in more women seeking government support to

help cover the expenses of children that they did not want and cannot afford to provide for on their own.

These conclusions are, incidentally, not without foundation in the existing literature. Lichter, McLaughlin and Ribar (1998), for example, found that "Welfare reform legislation and new legal restrictions on abortion are seemingly working at cross-purposes. The cutbacks in welfare have increased the costs of unmarried childbearing...arguably increasing the demand for abortions...at the same time...the public policy goal of reducing unmarried childbearing and the proportion of women heading families may be undermined...by increasing geographic and legal barriers to abortion" (pp. 286-7). It is also interesting to note that a similar line of logic may also have troubling implications for political advocacy groups on the left. As with previous studies, my ancillary models indicate that more restrictive policies may operate in large part by encouraging more responsible sexual conduct prior to a potential pregnancy. Progressive organizations such as the AGI or NARAL may therefore be counteracting their own efforts to prevent unplanned or unwanted pregnancies by also working for the liberalization of abortion policies in the United States. While none of this provides any normative indication of how best to legislate in this policy area, these insights may nevertheless prove interesting to individuals on both sides of the abortion debate.

Of course, my results do not yield any evidence that legal restrictions are a key determinant of abortion rates in developing countries. Both policy variables failed to obtain statistical significance in every single model run against data collected from south of the national border. Yet, preliminary evidence is not supportive of the theory that legal restrictions simply replace safe with unsafe abortions, either. On the contrary, findings

that increased contraception does not help to reduce abortion and that more restrictive abortion policies either mitigate or are unrelated to maternal mortality are actively in opposition to AGI argument. The academic community should therefore focus on generating a new theory of abortion in the developing world rather than simply relying on the narratives of prochoice organizations or extrapolating insights from the United States. Whatever theory the academic community generates, however, one thing is clear. The economic model of fertility control exhibits a greater degree of explanatory power when applied to developing countries. Results are therefore broadly and consistently supportive of both my hypothesis and my general theory.

CHAPTER V

CONCLUSION

The research described in preceding chapters of this thesis was conducted with the intent of exploring the impact of abortion's legal status on the frequency with which it occurs. A number of previous studies have also investigated this relationship but have made no attempt to integrate national or economic context into a comparative analysis of subnational abortion policies. They have also revealed something of an empirical puzzle. Studies of the United States provide extensive empirical evidence that legal restrictions can be an effective mechanism for the reduction of abortion. However, this relationship has not been substantiated by data collected at the supranational level. The academic community is therefore left with the task of explaining why the laws governing abortion seem to impact the rate at which it occurs when observed in the United States but not when examined on a global scale. As a result, even a cursory survey of the existing literature is enough to identify an ongoing disagreement between at least two broad categories of research. The first category is comprised of primarily Americanist studies that yield substantial evidence to suggest that abortion is a normal economic good and that it can be made less common through more restrictive policies. By contrast, the second category is made up of descriptive case studies and supranational reports arguing

that there is no relationship between abortion and its legal status. In addition to yielding insights about how my key variables interact in different contexts, then, my research also provides an opportunity to help resolve an empirical puzzle and to weigh in on a literary debate. All of this is achieved by postulating a theoretical narrative which helps to explain the empirical puzzle discussed above. More specifically, my thesis advances the existing literature by introducing a novel theory wherein the power of legal policies to reduce abortion is argued to be at least partially dependent upon national and economic context. In the second chapter, I built upon the insights of other scholars in order to argue that de jure restrictions of abortion are more effective in developed countries where the costs of family planning and unwanted birth are minimized. Conversely, they are less meaningful in developing or middle income countries where the costs of unwanted childbearing are more severe and the expenses entailed in preventing unplanned pregnancy are less affordable. Based on this theory I hypothesized that the restrictiveness of state policies would bear a statistically significant, inverse relationship to abortion rates in the United States but that this relationship would either be reduced or cease to exist when tested against data collected from Mexico. This hypothesis was then subjected to a battery of empirical tests according to the methodology described in Chapter III. The results of these tests were reported in Chapter IV and provide robust support for my theoretical expectations.

