ABORTION AS PREGNANCY INSURANCE

August 2001

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We would like to thank Brian Lavoie for research assistance, Jenny Hunt and Tori Velkoff for their assistance in collecting data for this project, and seminar participants at the National Bureau of Economic Research Summer Institute Children's Program Meeting, Syracuse University, and Baruch College.

ABSTRACT

This paper provides a theoretical examination and empirical evidence regarding the impact of changes in the legal status of abortion on abortions, births, and pregnancies. We first present a theoretical model which treats abortion access in a manner analogous to "pregnancy insurance," with a tradeoff between providing insurance against unwanted births and moral hazard in the form of additional pregnancies. After reviewing previous evidence that generally supports the predictions of the model, we analyze data from Europe between 1980 to 1997. Over this period several countries changed their abortion laws, providing significant variation regarding the degree to which abortion is restricted across countries and over time. We find that countries that changed from very restrictive to liberal abortion laws experienced a large reduction in births, highlighting the insurance value. On the other hand, changes from modest restrictions to abortion available upon request led to no such change in births despite large increases in abortions, indicating that pregnancies rose as well. This evidence is consistent with moral hazard.

I. INTRODUCTION

The debate about abortion typically involves issues of philosophy, religion, ethics, and feminism. When does life begin? Does a fetus have rights? Do women have the right to control their own reproductive functions? These issues are clearly crucial in determining one's position over the sets of policies that regulate the access and availability of abortion. Rarely, if ever, does the debate regarding abortion policy focus on the results of economic analysis. Yet standard economic models of decision-making under uncertainty when applied to this issue yield interesting predictions regarding women's behavior.

The purpose of this paper is to apply the tools of economic analysis to examine the impact on fertility-related behavior brought about by changes in abortion access. We first present a theoretical model that draws an analogy between abortion availability and standard models of insurance. In this model, we consider abortion to be much like "pregnancy insurance," that provides significant value in the form of preventing unwanted births, but may also lead to "moral hazard" in the form of additional pregnancies and, potentially, additional births. In the second part of the paper, we review the existing empirical evidence. We focus on the support for our theoretical model that may be gleaned from the evidence available from this literature.

The final part of the paper provides an empirical analysis of the changes in abortion access that have taken place in Europe over the past two decades. We consider changes made in Western Europe separately from those made in Eastern Europe and the former republics of the Soviet Union. The countries in the East, in particular, provide a valuable laboratory for examining the impact of changes in abortion policy because changes in this region have been both extensive and varied. We distinguish between highly restrictive, moderately restrictive, and largely unrestricted policies and

examine the impact of changes in these policies on legal abortions, maternal deaths (as an indicator of illegal abortion), fertility, and infant health.

The results of this analysis provide support for our theoretical model. First, we find that abortion does provide a significant insurance component in preventing unwanted births. Evidence for this is found in the reduction of births and maternal deaths that occur when abortion is no longer highly restricted. On the other hand, in countries with moderate restrictions in place that subsequently make abortion available upon request, we find no evidence of a reduction in births and strong evidence of an increase in pregnancies. These findings are consistent with the moral hazard implications of our model.

II. THEORY

In this section we develop a simple model of decision-making under uncertainty, closely related to Kane and Staiger (1997), and use the model to analyze how the availability of abortion affects a woman's choices about pregnancy risk, abortion, and birth. The use of such a model follows the pioneering work of Becker and others in assuming that fertility decisions are the result of a rational decision-making process in which a woman's actions are influenced by the expected costs and benefits of the choices she makes.[1]

A. Overview

Our model has three key features. First, women are able to take actions that reduce the risk of pregnancy, but these actions are increasingly costly as one tries to further reduce the risk of

[1]For early examples, see Becker (1960, 1965, 1981), Becker and Lewis (1973), Willis (1973) and Schultz (1973). Montgomery and Trussel (1986) provide a survey of early work in this area.

pregnancy. Second, decisions are made sequentially; actions are first taken that influence the risk of pregnancy, then pregnancy occurs (or not), and then after some time has elapsed a decision is made whether to abort or give birth. Third, women obtain better information over time, and so are better informed about the consequences of a birth at the time of choosing an abortion than at the time of becoming pregnant.[2]

Within this simple structure, the key role of abortion is in providing insurance. A woman faces uncertainty both about becoming pregnant and the consequences of a birth. Abortion provides insurance by limiting the down-side risk; a woman can choose ex-post to have an abortion if the cost of giving birth is high. As in all insurance models, there will be a trade off between insurance and incentives. The availability of low-cost abortion reduces risk in the sense that an unwanted birth may be avoided. On the other hand, it may also distort the initial decision to become pregnant. As in other models of fire or medical insurance, better insurance results in less precaution against an adverse event (e.g. more pregnancy) and more use of the insured service following an adverse event (e.g. more abortion).

B. Setup

More formally, we consider the simple model illustrated in figure 1. A woman initially chooses a level of contraceptive intensity, which determines the probability (P) that she avoids getting pregnant. For simplicity, we assume that a woman who practices no contraception (including

[2]In fact, there is considerable evidence that information obtained after becoming pregnant (e.g. support from parents or boyfriend, health problems of mother or fetus) is an important determinant of the abortion decision (Bankole, Singh and Haas, 1998;. Torres and Forrest, 1988).

abstinence) will become pregnant with certainty.[3] The cost of adopting a particular intensity level is defined by the function, C(P), where we assume that C' > 0 and C'' > 0 (i.e. that the marginal cost of reducing the risk of pregnancy is positive and increasing). A woman then either becomes pregnant with probability,1-P, or not with probability, P.

If she is not pregnant, she receives a payoff normalized to 0. If she is pregnant, she then receives additional information regarding the payoff to a birth; with probability that information is negative. If she has the baby, it would be "unwanted" and we define the payoff to be -1. Alternatively, with probability 1 - , she is presented with positive information, so that the payoff to giving birth is +1 (a "wanted" birth). Should she decide to have an abortion, she receives a payoff of -A, where A represents the cost (both monetary and psychic) of an abortion and is assumed to be nonnegative. The woman's objective is to maximize her expected payoff net of the cost of pregnancy reduction.

C. Solution

The solution to this model is straightforward, and is derived by working backwards. The decision between abortion and birth is made after becoming pregnant and after learning whether the birth will be wanted or unwanted. A woman for whom a birth will be wanted will always give birth (since 1 > -A) and receive a payoff of 1. A woman for whom a birth will be unwanted will abort if the cost of abortion is less than the cost of giving birth (A<1), and will give birth otherwise. In this case the payoff represents the least costly option; she pays a cost equal to min(A,1). Therefore, the

[3]A straightforward extension could cap that probability at the biological maximum for women engaging in regular sexual activity without using any contraception.

expected payoff from being pregnant *prior to learning if the birth will be wanted* is simply E(payoff|pregnant) = 1 (1 -) - min(A,1) .

To determine the optimal level of contraceptive intensity, we maximize the expected payoff net of the cost of pregnancy avoidance. That is, we maximize:

(1) Expected Payoff = P E(payoff|not pregnant) + (1-P) E(payoff|pregnant) - C(P).

The first order condition yields:

(2) C'(P*) = E(payoff|not pregnant) - E(payoff|pregnant) = - E(payoff|pregnant)

= min(A,1) - (1-).

In other words, a woman chooses P so that the marginal cost of pregnancy reduction (C') is just equal to the marginal benefit (the gain in expected payoff from avoiding pregnancy).

D. Implications for the Individual

This model provides predictions for individual behavior that differ depending upon a woman's likelihood of an unwanted birth and her own personal cost of abortion, which includes psychic and monetary costs. We consider each of the possible alternative scenarios in turn.

1. Likely Wanted Birth

If a woman is likely to have a birth that is wanted (i.e. a low value of), then she will not engage in any pregnancy avoidance behavior ($P^* = 0$) regardless of the status of abortion policy. From equation 2, a corner solution is obtained if the expected payoff to a pregnancy is positive. Based on the normalizations imposed in our model, such an outcome is guaranteed if is less than 0.5, which is indicative of a likely wanted birth. But a woman in this category may still obtain information after becoming pregnant (like a fetal defect) that changes the extent to which the birth is wanted. In this case, the woman may choose to abort rather than give birth if the abortion cost is

less than the newly determined cost of giving birth, or A < 1. This decision is clearly a function of abortion costs. If abortion costs fall below the threshold of the birth cost, the woman would change her behavior and abort rather than give birth to an unwanted child. For her, a fall in abortion costs acts strictly as insurance, providing protection from an otherwise unanticipated, unwanted birth.

2. Likely Unwanted Birth, High Abortion Cost

For births that are more likely to be unwanted (defined here to be a value of > .5), a woman's behavior will depend upon the specific degree to which it is likely to be unwanted and the cost of abortion, and A. In the following discussion, we fix the value of and indicate how women's behavior responds to changes in abortion costs. This discussion is facilitated by Figure 2, which illustrates the implications of changes in abortion costs on abortions, births, and pregnancies (the sum of the first two).

When abortion costs are high (defined to be greater than 1), equation 2 simplifies to C'(P*) = 2 - 1 and an interior solution is guaranteed for > .5 (which is our definition of a likely unwanted birth). In this case, pregnancy avoidance behavior, P^*, is maximized and unaffected by further increases in abortion costs. Despite the woman's pregnancy avoidance measures, a pregnancy will result some fraction of the time and additional information is revealed subsequently regarding whether the birth will be wanted. In the unlikely event that the birth is wanted, then obviously a birth results. But even in the more likely event that the birth is unwanted, the birth still takes place because abortion costs are greater than the costs of the unwanted birth (A > 1). Therefore, as displayed in the far right region of Figure 2, pregnancies are minimized, but all pregnancies result in births. None of these outcomes is affected by changes in abortion costs until the abortion cost falls below the threshold defined by A = 1. At that point, all pregnancies that

would result in an unwanted birth are aborted, so births decline. Lower cost abortion acts as insurance here as well.

3. Likely Unwanted Birth, Moderate Abortion Cost

As A falls below 1, equation 2 simplifies to C'(P*) = A - (1 -) and an interior solution is guaranteed as long as A remains above (1-)/ . For those pregnancies that do result, the abortion cost is below the cost of an unwanted birth, indicating that a pregnancy that is revealed to result in an unwanted birth is now aborted. In this case, outcomes are affected by changes in abortion costs. Further reductions in costs lead to reductions in pregnancy avoidance and increases in pregnancies. For those pregnancies that do result, abortions and births will be split proportionally according to the likelihood that the birth is wanted, so both abortions and births will rise as well.

These effects are shown in the middle region of Figure 2. As the abortion cost falls below the threshold at which an unwanted pregnancy is aborted, we see a discrete increase in the likelihood of abortion and a discrete drop in the likelihood of a birth. This pattern reiterates the insurance value of abortion in preventing unwanted births. On the other hand, we begin to see the introduction of moral hazard as abortion costs continue to fall. As costs fall further, pregnancy avoidance wains at an increasing rate, increasing the likelihood of pregnancy as well as both abortions and births.

4. Likely Unwanted Birth, Low Abortion Cost

When abortion costs become low enough, so that A < (1-)/ , then a corner solution emerges again and $P^* = 0$; no pregnancy avoidance occurs. In the likely outcome that a pregnancy would result in an unwanted birth, the woman aborts. Otherwise she gives birth. None of these behaviors is affected by further reductions in the cost of an abortion. This behavior is represented by the left-most segment in Figure 2. In this region, the low cost of abortion strictly results in moral

hazard. Here, because abortion is "cheap enough," a woman will take no actions to prevent pregnancy and decides subsequently whether to abort after she has more information regarding the "wantedness" of the birth. In other words, the only form of contraception is abortion.

5. Summary

Oveall, this simple model implies that a reduction in the cost of abortion will have an increase or no effect on pregnancies and abortions for the individual. However, the relationship between abortion cost and births is non-monotonic. If abortion costs start high, modest reductions in the cost lead to fewer unwanted births (insurance). More extensive reductions in the cost lead to more wanted births as women increase their pregnancy risk and continue to abort the fraction of births that would be unwanted (moral hazard).

E. Implications for Society

The implications for the individual become somewhat more complicated when they are extended to society as a whole. First, there is an aggregation issue in which individuals facing different abortion costs and different likelihoods of having a wanted birth are combined. Second, we have assumed that contraceptive technology is comparable for all women within a society, but across societies these technologies may differ, altering the C(P) function. This section will address the implications of both of these issues in predicting the societal impact of changes in abortion costs.

1. Aggregation

The preceding section indicated that the predicted impact of reductions in abortion costs for a particular woman with a specific probability of having a wanted birth ( ) who is facing a particular abortion cost (A - which includes psychic costs). But in a society, women differ on both dimensions. In other words, each society has a joint distribution, F(A,), and the impact of a small reduction in

abortion costs on birth rates depends upon this distribution. It is important to note, however, that the likelihood of both pregnancies and abortions will increase in response to a reduction in abortion costs regardless of the form of this distribution.

The predicted impact on births in response to a small reduction in abortion costs depends upon the share of women in each of the four categories defined in the preceding section. For instance, we know that for women who are likely to have a wanted birth, a reduction in abortion costs can only reduce births. Similarly, for women who face high abortion costs and have a high probability of an unwanted birth, a reduction may lead them to have fewer (unwanted) births. On the other hand, for those who have a similar probability of an unwanted birth, but face a moderate abortion cost, a reduction in abortion costs will increase births. The overall impact on births will depend upon the distribution of women across these categories and, therefore, is ambiguous.

Larger changes in abortion costs cannot be evaluated within this framework because of the extent to which women would "move" between categories. For the purposes of this analysis, we assume that a large reduction in abortion cost (in response to, say, its broad legalization) would result in a cost of abortion less than the cost of an unwanted birth for most, but certainly not all, women. As such, we would expect to see an increase in abortions and a reduction in (unwanted) births. This prediction is consistent with the conventional wisdom regarding the impact of changes in the cost of abortion.

2. Differences in Contraceptive Technology

Women's ability to effectively prevent an unwanted pregnancy has important implications regarding the impact of changes in abortion costs as well. In societies in which modern methods of contraception are readily available, relatively small pregnancy avoidance measures can significantly

reduce the likelihood of an unwanted pregnancy. Greater efforts can virtually eliminate it. Elsewhere, traditional methods of contraception that are less effective and require far greater efforts to obtain similar results. In the context of our model, the more advanced the state of contraception is, the greater the value of C'(P).

Differences in contraceptive technologies across societies do not alter the qualitative implications of our model for individuals or in the aggregate. These differences do, however, affect the magnitude of the impact of policy changes. In particular, women who are likely to have an unwanted birth and face a moderate abortion cost, choose their level of pregnancy avoidance according to the relationship: C'(P*) = A - (1 -). In societies with superior contraceptive technology, changes in abortion cost will have a greater impact on pregnancy avoidance, abortions, and births for women in this category, but the direction of the effect does not change. In addition, women who are likely to have an unwanted birth and face high abortion costs choose their level of pregnancy avoidance based on the relationship: C'(P*) = 2 - 1. For a particular value of , better contraceptive technology simply increases the extent of pregnancy avoidance and lowers the fraction of unwanted births that will not be avoided. But this is independent of changes in the cost of abortion (so long as it remains "high").

F. Summary

Our model suggests that it is useful to think of abortion as an insurance mechanism. As we increase insurance (by making abortion less costly) we improve the welfare of women by reducing the risk they face. But for some women we also distort decisions if abortion becomes sufficiently low in cost, increasing the pregnancy rate. The effect of this distortion on the pregnancy and abortion rate is unambiguous; lower abortion costs are associated with higher rates of abortion and

pregnancy. However, the effect on birth rates is ambiguous depending upon an individual's likelihood of having a wanted birth and her perception of the cost of abortion. If the decline in abortion costs is great (as it would be in response to a broad legalization), however, it will lead to a decrease in birth rates.

III. REVIEW OF RELATED LITERATURE

An extensive empirical literature exists that considers the response in women's outcomes brought about by changes in abortion access, which can be used to examine some of the theoretical predictions of our model. In this section of the paper, we review this evidence with an emphasis on findings from research examining changes in abortion access in the United States.

Until recently, most research in this area tended to ignore the possibility that changes in abortion policy may alter the likelihood of pregnancy as well as the decision to abort once pregnant.[4] Early research typically examined the impact of abortion legalization in the United States in the early 1970s on the birth rate and, to a lesser extent, the rate of maternal mortality (c.f. Tietze, 1973; Sklar and Berkov, 1974; Baumann et al., 1977; Quick, 1978; Tietze, 1984; and Joyce and Mocan, 1990).[5]

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[4]For instance, Potter (1972) formally argues that 100 additional abortions do not necessarily lead to 100 fewer births because a woman who aborts may get pregnant again relatively quickly. The notion that those abortions may result from pregnancies that would not have occurred otherwise is not addressed. In another example, Trussell, et al. (1980), examine the impact of Medicaid funding restrictions on abortion and birth rates and find that they were associated with a significant decline in abortions, but that births were largely unaffected, which means that pregnancies had to fall. Yet the authors dismiss this possibility out-of-hand, stating: *"Other choices theoretically available to women denied access to Medicaid-funded abortions were avoiding intercourse or improving their contraceptive practice. We believe that neither of these options was of practical significance during the course of the study"* (p. 121).

[5]Abortion was legalized in five states in 1970 as four states (New York, Washington, Alaska, and Hawaii) passed laws and a de facto legalization took place in California about that time. The

More recent research on both the effect on births (Angrist and Evans, 1999; and Levine, et al., 1999) and maternal mortality (Dow and Ronan, 1997) has addressed some of the methodological limitations of earlier work (using the same techniques we employ subsequently), correcting problems like inadequate control groups, measurement error, and the influence of interstate travel. Estimates based on this more recent research indicate that abortion legalization in the United States in the early 1970s led to up to a 10 percent reduction in births and almost a 10 percent reduction in deaths to women of childbearing age. Research from other countries similarly shows that changes in abortion legalization that took place in the 1950s and 1960s also had a dramatic impact on births and maternal mortality, although the magnitude of these effects varies from country to country (c.f. Potts et al.,1977; Coelen and McIntyre, 1978; and Frejka, 1983).

An important limitation of this research is its failure to consider the impact of abortion legalization on the probability of becoming pregnant. Yet, based upon an estimate of the reduction in fertility of 10 percent following legalization in the United States (and assuming little or no change in the rate of spontaneous abortion), if one could determine the increase in the frequency of abortion the impact on pregnancies could be estimated. Unfortunately, the number of illegal abortions performed prior to legalization is a statistic that, for obvious reasons, can never be determined with any degree of accuracy. For example, if one assumes that pregnancies are unaffected (as done by Tietze, 1973, and Quick, 1978), then a 10 percent reduction in births following legalization (about 300,000 fewer births per year in the mid 1970s) combined with the approximately 1.3 million legal abortions being performed in the U.S. at that time implies that nearly 1 million illegal abortions were being performed prior to legalization. At the other extreme, if one assumes that no illegal abortions

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1973 Supreme Court decision in Roe v. Wade legalized abortion in the rest of the country.

were performed prior to legalization, then the implication is that pregnancies increased by 25 percent following legalization of abortion.[6] A potentially more reasonable middle ground position would suggest that perhaps half a million illegal abortions were being performed and that pregnancies increased by, say, 10 to 15 percent.

In fact, earlier evidence from Eastern Europe suggests that pregnancies may be very responsive to abortion legalization (Frejka, 1983). In Romania, for example, following a surprise policy change in October 1966 that made abortion illegal (after ten years of liberal availability), birthrates rose by more than 50 percent in 1967, the first year following the change. However, by 1970 birthrates fell by about 25 percent relative to 1967. This indicates that either women were able to incorporate this change into their behavior, lowering their pregnancy rates, or that an extensive market for illegal abortions developed very rapidly.

Recent research has begun to formally address the question of whether or not changes in abortion policy affect the likelihood of becoming pregnant. Although data on pregnancies is typically unavailable in a source that is of sufficient size and quality to test this hypothesis, researchers have relied upon a combination of birth and abortion data. Assuming that spontaneous abortions are unaffected by access to induced abortion, changes in the sum of births and abortions may be attributed to changes in pregnancies.

Studies in this area typically involves women's responses to relatively moderate changes in abortion access, like Medicaid abortion funding restrictions and parental consent laws. Moderate changes in abortion access are not believed to lead to large numbers of illegal abortions, so that the

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[6]This calculation is based upon the assumption that roughly 4 million pregnancies are required to result in roughly 3 million births.

impact on abortions, births and pregnancies (the sum of the first two) can be estimated. In response to Medicaid funding restrictions, in particular, a large body of evidence indicates that these sorts of changes significantly reduced the number of abortions performed (c.f. Trussell, 1980; Joyce, 1988; Lundberg and Plotnick, 1990 and 1995; Blank, et al., 1996, Cook, et al., 1996; Currie, et al., 1996; and Haas-Wilson, 1996). A common finding across papers is that Medicaid funding restrictions lowered the abortion rate by about 3 to 5 percent. The evidence regarding parental involvement laws and abortion demand is less robust across papers and model specifications (c.f. Cartoof and Klerman, 1988; Haas-Wilson, 1996; and Joyce and Kaestner, 1996)

Recent research has extended this literature by including births as an outcome as well, so that implications regarding pregnancies may be drawn. The results from these analyses provide evidence that these changes in abortion access may affect women's sexual activity and/or contraception behavior. Regarding Medicaid funding restrictions, these papers continue to find that abortions are reduced when restrictions are imposed, but they also find no corresponding increase in births (c.f. Matthews, et al. 1996; and Levine, Trainor, and Zimmerman, 1996). In fact, some evidence appears to indicate that births also fell in response to these policies. These findings imply that fewer women became pregnant after the restriction was imposed. Regarding parental involvement laws, in those studies that do find that these policies reduced abortions (Rogers, et al., 1991; Ohsfeldt and Gohmann, 1994; and some specifications in Matthews, et al., 1996), birthrates are estimated to either fall or remain constant, again indicating that pregnancies fell.

Moreover, Joyce, et al. (1997) show that a mandated waiting period reduced abortion rates, but found no strong evidence of an increase in births. Kane and Staiger (1996) find that Medicaid funding restrictions, parental involvement laws, and increases in travel distance to the county of the

nearest abortion provider did not increase teen births and, if anything, reduced them. Taken collectively, none of these studies find much evidence of opposite effects on abortions and births brought about by changes in abortion access, which would be required if pregnancies were not affected by the policy change.

In summary, the available evidence provides several insights regarding the impact of changes in abortion access on women's fertility-related behavior. First, the effect of limits to abortion access appears to depend upon the extent of the limitation. When abortion is legalized, births decline substantially. Unfortunately, it is difficult to accurately assess the impact on pregnancies from such a policy change because the number of illegal abortions performed prior to legalization can never be known with any degree of accuracy. Nevertheless, the fact that births fall so much at least allows us to determine that at least some of the additional abortions prevented unwanted births. On the other hand, in response to more modest restrictions to abortion access (like Medicaid funding restrictions), the bulk of the evidence indicates that abortion demand is reduced, but that births do not rise and may even fall. These facts imply that women may increase their use of contraception or reduce their sexual activity in response to moderate abortion restrictions.

IV. ABORTION LEGALIZATION IN EUROPE

Recent history in Europe provides a great resource for further examination of the impact of changes in abortion policy on fertility-related behaviors. Several countries instituted changes to their laws regulating abortion availability and many of these changes were rather dramatic. The experience of Eastern European countries is particularly useful in that countries that imposed restrictions strongly enforced them and liberalization was clearly brought about by political change.

This section of the paper will present an empirical analysis of the impact of those changes, focusing on the 1980 through 1997 period.

A. Description of Abortion Laws

European countries have in place a wide variety of laws regarding abortion access, ranging from countries like Ireland, in which abortion is virtually completely outlawed, to countries like Denmark and Russia, where abortion is available on request with few, if any, barriers. Table 1 presents a brief summary of laws in each country, noting the changes that have taken place since 1980. The Data Appendix provides a list of sources we used to compile this table. Here, and in the remainder of the analysis, throughout the period we consider both regions of Germany (the former Federal Republic and the former Democratic Republic) as well as the Czech and Slovak Republics separately.[7]

We provide a main classification of the legal status of abortion in each country at a point in time and break it into five separate categories.[8] These categories include: (1) "Life" in which abortion is only available to save the life of the mother; (2) "Medical" in which an abortion is available for those with specific, narrow medical conditions only; (3) "Physical/Mental Health" in which an abortion is available to those for whom the pregnancy/birth is leading to physical or serious mental health problems; (4) "Medical/Social" in which an abortion is available to those with medical

[7]We have chosen not to include the new countries that emerged from the former Yugoslavia, partly because of limited data availability and partly because of the conditions of war that persisted over much of this region in the 1990s. Because the status of Turkey as being part of Europe appears to be unclear and because the Turkish total fertility rate in 1980 is considerably higher than the rest of Europe, we have chosen to exclude Turkey from our sample. We also do not include other countries in Europe, like Luxembourg and Liechtenstein, because of their size.