The implications of these findings are quite significant. Academically they suggest the need for a more broadly generalizable way to explain geographical and temporal variations in the rates at which abortion occurs. My findings indicate that explaining abortion on a global scale is not simply a matter of extrapolating the economic

model of fertility control to foreign countries. Neither is it as straight forward as postulating a one-size-fits-all story about whether legal policies influence the decisional calculus of women at risk of unplanned pregnancy or abortion. Instead, policy makers at the national, subnational and supranational levels must take economic context into consideration if they want to influence the overall number of abortions in a given country, region or first order administrative subdivision. Of course, readers should be cautious in the conclusions that they draw from the research described in this thesis. While my results are strongly supportive of the hypothesis first introduced in Chapter II, it is nevertheless necessary to conduct more research before we can confidently draw conclusions about how to explain abortion on a global scale.

My research does provide enough empirical evidence to challenge the broader applicability of the economic model of fertility control and to suggest that, contrary to the expectations of the AGI, legal restrictions can reduce abortion under at least some circumstances. It is also broadly supportive of my theory in that it shows a statistically significant and inverse relationship between abortion laws and abortion rates in the United States but not in Mexico. My theory is further buttressed by a series of ancillary regressions which further reinforce the expectations of the economic model of fertility control in the United States. For example, empirical tests indicate that women in the United States take extra precautions to avoid unplanned pregnancies when abortion policies are less permissive. This suggests that couples are forward thinking in determining their levels of sexual activity and that abortion is utilized as a sort of insurance policy for uninhibited sexual activity in states with more liberal abortion policies. Interestingly, secondary analyses also challenge the veracity of the Alan

Guttmacher Institute's argument that legal restricting abortion simply replace safe and legal terminations with unsafe and illegal ones. Altogether, these results suggest the need for a new theory of abortion in the developing world. However, further investigation is necessary before we can confidently identify what such a theory would look like. In other words, this thesis does more to show what does not explain abortion in middle income countries than it does to show what does do so.

For this reason, the central lesson that policy makers, activists and public leaders should draw from this thesis is one of caution and humility. This is not to say that my research offers no affirmative insights. On the contrary, it clearly indicates that the relationship between abortion and the law is at least partially context dependent. It is therefore imperative for researchers and policy makers alike to consider economic context when either studying abortion or seeking to limit the frequency with which it occurs. However, pro and anti-abortion actors have tended to make sweeping assertions about the ability of legal restrictions to reduce abortion. Researchers working with the Alan Guttmacher Institute, for example, have interpreted similarities in abortion rates between the developed and developing worlds as conclusive proof that the law is a nonfactor in determining how many women terminate their pregnancies or how frequently they decide to do so. The academic community, in contrast, has argued through its empirical research of the United States that legal restrictions are at least one in a number of important factors. My empirical results suggest that neither of these narratives is wholly true. Neither are they entirely false. Rather, each captures at least some aspect of the truth: the restrictiveness of policies may be an important factor in some cases but not in others. Instead of making sweeping assumptions about the

determinants of abortion and endorsing these on a universal scale, then, leaders and scholars alike should begin by trying to understand fertility decisions within their given contexts. Only afterwards can we begin to formulate informed arguments or nomothetic theories about how the law and abortion interact on a global scale. Simply comparing abortion rates in the developed regions of the worlds to those of the developing regions is in and of itself misleading and inadequate if the determinants of abortion in each of these settings are distinct from those in the other.

In the preceding chapters of this thesis I have argued that the relationship between my primary dependent and independent variables is mediated by economic and national context. I base this argument upon the literature-supported assumption that difference in economic contexts lead to systematic variations in the costs and affordability of abortion alternatives. Such alternatives may involve unwanted childbearing or additional steps to avoid an unplanned pregnancy in the first place. Either way, the literature reviewed in Chapter II provides ample reason to believe that these alternatives are likely more costly and less affordable in middle and low income countries where women have fewer economic resources and opportunities, where it is harder to access contraceptive services and where the consequences of unwanted childbearing are likely to be more severe. National and subnational leaders on both sides of the abortion debate therefore have a shared interest in promoting economic growth and lowering the costs associated with alternatives to abortion.⁵¹ Such steps may help to not only reduce the demand for abortion

⁵¹ It should be noted, however, that the results of my regressions do not generally provide support for the notion that abortion may be mitigated through an increase in contraceptive prevalence. This is somewhat puzzling in light of the fact that at least one of the theoretical mechanisms linking more restrictive policies to a reduction in abortion in the developed world is the proliferation of contraception. As has been previously discussed, the most likely explanation for this is that contraception is linked to abortion via two

but may also play a critical role in strengthening the ability of legal restrictions to limit abortion regardless of whether one believes that the government should endeavor to do so. At the same time, my research has some valuable lessons for the international community. It suggests that global strategies for the reduction of abortion, safe or otherwise, should not be adopted without due consideration being given to economic environments. Again, this deduction may be drawn without addressing the normative question of whether abortion is something that *should* be limited.