[8]These classifications largely follow those used by the Alan Guttmacher Institute in their summary of world abortion laws (Henshaw, 1990; and Rahman, et al., 1998).

problems or those for whom the birth of a child would present some hardship; and (5) "On Request" in which an abortion is available if a woman asks for one.[9] We also include a set of classifications describing additional regulations regarding abortion access among those countries/years in which abortion is generally available (i.e. either Medical/Social or On Request). These include the presence of a waiting period and/or counseling before an abortion may be performed, whether the procedure is subsidized by the government, and whether parental consent is required for minors.

Two important caveats are in order in interpreting our classifications regarding the legal status of abortion. First, we have coded the statutory provisions of the law and not the law as it is, in fact, practiced. For instance, in Belgium, abortion was not officially legalized until 1991. Before that it was mainly illegal according to the law, but abortion clinics were operating openly in the 1980s (c.f. Henshaw, 1990; United Nations, 1992) Second, abortion access can vary greatly even within the category. For instance, in Denmark, a woman seeking an abortion faces virtually no obstacles in obtaining one. In Germany after 1993 abortion is also available "on request," but a woman seeking an abortion is required to be counseled towards giving birth and must wait three days before the procedure can be performed. Nevertheless, if she persists in her request to obtain an abortion, she can get one, which is why we code this country as "on request."

Over the 18 year period we examine, a number of changes in the main legal status of abortion are observed in these countries. In Western Europe, all changes in abortion policy move in the direction of greater access. Belgium (in 1991), Greece (in 1986), and the Netherlands (in 1981) made the most dramatic changes, moving from a legal environment where abortion was only

[9]We do not separately categorize those countries with restrictive policies in which abortion is available in cases of rape/incest or fetal defects, but these exceptions are noted in the brief narrative description for each country.

available in limited circumstances to one where abortion is available on request.[10] Portugal (in 1984) and Spain (in 1985) liberalized abortion somewhat, moving from a regime where abortion was only available to save the life of the mother to one in which it is available for reasons of physical or mental health. In the western portions of reunified Germany, abortion access also increased in 1993, moving from being available for medical or social reasons to being available upon request (albeit, with a waiting period and mandatory counseling).[11]

In Eastern European countries that were not part of the former Soviet Union, virtually every country instituted fundamental changes to their laws governing abortion. Some, but not all, of these changes (Albania in 1991, Bulgaria in 1990, and Romania in 1990) coincided with the transition from communism to democracy as strong pro-natalist policies previously enacted in these countries were abandoned. In the Czech and Slovak Republics, requirements that an abortion request be approved on the basis of a medical or social condition were dropped in 1987 and abortion became available upon request. This change took place 6 years before the two republics split apart and 3 years before the collapse of the Soviet Union. Hungary made a similar change in policy in 1993. The only example in all of Europe of a significant tightening of abortion availability during this period is Poland. After Soviet domination ended, the strong influence of the Catholic church led to the imposition of strict regulations in 1993, allowing abortion only in limited circumstances. In the

[10]In each case, however, abortion was reportedly practiced openly before it was formally legalized (c.f. United Nations, 1992 and 1994).

[11]We code this change as occurring in 1993 in response to a German court decision, which dictated abortion policy in the country until 1995, when legislation consistent with the court decision was enacted (Dorbritz and Fleischhcker, 1999).

European republics of the former Soviet Union, abortion was available on request both before and after the break-up.

B. Methodology and Data

To empirically examine the impact of changes in abortion policy on fertility-related behavior, we estimate regression models of each outcome considered as a function of the legal status of abortion, macroeconomic conditions, specific age composition among all women of childbearing age, country and year fixed effects, and, in some models, country-specific trends. The outcomes we consider are the abortion rate (abortions per 1,000 women age 15 to 44), the age-specific rate of deaths to women of childbearing age relative to that for men (the ratio of the number of deaths per 100,000 women in each age group to the comparable statistic for men), age-specific birth rates, and the "pregnancy rate" (the number of births and abortions per 1,000 women age 15 to 44).

Models of the abortion rate are estimated to provide an indication that abortion access is, in fact, changing when its legal status changes. We consider the relative female death rate to provide an indication of the extent of illegal abortions performed in a country. If a pregnant woman has a strong preference against giving birth and a legal abortion is not available, she may turn to an illegal abortion, which may pose a health risk to the mother. Following Dow and Ronan (1997), we normalize the rate of death to women of childbearing age using the analogous measure for men to control for other possible changes taking place over time in the health care delivery system of each country.

Birth and abortion outcomes provide perhaps the most direct test of our theoretical model. If increased abortion access reduces births then outlawing abortion would lead to unwanted births. On the other hand, if no impact or an increase is observed in births, then any increase in abortions

brought about by increased access would have been the result of additional pregnancies. In our analysis, we consider both the overall birth rate (the number of births per 1,000 women age 15 to 44), as well as age-specific birth rates. We also create a pseudo-pregnancy rate, defined as the sum of births and abortions per 1,000 women age 15 to 44. Analysis of this variable allows for a test of the impact of abortion access on pregnancies assuming that spontaneous abortions are unaffected by any such policy change.

We control for macroeconomic conditions in these models as well because they may also influence our outcome measures and be related to the timing of changes in abortion law. Particularly in Eastern Europe and the former republics of the Soviet Union, the decline and collapse of the Soviet empire led to dramatic economic contractions and rampant inflation in many countries. To the extent that these economic developments are correlated with the political developments that led to changes in abortion policy, it is important to control for them. Therefore, our models include measures of gross domestic product per capita and the level of inflation.

In the model, country fixed effects are included to control for long-term, country-specific differences in outcomes that may be attributed to differences in history, culture, other institutional arrangements, and the like. Time fixed effects are added to control for trends occurring over time that are common to each country. For instance, in Eastern Europe and the republics of the former Soviet Union, the timing of the decline and fall of the Soviet Empire certainly had important influences on all these countries. In some specifications, we also include time trends that are allowed to vary across countries. This approach provides the advantage of capturing any factor within a country that is changing over time and is also different from that occurring in other countries. On the other hand, some worry that such models result in "over-fitting" the data, significantly reducing

the power of the analysis (c.f. Blank, 2000). We present our results both with and without these trends to examine the sensitivity to their inclusion. In models without country-specific trends, identification is provided by those countries that changed their abortion laws over the period. In models with the trends, identification is based upon the discrete nature of the change in abortion laws and the change in outcomes right around the time of the change of the abortion law.

To estimate these models, we have compiled a dataset comprised of abortions, births by age group, deaths by sex and age, and population size by sex and age for Western European countries as well as those in Eastern Europe and the former Soviet Republics in Europe. Data on each outcome is available for most, but not all, years in our sample period of 1980 to 1997, as detailed in Appendix Table 1. Our data sources are presented in the Data Appendix. Briefly, we obtained the majority of our data from various international compilations from the United Nations, the World Health Organization, and the Council of Europe.[12] It is important to recognize that all data on abortions represent legally obtained services and are likely to understate the total number of abortions performed in countries where strong restrictions are in place.

In addition to these demographic data, we have also collected data on macroeconomic conditions in each of the countries in our analysis. The specific measures we include are the natural log of per capita gross domestic product (GDP), and a set of dummy variables representing different levels of inflation (less than 5 percent, between 5 and 25 percent, between 25 and 100 percent, and greater than 100 percent). For most western European countries and for those countries in eastern

[12]The main complications arose in Germany and the Czech and Slovak Republics, because of German reunification and the break up of Czechoslovakia in the middle of our sample period. To acquire data for the two German regions separately following reunification and for the two Czechoslovak Republics prior to their separation required additional data from the united countries' statistical yearbooks and direct communications with their national statistical offices.

Europe and the former Soviet Union following the collapse of the Soviet empire, these data were largely available from the World Bank.[13] But for those countries in the East during the communist era, the available macroeconomic data was obtained from the estimates made by the Central Intelligence Agency, for which the quality is unknown. Moreover, even using the CIA estimates, some countries and years still have missing data for these macroeconomic variables. To include these countries in our analysis, we have added dummy variables for both the GDP and inflation measures indicating whether or not these data are missing.

C. Descriptive Analysis

Before presenting the results of our regression analysis, we first present a descriptive analysis that is intended to characterize the data and to highlight some of the econometric issues that will arise subsequently. We begin by reporting Table 2, which presents mean values of our outcome measures in Western Europe, Eastern Europe, and the republics of the former Soviet Union, weighted by the relevant population measure in each country, in 1980 and 1995.[14] We also report statistics for the United States for purposes of comparison.

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[13]Germany and the former Czechoslovakia present additional problems since macroeconomic data are difficult to obtain for separate regions within a country. In Germany, we were able to obtain separate estimates for the two regions of the level of GDP starting in 1991. For previous years, we calculated the level of GDP for both regions using the more recent data combined with CIA estimates of GDP growth rates in earlier years. We have complete inflation data for the western sections of Germany both before and after reunification. For the eastern regions, we have inflation data from the German Statistical Office beginning in 1992 and CIA estimates through 1989, but we were unable to locate data for 1990 and 1991. For the Czech and Slovak Republics, the World Bank reports separate GDP data going back to 1984. Before that we assigned the GDP growth rates from the combined Czechoslavakia to the 1984 levels of GDP to project backwards. We also assumed that inflation rates in the two halves of the country were the same before they separated.

[14]The latter year was chosen because the problem of missing data becomes somewhat greater for 1996 and 1997.

The first row of the table provides estimates of the reported abortion rate and provides evidence of huge disparities across regions. In 1980, about 13 women per 1,000 of childbearing age aborted in Western Europe, but in Eastern Europe the comparable level was more than three times greater and in the European republics of the former Soviet Union, the level was about 10 times greater. Those relative comparisons do not change much by 1995 in that all regions experienced at least a 25 percent reduction in abortion rates and the former Soviet republics still exhibit an abortion rate 8 times greater than that in Western Europe. But that masks the absolute magnitude of the decline in the Soviet Union, which declined from a level of 127.4 to 75.9.

Regarding female mortality, we see that across the age spectrum and across region women in these age ranges experience levels of mortality that are one quarter to one half those of men. This excessive risk of death among men is particularly apparent in the former Soviet Republics. These ratios have fallen over time most notably in Eastern Europe and somewhat in Western Europe among non-teens.

Perhaps the most notable change over time in these data is the dramatic decline in births in all of Europe (but not in the United States). The total fertility rate, which represents the number of children a woman can expect to have over all her childbearing years based on present age-specific birth rates, stood at roughly two (or replacement level) in all regions of Europe in 1980. By 1995, that rate was below 1.5 in all regions. In fact, in the former German Democratic Republic (East Germany), the level has fallen below unity and remained there since 1991. These declines are generally brought about by reductions in birth rates at all ages in these regions. Figure 3 presents the complete time series in total fertility rates over our sample period for both western European countries and the combination of Eastern Europe and the former Soviet Republics. It shows a slow

gradual downward trend in western Europe, but a dramatic decline beginning in 1988 or 1989 in the East. Although total fertility rates began somewhat higher in these eastern regions compared to Western Europe, by the early 1993 this was reversed. The timing of this decline corresponds well with the political and economic uncertainties brought about by the decline and dissolution of the Soviet Union. With declining rates of abortion and birth, our constructed pregnancy rate declines as well. The striking statistic here is that almost two-thirds of these constructed pregnancies are represented by abortions in the former republics of the Soviet Union.

In Figures 4 to 6 we present a series of comparisons of our outcome measures between Romania and the former republics of the Soviet Union. We chose Romania because it represents the country with the most extreme increase in abortion access for which we have complete data in our sample. Prior to 1990, abortion was only legally available under a limited number of medical conditions (although the officially reported abortion rate in the mid 1980s was still at a high level of about 40 per 1,000 women of childbearing age) but it became available upon request in that year. The former Soviet republics experienced little change in their abortion policies over the period and may provide a suitable control group.

Figure 4 indicates that reported abortions skyrocketed at precisely that time, rising to almost 200 in 1990 and 172 in 1991. Abortion in the republics of the former Soviet Union did not change much at about this time, resulting in a dramatic relative rise in abortion in 1990. In 1989, the abortion rate in Romania was roughly one-third the level of the former Soviet Republics, but it spiked to being about three-quarters greater in 1990.

Figure 5A provides evidence that maternal mortality dropped noticeably at precisely that time as well, suggesting there was a large reduction in illegal abortions. The ratio of female-to-male

deaths among those age 15 to 44 in Romania hovers around 0.5 through 1989 before dropping to 0.45 in 1990 and 1991 and then to about 0.4 after that. This evidence is consistent with previous studies that have found a dramatic reduction in maternal mortality in Romania following abortion legalization (c.f. Baban, 1999). This distinct pattern is obscured somewhat in a comparison with the Soviet Union, which has an unusual time pattern as well, running up in 1985 and 1986 and then slowly declining. Figure 5B presents the direct comparison and shows that the influence of abortion legalization on female deaths in Romania is harder to see in this framework. The relative female death rate is indeed lower in Romania than in the former Soviet Republics in the 1990s, but the decline is not discrete. This comparison provides some indication that we may have some difficulty distinguishing between a policy effect and country-specific trends in our regression analysis below.

The impact of abortion legalization on fertility can be seen in Figure 6. Here we see that fertility in Romania was roughly 10 percentage points higher than in the former Soviet Republics through 1989, although this difference was not perfectly stable. Beginning in 1990, however, that gap disappeared, suggesting that abortion legalization in Romania reduced the total fertility rate by about 10 percent. Given the dramatic increase in abortions and the smaller relative decrease in births, one may suspect that pregnancies increased as well. Drawing such a conclusion is hindered, however, by the fact that no data are available on the number of illegal abortions performed prior to abortion legalization in Romania. In the econometric analysis reported below, we discuss certain assumptions that may help us make more definitive statements regarding the impact of changes in abortion laws on the pregnancy rate.

D. Econometric Results

1. Abortion Rates

Tables 3 through 6 report the results of our econometric analysis, beginning with the impact of changes in abortion laws on the abortion rate in Table 3. As with all subsequent tables, we estimate and report results from models for Western Europe and for Eastern Europe along with the former Soviet Republics separately. We also report results from models with and without country-specific linear trends. Throughout the remainder of the analysis, the omitted legal status is available on request so that all coefficients for those types of abortion laws included should be interpreted relative to an on-request legal regime.

The first two columns of this table display our estimates for Western Europe without (Column 1) and with (Column 2) country-specific trends. Surprisingly, these estimates do not provide strong evidence that changes in the legal status of abortion had much impact on abortion rates. Parameter estimates tend to be small and inconsistent across specifications and the types of changes in legality. Missing data prevent us from identifying the impact when laws are changed to allow abortion solely for reasons of physical or mental health.

The weakness of these results are likely to be related to substantial data limitations. Identification in these models comes from those countries that changed their abortion laws over time and, as we described earlier, in Western Europe those countries are Belgium, the former Federal Republic of Germany, Greece, the Netherlands, Portugal, and Spain. We have no abortion data for Belgium, Greece, Portugal, or Spain for the periods before legalization. The Netherlands is one of the remaining countries and that only provides one observation prior to legalization in 1981.

Moreover, abortion was reportedly widely practiced in the Netherlands even before legalization (c.f. United Nations, 1994).

In the former Federal Republic of Germany, the 1993 changes in abortion policy are complicated by the process of German reunification. Apparently, differences in its legal status between East and West Germany were an important issue in the reunification process (Dorbritz and Fleischhcker, 1999). A political compromise crafted in 1990 allowed the two regions to keep their existing policies temporarily until new national guidelines could be drafted; importantly, women in the West were allowed to travel to the East to take advantage of the East's more liberal laws. These arrangements undoubtedly complicated the process of counting abortions and, in fact, the Alan Guttmacher Institute (1999) does not categorize German abortion data as being reliable until 1995.

Due to these data limitations, it is difficult to draw any conclusions regarding the impact of changes in abortion law on rates of abortion in Western Europe. Although these problems will not affect our analysis of Western European fertility and mortality, for which our data are virtually complete and likely to be of high quality, they will reappear when we examine patterns in pregnancies, defined to be the sum of births and abortions.

In Eastern Europe and the former Soviet Republics, our abortion data is more complete, although the quality of the data that does exist is questionable in some countries (AGI, 1999).[15] In Columns 3 and 4 we estimate abortion rate models for this region using all of our available data and

[15]Another potential problem with the available abortion data is that in the former Soviet Republics, through the late 1980s abortion counts included spontaneous abortions. We do not believe that this presents a serious limitation for our analysis for two reasons. First, most spontaneous abortions occur relatively soon after the start of the pregnancy and it would seem unlikely that the majority of them would be counted. Second, no noticeable deviation from trend is apparent in these republics at the time of the change in definitions.

in Columns 5 and 6 we replicate the analysis using only data for those countries and years in which the Alan Guttmacher Institute has specifically identified abortion counts to be virtually complete.[16] The results provide strong evidence that the status of abortion laws has a large impact on the abortion rate. For instance, based on all available abortion data, countries in which abortion is only legal to save the mother's life or for specific medical reasons have abortion rates that are only about 5 percent of the level observed in countries in which abortion is legal upon request.[17] Unfortunately, we cannot identify this parameter in models with the more limited, complete abortion data. Here, and in all subsequent models, we are never able to identify the parameter for the variable indicating abortion is legal for physical or mental health reasons only because no countries in these regions ever had these policies.

Those countries/years in which abortion is available for medical and social reasons are also found to have a significantly lower abortion rate compared to those countries/years in which abortion is available upon request. Estimates of this parameter are noisy, but still statistically significant in models using all the abortion data (Columns 3 and 4), indicating that abortion is reduced by about 20 to 60 percent in response to the more restrictive rules. When we only use those countries with

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[16]The Eastern European countries and former Soviet Republics that the Alan Guttmacher Institute considers to have virtually complete abortion data are: Belarus, Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, and the Slovak Republic. We omit a similar analysis for Western Europe since the problems in German abortion data previously discussed only leave us the one observation in Netherlands in 1980 to identify any changes.

[17]With the dependent variable measured in logs and parameter estimates this large in absolute value, one cannot simply interpret the coefficients as an approximation of a percentage change. The impact is obtained by taking the number e raised to the power of the coefficient (i.e. $e^{-3.1} = 0.045$, so that countries where abortion is only available to save the mother's life or for specific medical reasons have abortion rates that are 4.5 percent the level observed in countries and years where abortion is available on demand).

complete abortion data (Columns 5 and 6), we find a much more precise and robust estimate of about a 25 percent reduction in the abortion rate.

Results from this analysis also provide some interesting evidence regarding the impact of economic conditions on the decision to abort, particularly in the East. In those regions, we find a strong negative relationship between the state of the economy and the abortion rate. Across specifications, we find that an increase in GDP per capita reduces the abortion rate; a one percent increase reduces abortions by roughly 0.2 to 0.4 percent. In models using all the available abortion data, we also find that high inflation leads to a significant increase in the abortion rate. For instance, countries with very high inflation rates, over 100 percent, are estimated to experience about a 40 percent increase in abortion rates. These results, however, are not robust to limiting the sample to those countries with complete abortion data.

2. Relative Female Death Rates

Tables 4A and 4B present estimates from models where the dependent variable is the ratio of female-to-male death rates for various age groups in Western Europe and in Eastern Europe and the former Soviet Republics, respectively. In Western Europe (Table 4A), we find no compelling evidence that changes in the legal status of abortion had any impact on the relative female death rate. One explanation for this is that illegal abortion was not a tremendous problem in Western Europe over this period. Alternatively, those illegal abortions that were being performed may not have differed significantly from those performed legally. Although abortion was officially illegal in some of these countries at the beginning of our sample period, it was often practiced openly as described earlier, and may not have posed a significant health threat to women who used those services. Moreover, given that travel distances are relatively short in Europe and borders are open, those who

might otherwise turn to a risky illegal abortion may have chosen to obtain a legal abortion in a different country.

Results are somewhat different for Eastern Europe and the former Soviet Republics, as reported in Table 4B. Here we see that in models without country-specific trends, estimates indicate that the relative female death rate is 7 to 10 percent higher, depending upon the specific age group, in countries where abortion is only available to save a mother's life or for other specific medical reasons compared to countries in which abortion is available upon request. The introduction of country-specific trends, however, lowers these estimates and increases their standard errors to the point where they are no longer statistically significant. Our earlier analysis of Romania foreshadowed this problem, making it difficult to draw strong conclusions regarding the impact of strong abortion restrictions on maternal deaths and, hence, illegal abortion.

On the other hand, we find no evidence that countries with weaker abortion restrictions (i.e. those where abortion is available for medical or social reasons) experience any difference in relative female death rates. Point estimates are close to zero or wrong-signed and generally not statistically significant. This finding is important because it provides evidence that illegal abortion is probably not a tremendous problem in countries with these weaker restrictions compared to those in which abortion is available on request. It still may take place, but it seems unlikely that it is extensive or terribly risky. This conclusion will play an important role in our subsequent analysis of pregnancy behavior.

3. Fertility Rates

Estimates from our analysis of the responsiveness of fertility to changes in abortion policy is reported in Tables 5A and 5B for Western Europe and for Eastern Europe and the former Soviet

republics, respectively.[18] In Western Europe, we see that severely restricting abortion access so that it is only available to save the mother's life or for other specific medical reasons has a strong positive impact on the birth rate. Imposing these restrictions increases the overall birth rate by 5.7 to 8.5 percent, depending upon the treatment of country-specific trends, relative to countries where abortion is available upon request. Interestingly, this birth effect is only observed for non-teens, suggesting that teenagers are not the ones who will experience unwanted births if abortion availability was severely restricted. This conflicts with prior evidence from the United States, which finds that teens were the demographic group with the largest reduction in fertility when abortion was legalized in the early 1970s (Levine, et al. 1999). Beyond the impact of these severe restrictions, more modest restrictions appear to have no obvious effect on fertility. Economic conditions also appear to matter in that increases in GDP per capita are predicted to reduce fertility, particularly among older women.

In Eastern Europe and the former Soviet republics we see even stronger effects of severe abortion restrictions. Relative to countries in which abortion is available upon request, the birth rate in countries in which abortion is only available to save the mother's life or for other medical reasons is estimated to face a birth rate that is 9 to 18 percent higher, depending upon the treatment of country-specific trends. This effect appears to be strong across the age distribution, although identifying an age pattern is difficult as age-specific estimates are somewhat unstable depending upon the treatment of country-specific trends. If abortion is made available for medical or social

[18]We have also estimated analogous models where the dependent variable is the total fertility rate. The results from these models were very similar to those reported here regarding birth rates for women age 15 to 44. This makes sense because the main difference between this birth rate and the total fertility rate is the specific age composition of women of childbearing age. But these models control for age composition. We chose to report the birth rates because they are easier to interpret in the context of an analysis of abortion and pregnancy behavior.

reasons, births are estimated to rise slightly overall and generally throughout the age-distribution compared to those countries where abortion is available upon request, but these effects are generally not statistically significant. Based on our earlier evidence indicating that these policies did have a rather large impact on abortion rates, the combination of these findings suggests that pregnancies are lower in this policy environment compared to one where abortion is available upon request. We treat this implication more formally below. Regarding economic conditions, findings across specifications are not terribly robust making it difficult to draw definitive conclusions.

4. Pregnancies

So far we have seen that particularly in Eastern Europe severe abortion restrictions have large effects on both the abortion rate and birth rate, while more moderate restrictions reduce the number of abortions, but do have a statistically significant impact on fertility. In this section we combine abortions and births into a pseudo-pregnancy measure and estimate comparable models to those reported earlier. Results from these models will provide formal estimates of the balance of the potentially offsetting pregnancy effects brought about by changes in abortions and births.

Estimates from models of the pregnancy rate (or the sum of abortions and births per 1,000 women age 15 to 44) are reported in Table 6. We report results for Western Europe for the purpose of completeness, but it is difficult to learn much about pregnancies in that region because of the problems with the abortion data described earlier. Nevertheless, we do find robust results indicating that increases in GDP per capita lead to statistically significant reductions in pregnancies.

We focus instead on the results from Eastern Europe, where we see that severe abortion restrictions lead to large reductions in this measure of pregnancies. Using all the available abortion data, estimates indicate that pregnancies fall by 28 to 45 percent when abortion moves from available

upon request to available only in serious medical circumstances. This estimate may be inaccurate, however, in that it fails to include counts of pregnancies that result in illegal abortions when restrictions are severe. The results from Table 4B provide some evidence for this in that maternal mortality rises when abortion is severely restricted, indicating that at least some illegal abortions are performed. This problem is identical to the one described earlier regarding the impact on pregnancies of abortion legalization in the United States. Without additional information, we cannot draw strong conclusions regarding the pregnancy impact of such a policy change.

On the other hand, we are on safer ground drawing strong conclusions regarding the impact of more moderate abortion restrictions. In Table 4B, we found no evidence that maternal mortality rises when abortion is made available for medical or social reasons compared to when it is available upon request. This suggests that illegal abortions are probably not a huge problem under these circumstances. We do not conclude from this that they do not occur, only that they are not that prevalent. This is important because we also see that the pregnancy rate is estimated to fall by about 25 percent in response to these more moderate restrictions when we use all available abortion data and by roughly 10 percent when we restrict the analysis to those countries with complete abortion data. If illegal abortions are performed only infrequently in locations that have imposed these more moderate restrictions, then these estimates probably are at least close approximations of the true pregnancy effect. Based on this evidence, we conclude that pregnancies really are meaningfully reduced when moderate abortion restrictions are imposed.