Unfortunately, there are several limitations associated with my research that may undermine the confidence with which some of these conclusions can be drawn. Although most of these limitations are fairly minor at least one is worthy of further discussion. Existing techniques for the estimation of induced abortion have been known to systematically overestimate abortion in countries with more restrictive policies (Koch et al 2015). This, in turn, creates an upward biasing affect that may help to explain why my empirical analyses found that legal restrictions were statistically significant in the United States but not in Mexico. The academic community should therefore continue to develop new methods for the estimation of induced abortion that yield more accurate and verifiable numbers. One possible approach may be to integrate a combination of qualitative and quantitative techniques (Edmeades et al. 2010) or to replace the existing and subjective multipliers of existing methodologies with empirical multipliers derived from standard populations (Koch et al 2012A). At the same time, further attention is

competing mechanisms: it reduces the risk that an individual instance of copulation will result in an unwanted pregnancy but offsets this benefit in aggregate by leading to an overall increase in sexual activity.

needed to identify the mechanisms through which legal restrictions reduce abortion in developed countries and to garner better measures of contraception for the United States.

In spite of these limitations and although there is a need for further research, my thesis provides a necessary first step in explaining why lessons learned from the United States are not substantiated by the supranational data. It also presents a novel theoretical narrative with the potential to not only guide further investigation but to help resolve a prior debate within the literature. While some caution is always advisable in drawing conclusions, especially where indirect methods of estimating induced abortion are employed, the results of my analyses are also valuable to policy makers and public leaders if only in that they are illustrative of a need for greater caution than has been exhibited by prior analyses. This thesis has thus served to help fill a gap and weigh in on a debate within the existing literature. At the same time it has highlighted a number of ancillary inquiries that remain unanswered and suggested a route forward for future research. The academic community should continue its quest to understand the relationship between abortion laws and abortion rates with greater humility: acknowledging the limitations associated with existing estimation techniques and being mindful of the possibility that the interactions between these variables are mediated by economic and national context.

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APPENDICES

Appendix Table 1: Independent Variables and Expectations for Primary Analyses, Mexico		
IV	Description	Primary Expectations
Personhood	Binary measure of state policy restrictiveness based on the presence or absence of constitutional protection life from conception. 1 = more restrictive.	My theory indicates a negative coefficient and limited or no statistical significance.
More/less permissive	Binary measure of state policy restrictiveness based on legal exceptions allowing for abortion. 1 = more <i>permissive</i> . Koch et al. (2015).	My theory indicates a <i>positive</i> coefficient and limited or no statistical significance.
Contraceptive Prevalence Rate (CPR)	Proportion of married women 15-44 currently utilizing at least one form of contraception.	The existing (AGI) narrative indicates a negative coefficient and statistical significance.
Unmet Need for Family Planning (UNFP)	Percentage of women who want to stop/delay childbearing but who are not using any method of contraception.	The existing (AGI) narrative indicates a positive coefficient and statistical significance.

Appendix Table 2: Independent Variables and Expectations for Primary Analyses, U.S.		
NARAL Index	Ordinal measure of state policy restrictiveness for the United States. Values range from 1 (the least restrictive) to 5 (the most restrictive) and are derived from NARAL's annual report card.	My theory indicates a negative coefficient and statistical significance.
Medicaid	Binary measure of a state policy restrictiveness for the United States. Based on the presence or absence of legal restrictions on Medicaid funding for abortions.	My theory indicates a negative coefficient and statistical significance.
Con13	Women defined by the AGI as in need of contraception divided by total population of women 15-44 (traditional definition of reproductive age).	The existing (AGI) narrative indicates a positive coefficient and statistical significance.
Con15	Women defined by the AGI as in need of contraception divided by total population of women 13-44 (AGI definition of reproductive age).	The existing (AGI) narrative indicates a positive coefficient and statistical significance.

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