V. CONCLUSIONS

The evidence we have presented for Europe is consistent with a growing body of recent evidence from the United States that similarly compares regions with changed abortion access to regions where it has been stable. As has been found in the United States, we find that modest restrictions on abortion access have no significant effects on birth rates, but do reduce abortion rates and, by implication, pregnancy rates by a substantial amount. In the countries of Eastern Europe and the Former Soviet Republics, where abortion data is more readily available, we find that modest restrictions on abortion access reduced abortions by about 25 percent and pregnancies by about 10 to 25 percent. Moreover, we find no evidence of a rise in maternal mortality associated with these modest restrictions, which suggests that this decline in pregnancy was not offset by any substantial rise in illegal abortions.

In contrast, we find that more severe restrictions on abortion access were associated with significant increases in the birth rate, in both Eastern and Western Europe, ranging from 6 to 18 percent. At the same time, these severe abortion restrictions were associated with increases in maternal mortality rates of 4 to 10 percent in Eastern Europe and the Former Soviet Republics, suggesting substantial use of illegal abortion. Based on all available abortion numbers in these countries, we estimate that pregnancies rates fell by 28 to 45 percent when abortion access was very restricted (although this is most likely an over-estimate because it does not count illegal abortions). These results are consistent in magnitude with estimates of how the legalization of abortion in the United States affected birth rates and maternal mortality rates, and also consistent with earlier evidence from Romania suggesting that pregnancy rates fell about 25 percent after abortion was made illegal.

More broadly, our results add to the growing evidence that *both* pregnancy rates and the use of abortion react to changes in abortion access. If abortion access is viewed as a form of social insurance, there is a natural tradeoff between insurance (in the form of avoiding unwanted births) and incentives (in the form of less avoidance of pregnancy). Our findings suggest that such a tradeoff exists, and should be acknowledged in the design of abortion policy. However, our results say nothing specific about the optimal level of abortion access that balances the benefits of insurance against the costs of poor incentives. In general, the principles of optimal insurance suggest that some form of partial insurance is optimal – i.e. that women should face some cost of abortion between zero (perfect insurance) and the social cost (perfect incentives). But, of course, the optimal solution is complicated by variation across women in the degree of moral hazard and disagreement over the social cost of an abortion. Nonetheless, we believe that this conceptual framework provides a useful starting point for a more objective analysis of abortion policy.

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Table 1: Brief Description of European Abortion Policies, 1980-1997

Country	Years Legalized	Description	Coding			
			Legal Status of Abortion	Waiting Period/ Counseling	Large Cost Subsidy	Parental Consent
		WESTERN EUROPE				
Austria	1974-present	Legal on request in first 12 weeks of pregnancy following medical consultation.	On Request	No	No	No
Belgium	before 1991[1]	Prohibited except to save the life of the mother.	Life	NA	NA	NA
	1991-present	Legal in first 12 weeks of pregnancy following mandatory counseling and a six day waiting period.	On Request	Yes	No	No
Denmark	1973-present	Legal in first 12 weeks of pregnancy. Women must be informed of the risks and alternatives.	On Request	Yes	Yes	Yes
Finland	1970- present	Legal in the first 12 weeks of pregnancy upon the approval of two physicians. Women must be informed of the risks of the procedure and provided with information about contraception following it.	Medical/ Social	Yes	Yes	No
France	1975-present	Legal in the first 10 weeks of pregnancy following mandatory counseling and a one week waiting period.	On Request	Yes	Yes	Yes
Germany (former FRG)	1976-1992	Circumstances limited to rape or incest, maternal health, or social or emotional distress	Medical/ Social	Yes	Yes	No
	1993-present	Legal in the first 12 weeks of pregnancy after mandatory counseling and a 3 day waiting period. Procedure is subsidized in majority of cases.	On Request	Yes	Yes	No

Greece	1978-1985[1]	Legal in the first 12 weeks of pregnancy to protect the mother's physical or mental health only.	Phys/Mental Health	NA	NA	NA
	1986-present	Legal on request in the first 12 weeks of pregnancy.	On Request	No	Yes	Yes
Ireland		Abortion is strictly prohibited except to save the life of the mother.	Life	No	No	No
Italy	1978-present	Legal in the 90 days of pregnancy subject to mandatory counseling, a one-week waiting period, and physician approval.	Medical/ Social	Yes	Yes	Yes
Netherlands	before 1981[1]	Legal only to save the mother's life.	Life	NA	NA	NA
	1981-present	Legal on demand after a 5 day waiting period with no formal gestational limit.	On Request	Yes	Yes	Yes
Norway	1979-present	Legal in the first 12 weeks of pregnancy. Women must be informed of the risks and alternatives.	On Request	No	Yes	Yes
Portugal	before 1984	Abortion was strictly prohibited except to save the life of the mother.	Life	NA	NA	NA
	1984-present	Legal under limited circumstances (rape, maternal health, fetal deformities) after a 3 day waiting period.	Phys/Mental Health	NA	NA	NA
Spain	before 1985	Abortion was strictly prohibited except to save the life of the mother.	Life	NA	NA	NA
	1985-present	Legal under limited circumstances (rape, maternal health, fetal deformities).	Phys/Mental Health	NA	NA	NA
Sweden	1975-present	Legal in the first 18 weeks of pregnancy.	On Request	No	Yes	No

Switzerland	1942-present	Legal only if a woman's life or (physical or mental) health is threatened.	Phys/Mental Health	NA	NA	NA
United Kingdom (Excluding N. Ireland)	1967-present	Legal in the first 24 weeks of pregnancy for social and medical reasons upon the approval of two physicians.	Medical/ Social	No	Yes	Yes
		EASTERN EUROPE				
Albania	before 1991	Legal for limited medical reasons only.	Medical	NA	NA	NA
	1991-present	Legal on request in first 12 weeks of pregnancy	On Request	No	Yes	No
Bulgaria	1973-1989	Legal for medical reasons or on request in the first 10 weeks of pregnancy for certain categories of women, like those with two or more children.	Medical/ Social	Yes	Yes	No
	1990-present	Legal on request in the first 12 weeks of pregnancy.	On Request	No	Yes	No
Czech Republic	1957-1986	Legal for maternal health or social reasons in the first 12 weeks of pregnancy.	Medical/ Social	Yes	Yes	No
	1987-present	Legal in the first 12 weeks of pregnancy upon request and physician approval.	On Request	No	Yes	Yes
Germany (former GDR)	1972-1992	Legal on request in the first 12 weeks of pregnancy.	On Request	No	Yes	No
	1993-present	Legal in the first 12 weeks of pregnancy after mandatory counseling and a 3 day waiting period. Procedure is subsidized in majority of cases.	On Request	Yes	Yes	No

Hungary	1973-1992	Legal for medical reasons or on request in the first 12 weeks of pregnancy for certain categories of women, like those with three or more children.	Medical/ Social	Yes	Yes	No
	1993-present	Legal in the first 12 weeks of pregnancy after counseling and a three day waiting period.	On Request	Yes	Yes	Yes
Poland	1956-1992	Legal in the first 12 weeks of pregnancy for medical and social reasons.	Medical/ Social	Yes	Yes	Yes
	1993-present	Legal only when the pregnancy threatens the mother's life or health, in cases of rape/incest, or in cases of fetal defects.	Medical	NA	NA	NA
Romania	1966-1989	Legal in very limited circumstances (mother's life, rape, very large family, etc.).	Medical	NA	NA	NA
	1990-present	Legal upon request in the first 12 weeks of pregnancy.	On Request	No	Yes	No
Slovak Republic	1957-1986	Legal for matemal health or social reasons in the first 12 weeks of pregnancy.	Medical/ Social	Yes	Yes	No
	1987-present	Legal in the first 12 weeks of pregnancy upon request and physician approval.	On Request	No	Yes	Yes
		FORMER SOVIET REPUBLICS				
Belarus Estonia Latvia Lithuania Moldova Russian Federation Ukraine	1955-present	Legal on request in the first 12 weeks of pregnancy following consultation with doctor and notification of possible adverse consequences.	On Request	Yes	Yes	No

Notes:

[1]Abortions were openly performed in at least some regions of the country in the period prior to broad legalization.

Table 2: Weighted Average Values of Outcome Measures, by Region

	Western Europe		Eastern Europe		Former Soviet Republics		United States	
	1980	1995	1980	1995	1980	1995	1980	1995
Reported Abortion Rate	12.9	9.6	41.7	32.4	127.4	75.9	29.3	22.9
Relative Female Death Rate, Age 15-44	0.463	0.436	0.418	0.356	0.273	0.264	0.423	0.413
Relative Female Death Rate, Age 15-19	0.392	0.390	0.421	0.427	0.336	0.354	0.376	0.382
Relative Female Death Rate, Age 20-34	0.418	0.376	0.385	0.334	0.240	0.237	0.356	0.363
Relative Female Death Rate, Age 35-44	0.522	0.498	0.436	0.354	0.283	0.266	0.532	0.451
Total Fertility Rate	1.79	1.47	2.22	1.36	1.93	1.36	1.84	2.02
Birth Rate, Women 15-44	60.7	51.2	79.5	45.4	68.9	42.1	68.4	65.5
Birth Rate, Women 15-19	20.5	12.0	43.8	31.2	50.1	47.0	53.0	56.8
Birth Rate, Women 20-34	101.4	82.0	123.3	82.2	111.6	68.6	98.3	100.3
Birth Rate, Women 35-44	16.6	21.1	14.6	10.1	11.4	6.6	12.5	21.1
"Pregnancy Rate," Women 15-44	69.7	59.1	121.2	77.8	196.7	118.0	97.7	88.4

Notes: The relative female death rate for women 15 to 44 is the ratio of female death rate to the male death rate for men and women in that age group. Reported statistics are weighted by the relevant denominator for each rate (e.g. the number of women between the ages of 15 and 44 for the total fertility rate). Countries from the former USSR include Belarus, Latvia, Lithuania, the Republic of Moldova, the Russian Federation, and the Ukraine. The "pregnancy rate" is defined to be the sum of the total number of births and abortions per 1,000 women age 15 to 44. The abortion rate and birth rate for women 15 to 44 do not sum to the pregnancy rate because of missing data on abortions.

Table 3: Effect of Legal Status of Abortion on Abortion Rate[1]

	Western Europe		Eastern Europe/Former Soviet Republics			
			All Abortion Data		Complete Abortion Data	
	(1)	(2)	(3)	(4)	(5)	(6)
Legal to Save the Mother's Life or for Other Specific Medical Reasons	-0.240 (0.181)	0.061 (0.099)	-3.114 (0.175)	-2.596 (0.114)	---	---
Legal for Reasons of Physical or Mental Health	—	—	—	—	---	---
Legal for Medical or Social Reasons	-0.218 (0.093)	-0.133 (0.070)	-0.624 (0.197)	-0.196 (0.098)	-0.284 (0.039)	-0.249 (0.040)
Log GDP per Capita	1.307 (0.471)	0.422 (0.315)	-0.463 (0.209)	-0.400 (0.132)	-0.175 (0.130)	-0.431 (0.196)
Inflation between 5 and 25 Percent	-0.027 (0.034)	0.030 (0.018)	0.174 (0.086)	0.033 (0.041)	-0.038 (0.040)	-0.014 (0.041)
Inflation between 25 and 100 Percent	---	---	0.160 (0.140)	0.252 (0.068)	0.078 (0.052)	0.098 (0.058)
Inflation greater than 100 Percent	---	---	0.395 (0.137)	0.342 (0.069)	0.067 (0.068)	0.075 (0.078)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-Specific Trend	No	Yes	No	Yes	No	Yes
Number of Observations	177	177	223	223	115	115

Notes: The dependent variables in all models are measured in logs. All estimates are obtained from models that also include dummy variables indicating whether GDP and inflation data are missing and the percentage of women between the ages of 15 and 44 in each five year age interval, and that are weighted by the size of the relevant population.

Table 4A: Effect of Legal Status of Abortion on Relative Female Death Rate in Western European Countries, by Age[1]

	Age 15-44		Age 15-19		Age 20-34		Age 35-44	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Legal to Save the Mother's Life or for Other Specific Medical Reasons	0.006	-0.007	0.007	-0.050	0.005	-0.044	0.012	0.027
	(0.023)	(0.022)	(0.047)	(0.065)	(0.028)	(0.033)	(0.028)	(0.030)
Legal for Reasons of Physical or Mental Health	-0.031	-0.019	-0.036	-0.068	-0.012	-0.081	-0.025	0.046
	(0.022)	(0.025)	(0.046)	(0.073)	(0.028)	(0.038)	(0.027)	(0.034)
Legal for Medical or Social Reasons	0.001	0.013	0.048	-0.010	0.002	0.050	-0.014	-0.014
	(0.023)	(0.025)	(0.055)	(0.081)	(0.029)	(0.037)	(0.028)	(0.033)
Log GDP per Capita	-0.244	-0.232	-0.123	-0.154	-0.517	-0.573	-0.021	0.105
	(0.088)	(0.105)	(0.184)	(0.314)	(0.111)	(0.157)	(0.108)	(0.140)
Inflation between 5 and 25 Percent	-0.012	-0.002	-0.010	-0.010	-0.018	-0.005	-0.002	0.005
	(0.008)	(0.006)	(0.017)	(0.019)	(0.010)	(0.009)	(0.010)	(0.008)
Inflation between 25 and 100 Percent	-0.009	0.025	0.109	0.108	-0.063	-0.010	0.027	0.041
	(0.043)	(0.032)	(0.085)	(0.089)	(0.054)	(0.049)	(0.055)	(0.045)
Inflation greater than 100 Percent	----	---	----	---	—	---	—	---
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Specific Trend	No	Yes	No	Yes	No	Yes	No	Yes
Number of Observations	259	259	259	259	259	259	259	259

Notes: The relative female death rate for women 15 to 44 is the ratio of female death rate to the male death rate for men and women in that age group. The dependent variables in all models are measured in logs. All estimates are obtained from models that also include dummy variables indicating whether GDP and inflation data are missing and the percentage of women between the ages of 15 and 44 in each five year age interval, and that are weighted by the size of the relevant population.

Table 4B: Effect of Legal Status of Abortion on Relative Female Death Rate in Eastern Europe and Former Soviet Republics, by Age[1]

	Age 15-44		Age 15-19		Age 20-34		Age 35-44	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Legal to Save the Mother's Life or for Other Specific Medical Reasons	0.100	0.028	0.081	0.067	0.066	0.017	0.101	0.029
	(0.021)	(0.027)	(0.039)	(0.056)	(0.028)	(0.038)	(0.023)	(0.027)
Legal for Reasons of Physical or Mental Health	---	—	---	—	---	---	---	---
Legal for Medical or Social Reasons	-0.038	-0.015	-0.090	-0.084	-0.101	-0.063	-0.001	0.016
	(0.024)	(0.023)	(0.044)	(0.048)	(0.032)	(0.034)	(0.026)	(0.023)
Log GDP per Capita	-0.120	-0.013	-0.096	0.019	-0.185	-0.086	-0.090	0.054
	(0.046)	(0.051)	(0.086)	(0.110)	(0.061)	(0.074)	(0.049)	(0.053)
Inflation between 5 and 25 Percent	0.009	-0.005	0.003	-0.002	0.005	-0.007	0.019	-0.002
	(0.011)	(0.009)	(0.020)	(0.021)	(0.014)	(0.013)	(0.012)	(0.010)
Inflation between 25 and 100 Percent	-0.002	-0.008	0.012	0.020	-0.003	0.004	-0.002	-0.014
	(0.018)	(0.017)	(0.033)	(0.036)	(0.023)	(0.024)	(0.019)	(0.017)
Inflation greater than 100 Percent	0.012	-0.008	0.009	0.0003	0.014	-0.002	0.015	-0.007
	(0.018)	(0.017)	(0.033)	(0.037)	(0.023)	(0.024)	(0.020)	(0.018)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Specific Trend	No	Yes	No	Yes	No	Yes	No	Yes
Number of Observations	215	215	215	215	215	215	215	215

Notes: The relative female death rate for women 15 to 44 is the ratio of female death rate to the male death rate for men and women in that age group. The dependent variables in all models are measured in logs. All estimates are obtained from models that also include dummy variables indicating whether GDP and inflation data are missing and the percentage of women between the ages of 15 and 44 in each five year age interval, and that are weighted by the size of the relevant population.

Table 5A: Effect of Legal Status of Abortion on Fertility in Western European Countries

	Birth Rate, Women 15-44		Birth Rate, Women 15-19		Birth Rate, Women 20-34		Birth Rate, Women 35-44	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Legal to Save the Mother's Life or for Other Specific Medical Reasons	0.103 (0.033)	0.060 (0.021)	-0.058 (0.066)	-0.103 (0.053)	0.069 (0.031)	0.049 (0.020)	0.189 (0.050)	0.111 (0.035)
Legal for Reasons of Physical or Mental Health	-0.037 (0.032)	0.021 (0.025)	-0.088 (0.064)	0.009 (0.058)	-0.044 (0.031)	0.026 (0.022)	-0.113 (0.049)	0.033 (0.039)
Legal for Medical or Social Reasons	0.029 (0.034)	0.037 (0.024)	0.099 (0.077)	0.017 (0.063)	0.010 (0.032)	0.005 (0.021)	0.122 (0.051)	0.123 (0.037)
Log GDP per Capita	-0.580 (0.127)	-0.205 (0.099)	0.376 (0.258)	0.062 (0.240)	-0.464 (0.125)	0.002 (0.088)	-1.377 (0.198)	-0.545 (0.157)
Inflation between 5 and 25 Percent	-0.002 (0.012)	0.007 (0.006)	0.026 (0.024)	0.037 (0.015)	-0.005 (0.012)	0.006 (0.005)	-0.030 (0.019)	-0.019 (0.010)
Inflation between 25 and 100 Percent	-0.002 (0.064)	0.066 (0.032)	0.044 (0.119)	0.166 (0.069)	-0.018 (0.061)	0.058 (0.028)	-0.011 (0.102)	0.004 (0.051)
Inflation greater than 100 Percent	—	---	---	---	---	---	---	---
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Specific Trend	No	Yes	No	Yes	No	Yes	No	Yes
Number of Observations	266	266	251	251	251	251	251	251

Notes: The dependent variables in all models are measured in logs. All estimates are obtained from models that also include dummy variables indicating whether GDP and inflation data are missing and the percentage of women between the ages of 15 and 44 in each five year age interval, and that are weighted by the size of the relevant population.

Table 5B: Effect of Legal Status of Abortion on Fertility in Eastern Europe and the Former Soviet Republics

	Birth Rate, Women 15-44		Birth Rate, Women 15-19		Birth Rate, Women 20-34		Birth Rate, Women 35-44	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Legal to Save the Mother's Life or for Other Specific Medical Reasons	0.174 (0.030)	0.093 (0.035)	0.234 (0.064)	0.183 (0.054)	0.195 (0.032)	0.069 (0.036)	0.314 (0.078)	0.071 (0.089)
Legal for Reasons of Physical or Mental Health	---	—	---	---	---	—	---	---
Legal for Medical or Social Reasons	0.011 (0.034)	0.039 (0.030)	0.041 (0.067)	0.047 (0.043)	0.034 (0.034)	0.069 (0.029)	-0.081 (0.082)	0.066 (0.069)
Log GDP per Capita	-0.239 (0.036)	-0.052 (0.040)	-0.715 (0.073)	-0.158 (0.058)	-0.220 (0.036)	-0.029 (0.038)	-0.186 (0.088)	0.211 (0.096)
Inflation between 5 and 25 Percent	-0.002 (0.015)	-0.021 (0.013)	0.020 (0.031)	-0.023 (0.018)	0.007 (0.014)	-0.011 (0.012)	0.042 (0.037)	-0.015 (0.030)
Inflation between 25 and 100 Percent	0.016 (0.024)	-0.012 (0.021)	0.084 (0.049)	0.016 (0.030)	0.021 (0.024)	-0.002 (0.019)	0.089 (0.060)	-0.026 (0.050)
Inflation greater than 100 Percent	0.004 (0.024)	-0.024 (0.021)	0.097 (0.047)	0.021 (0.031)	0.001 (0.023)	-0.022 (0.020)	0.020 (0.058)	-0.068 (0.050)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Specific Trend	No	Yes	No	Yes	No	Yes	No	Yes
Number of Observations	231	231	229	229	229	229	229	229

Notes: The dependent variables in all models are measured in logs. All estimates are obtained from models that also include dummy variables indicating whether GDP and inflation data are missing and the percentage of women between the ages of 15 and 44 in each five year age interval, and that are weighted by the size of the relevant population.

Table 6: Effect of Legal Status of Abortion on the "Pregnancy Rate"[1]

	Western Europe		Eastern Europe/Former Soviet Republics			
			All Abortion Data		Complete Abortion Data	
	(1)	(2)	(3)	(4)	(5)	(6)
Legal to Save the Mother's Life or for Other Specific Medical Reasons	0.017 (0.073)	0.093 (0.042)	-0.274 (0.042)	-0.450 (0.046)	---	---
Legal for Reasons of Physical or Mental Health	---	---	---	---	---	---
Legal for Medical or Social Reasons	0.033 (0.038)	0.062 (0.030)	-0.239 (0.047)	-0.276 (0.039)	-0.106 (0.022)	-0.081 (0.017)
Log GDP per Capita	-0.501 (0.198)	-0.441 (0.135)	-0.234 (0.050)	0.050 (0.054)	0.082 (0.078)	-0.263 (0.093)
Inflation between 5 and 25 Percent	0.009 (0.014)	0.018 (0.008)	0.048 (0.020)	0.026 (0.017)	-0.042 (0.024)	-0.016 (0.018)
Inflation between 25 and 100 Percent	---	---	0.099 (0.033)	0.052 (0.027)	0.016 (0.030)	0.030 (0.026)
Inflation greater than 100 Percent	---	—	0.091 (0.033)	0.033 (0.028)	0.019 (0.039)	0.014 (0.035)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-Specific Trend	No	Yes	No	Yes	No	Yes
Number of Observations	168	168	213	213	109	109

Notes: The dependent variables in all models are measured in logs. All estimates are obtained from models that also include dummy variables indicating whether GDP and inflation data are missing and the percentage of women between the ages of 15 and 44 in each five year age interval, and that are weighted by the size of the relevant population.

Appendix Table 1: Years for which Data are Available, 1980-1997[1]

Country	Abortion Rate	Fertility Rate[3]	Age-Specific Number of Births	Age/Gender-Specific number of deaths	Age/Gender-Specific Population[4]
		WESTERN EUROPE			
Austria	1989-1996	1980-1997	1980-1996	1980-1997	1980-1996
Belgium (1991)	**1993-1995**	**1980-1997**	**1980, 1982, 1984-1995**	**1980-1994**	**1980-1995**
Denmark	1980-1995	1980-1997	1980-1996	1980-1996	1980-1996
Finland	1980-1996	1980-1997	1980-1996	1980-1996	1980-1996
France	1980-1995[2]	1980-1997	1980-1995	1980-1996	1980-1997
Germany - former FRG (1993)	**1980-1996**	**1980-1996**	**1980-1989, 1991-1994**	**1980-1997**	**1980-1989, 1991-1994**
Greece (1986)	**1989-1993**	**1980-1997**	**1980-1995**	**1980-1997**	**1980-1995**
Ireland	none	1980-1997	1980, 1983-1996	1980-1996	1980-1996
Italy	1980-1996[2]	1980-1997	1980, 1983-1995	1980-1995	1980-1996
Netherlands (1981)	**1980-1996**	**1980-1997**	**1980, 1984-1996**	**1980-1997**	**1980-1996**
Norway	1980-1996	1980-1997	1980, 1984-1996	1980-1995	1980-1996
Portugal (1984)	**none**	**1980-1997**	**1980-1996**	**1980-1997**	**1980-1996**
Spain (1985)	**1987-1996[2]**	**1980-1997**	**1980-1996**	**1980-1995**	**1980-1997**
Sweden	1980-1996	1980-1997	1980-1996	1980-1996	1980-1996
Switzerland	1982, 1986, 1990-1994, 1996	1980-1997	1980-1996	1980-1994	1980-1996
United Kingdom	1980, 1985-1996	1980-1997	1980-1996	1980-1997	1982-1996
Number of Observations, Western Europe	179	287	267/251[5]	271	267
		EASTERN EUROPE			
Albania (1992)	**1990-1996[2]**	**1980-1997**	**none**	**none**	**none**
Bulgaria (1990)	**1980-1996**	**1980-1997**	**1980-1996**	**1980-1996**	**1980-1996**
Czech Republic (1987)	**1980-1996**	**1980-1997**	**1980-1996**	**1980-1996**	**1980-1996**
Germany - former GDR	1980-1996	1980-1997	1980-1994	1980-1990	1980-1994
Hungary (1993)	**1980-1996**	**1980-1997**	**1980-1996**	**1980-1996**	**1980-1996**
Poland (1993)	**1980-1996**	**1980-1997**	**1980-1992-1995-1996**	**1980-1996**	**1980-1996**
Romania (1990)	**1980-1996[2]**	**1980-1997**	**1980-1996**	**1980-1996**	**1980-1996**

Slovak Republic (1987)	**1980-1997**	**1980-1997**	**1980-1996**	**1980-1997**	**1980-1997**
		FORMER SOVIET REPUBLICS			
Belarus	1980, 1982, 1984-1997	1980-1997	1980-1997	1981-1982, 1985-1990 1992-1997	1980-1997
Estonia	1980-1996	1980-1997	1980-1996	1981-1982, 1985-1996	1980-1996
Latvia	1980, 1982, 1984, 1986, 1988-1996	1980-1997	1980-1996	1980-1996	1980-1996
Lithuania	1980, 1982, 1984-1996[2]	1980-1997	1980-1996	1981-1982, 1985-1996	1980-1996
Moldova	1980, 1982, 1984-1996[2]	1980-1986, 1988-1997	1980-1985- 1987-1994	1981-1982, 1985-1994	1980-1994
Russian Federation	1980-1995	1980-1997	1980-1995	1980-1995	1980-1995
Ukraine	1980, 1982-1996[2]	1980, 1982-1997	1980, 1982-1995	1981-1982, 1985-1992	1980-1995
Number of Observations, Eastern Europe and Former Soviet Republics	235	268	253/229	236	237

Notes:

[1]Countries in bold have had "major" changes in abortion laws between 1980 and 1997, with the year of the change indicated.
[2]Abortion data has been labeled of unknown or poor quality by the Alan Guttmacher Institute.
[3]Fertility rates from COE were estimated based on the available birth rate data by five year age intervals.
[4]Where intercensal estimates are not reported, we calculate them by linear interpolation.
[5]Additional observations are available for teen births, which is the first number reported.

Figure 1: Contraceptive Intensity and Abortion Decision Tree

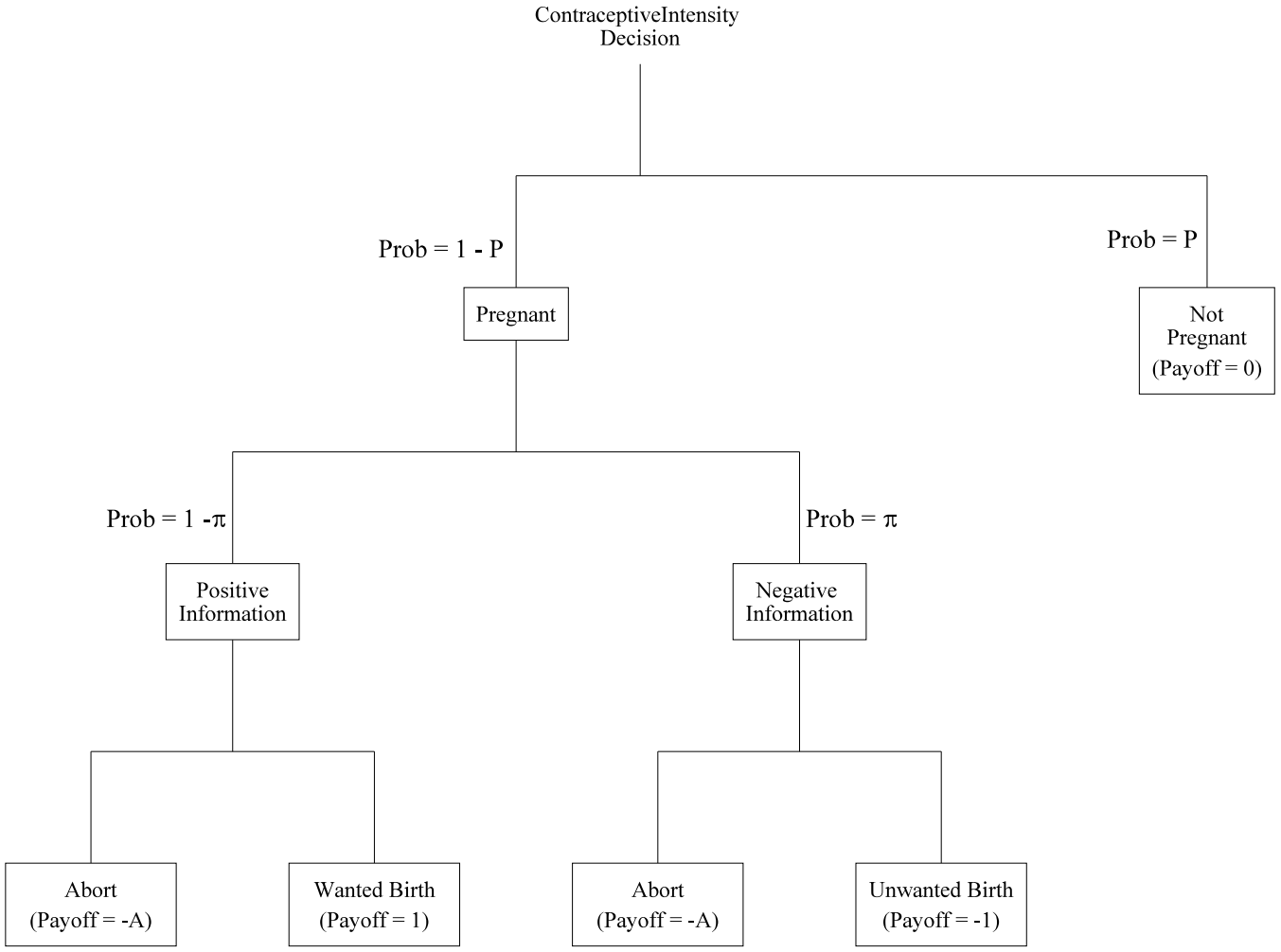


Figure 2: Theoretical Effect of Changes in Abortion Costs on Fertility-Related Outcomes

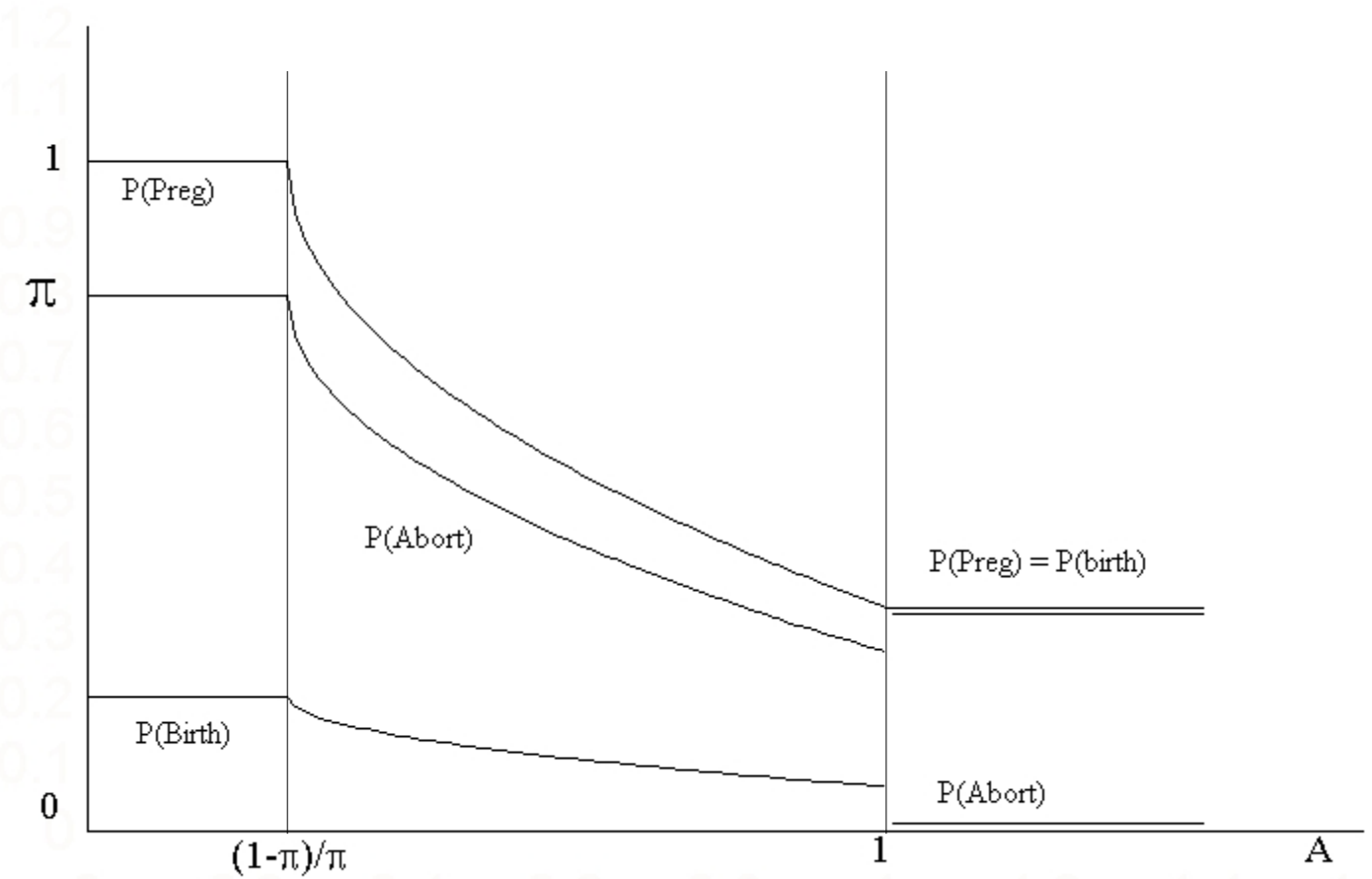


Figure 3: Total Fertility Rates in Europe

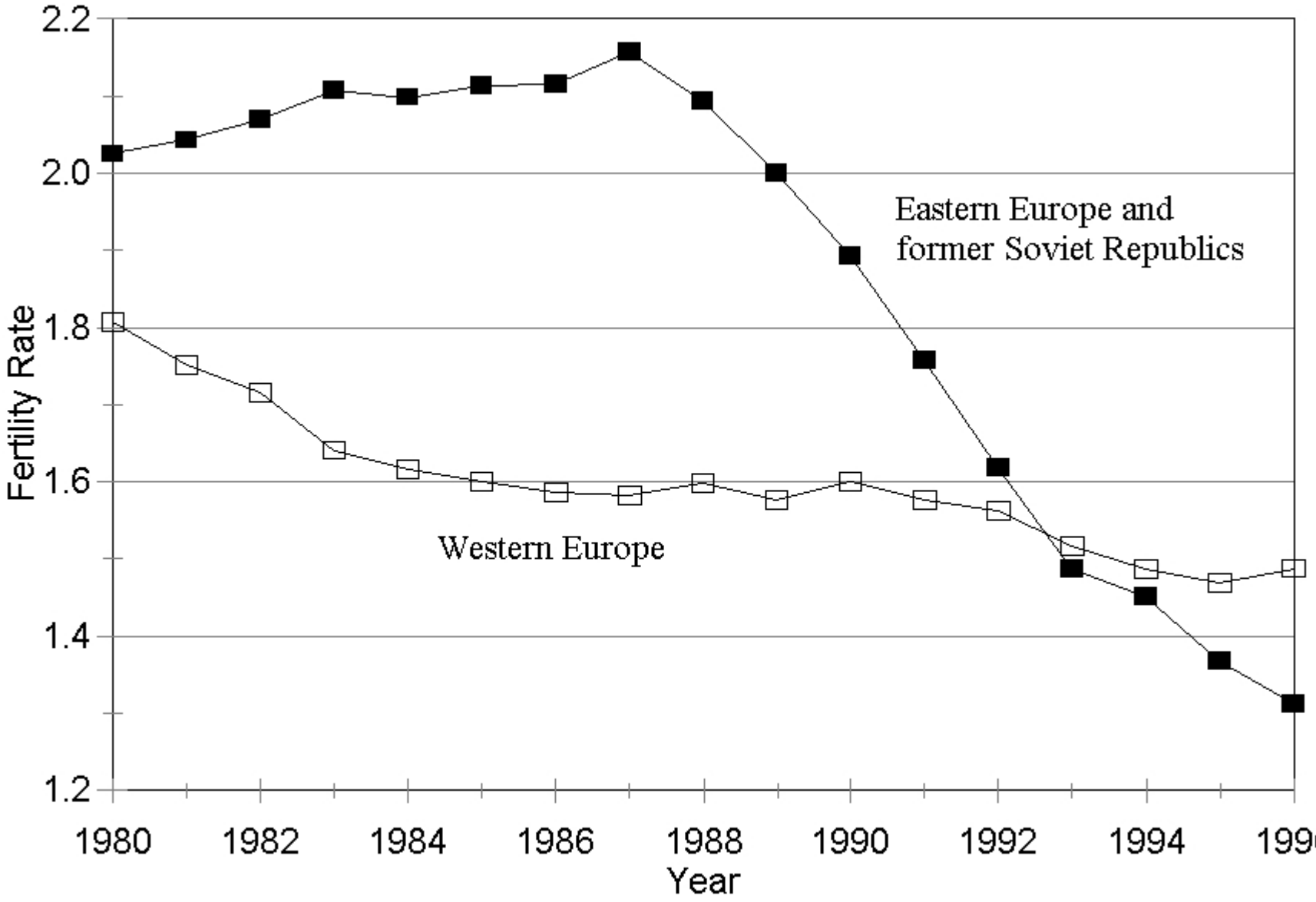


Figure 4: Percentage Difference in Legal Abortion Rate between Romania and the former Soviet Republics

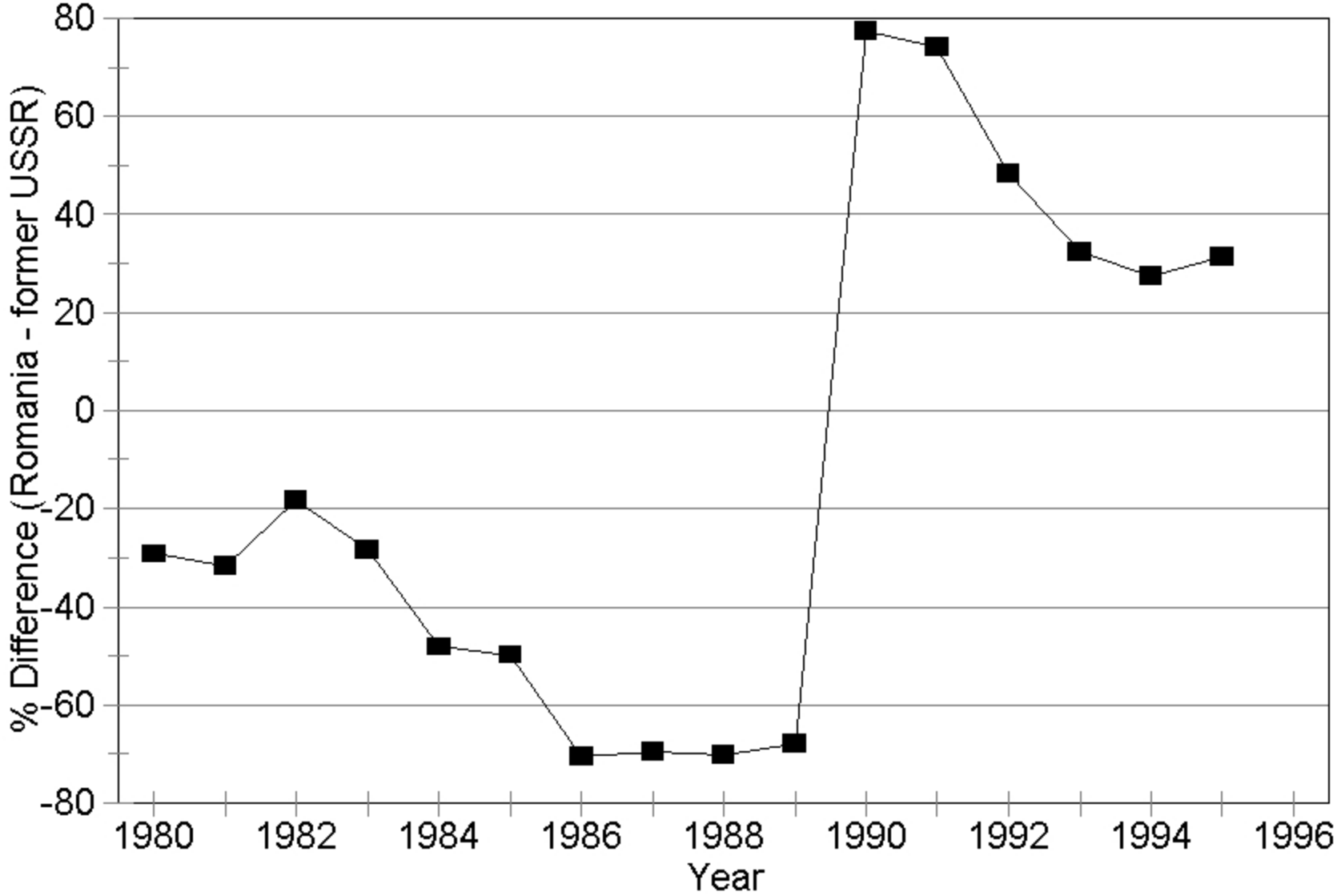
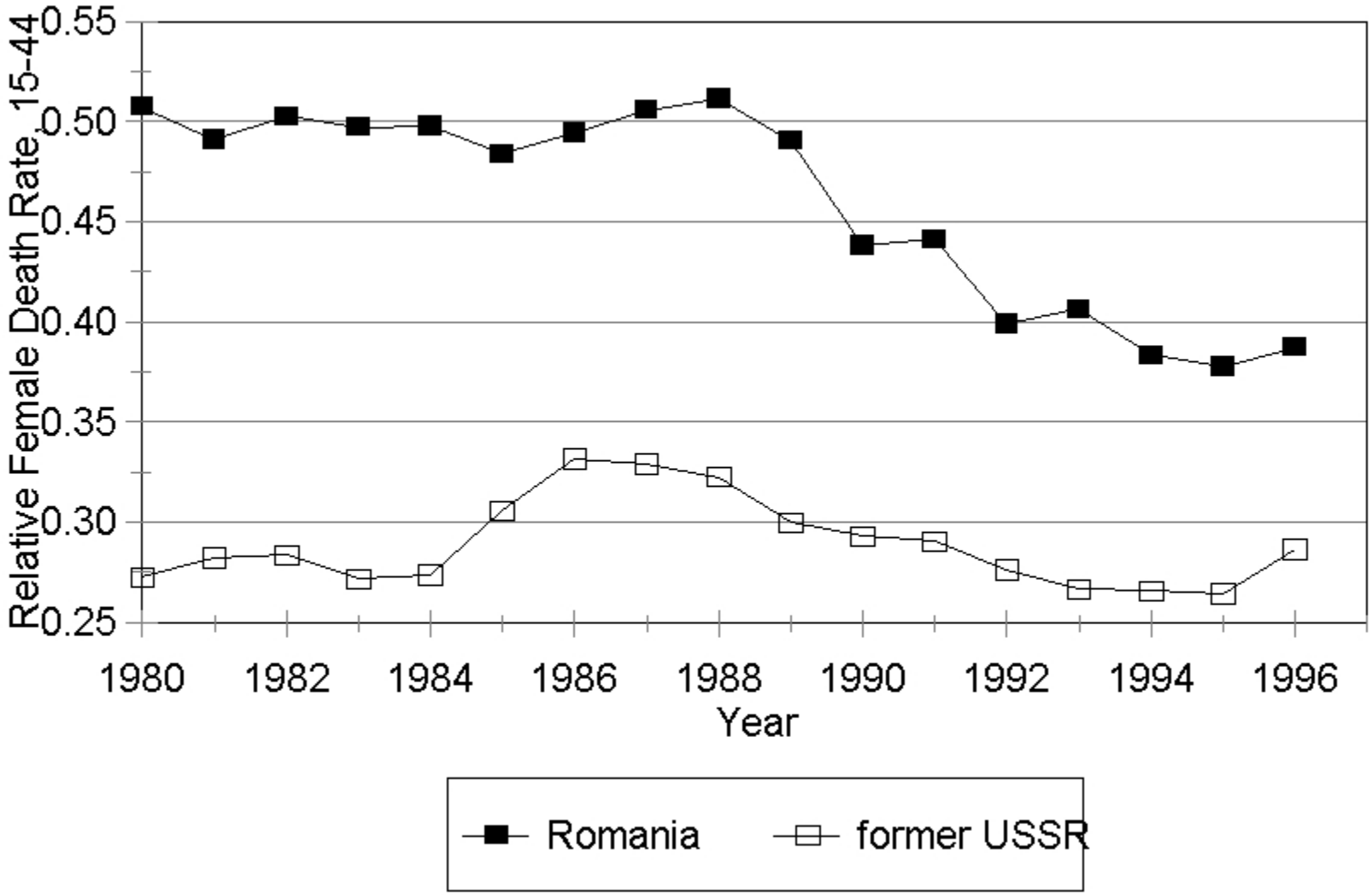
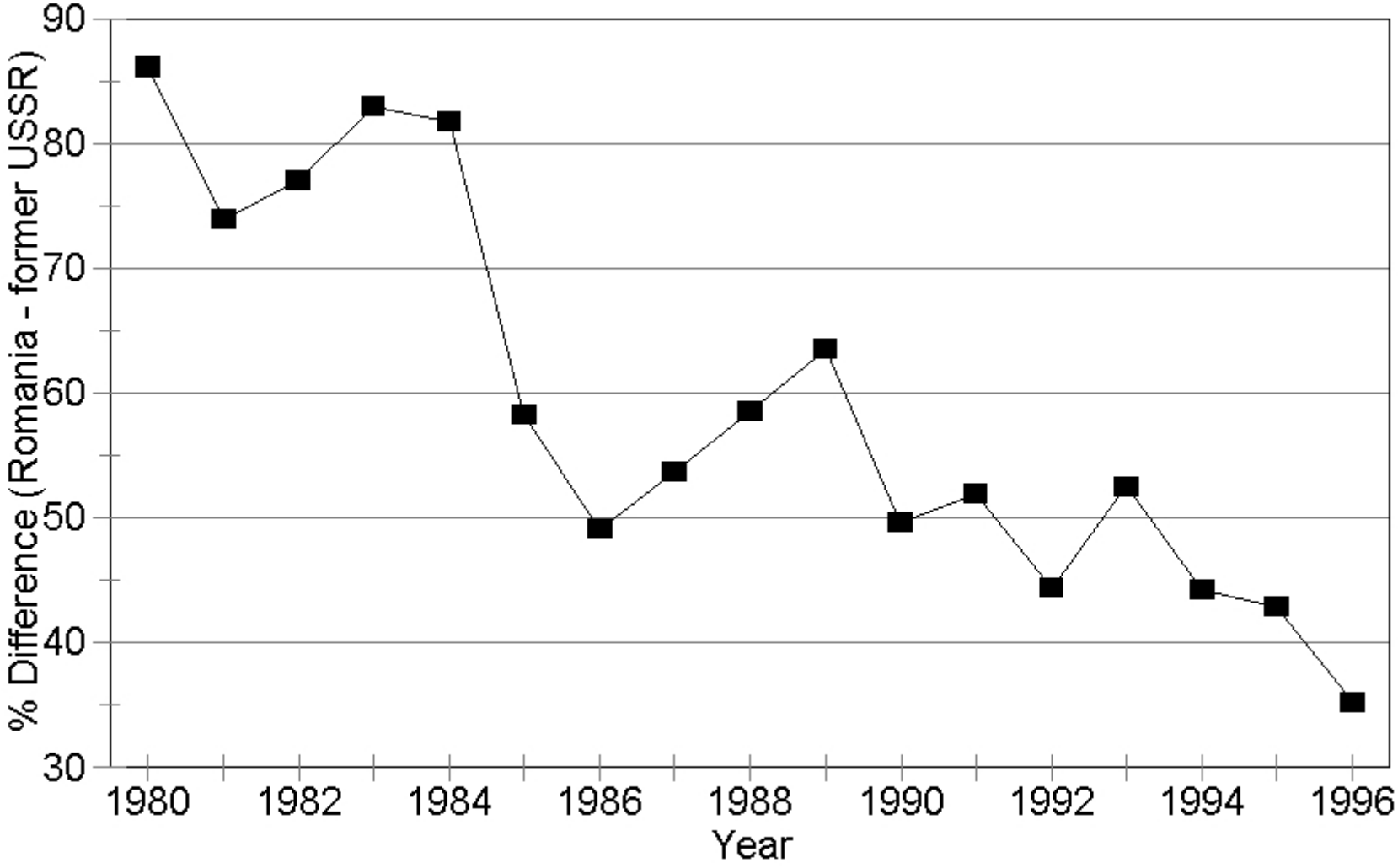


Figure 5A: Relative Female Death Rates in Romania and the Former Soviet Republics



Note: The relative female death rate is defined as the ratio of the female death rate to the death rate for those age 15 to 44.

Figure 5B: Percentage Difference in Relative Female Death I
between Romania and the Former Soviet Republics



Note: The relative female death rate is defined as the ratio of the female death rate to the death rate for those age 15 to 44.

Figure 6: Percentage Difference in Fertility Rates between Romania and the former Soviet Republics