

# Economics of Sex: Cost-Benefit Analysis

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**Abstract** The article presents an application of the cost-benefit analysis to human sexual behavior. We suggest that an event or occasion which lowers the costs of sex – such as increasing free time, decreasing health risks of sexually transmitted diseases or lowering the probability of parenthood (or costs connected with parenthood) – usually leads to an increase in sexual activity. Although the reviewed studies concerning these effects confirm our predictions, findings are not robust, e.g. a vaccination against STDs does not always lead to an increase in sexual activity. In the conclusion, we make several socioeconomic recommendations resulting from the application of the economics of sex.

**Keywords** Cost-benefit analysis · Sexual behavior · Opportunity costs · STDs · Natural disasters · Contraception · Abortion · Homosexuality

Every elementary economic analysis assumes that when making decisions people consider and evaluate the costs and benefits of those decisions in order to gain the highest possible utility. When the subject of a decision becomes more expensive, consumers start to demand lower quantities/qualities as

they (usually) receive similar utility from less expensive substitutes. The logic is rather trivial and therefore an economic way of thinking can easily lead to students' focusing their interest on a few precisely defined aspects of extremely complex processes of human decision-making.

Sexual behavior can also be viewed as a conflict of the benefits of sex and its costs. If we consider sex a recreational activity, the benefits of sex can be defined simply as feelings of satisfaction and pleasure. On the other hand, costs of sex include time sacrificed to the activity, risk of receiving sexually transmissible diseases (STDs) or risk of unwanted pregnancy etc. As the costs increase with every sexual act, the demand for sex – as for other goods – decreases. However, if the costs of sex decrease, the quantity of sexual activity increases. As the availability of contraceptives significantly lowers the risk of unwanted pregnancy, people – at least logic dictates – should increase their demand for sex and enjoy it more often.

Similar mental experiments are ideal for introductory economics courses as they keep students engaged in an otherwise abstract technical analysis of the rational calculation of the costs and benefits of decision-making. The last decade brought a growing number of empirical studies, which explicitly tested the thesis. This essay presents a selection of the papers and tries to show the extent to which a simple economics analysis can be applied to explain the very colorful world of human sexuality.

## Time Available

For every activity we choose to engage in, we sacrifice other activities. This simple concept of opportunity costs helps predict that events which limit other possibilities of recreational or working activities would lead to an increase in sex (as yet

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another recreational activity). A great historical example of such a situation is a ten-hour long blackout in New York City that occurred on 9 November 1965, which – as the media reported – led to an increase in birth rates nine months later. Not being able to go out after sunset, or to watch TV or read books or magazines, people interacted with each other more than on regular occasions. Additionally, as finding contraceptives in the dark could have been difficult – as one sociologist said – the birth rates should have sky rocketed. This, however, is in fact an urban legend – the birth rate actually increased only slightly (Udry 1970). Modern research which uses more advanced statistical methods suggests, however, that the effect, although not enormous, may be real.

Due to a climatic phenomenon known as El Nino in 1992, South America experienced a lack of rainfall. As most electricity in Columbia comes from hydropower, El Nino was followed by a whole year of electricity shortages. The shortages were, however, different across regions and it was possible to trace the households which spent more time in the dark and analyze whether such families had more kids as a result (only one third of Columbians use any birth control). The results (Fetzer et al. 2014) suggest that the power shortages increased the probability that a woman would get pregnant by 5%. This change was not a matter of an intertemporal substitution – the power shortages did not lead to a drop in pregnancies in the future. This change represented a long-term sustainable growth of birth rates. Similarly, Burlando (2014) found that a month long power shortage in Zanzibar in 2008 led to a small baby boom in the following 8–10 months. The effect was limited to places connected to the electricity network, a fact which supports the causal link. Burlando also used a time-use survey and proved that during the power shortages women and particularly men spent more time at home.

Hurricanes may have the same effect (Evans et al. 2010). Using the data on storm and hurricane emergency warnings between 1995 and 2001 Evans et al. showed – employing data from Atlantic and gulf areas of the US – that emergency warnings of mild storms led to an increase in birth rates, whereas the damaging hurricanes were followed by a drop in birth rates.

Differences in sexual behavior seem to be dependent on the storm's intensity. In the case of mild storm warnings, people seemed to wait for further information and spent more time at home, which inevitably may lead to increases in sexual activity. To the contrary, however, in the case of hurricanes or extreme storms people tend to pre-stock their households (not forgetting contraceptives). Moreover, severe storms might boost concerns regarding the economic situation of the household and the affected region and people might decide not to invest in children. Unlike in the Columbian analysis mentioned above, Evans et al. did not prove a similar long-term impact on birth rates using the American data (the results indicated a mildly negative effect). It seems that the storms

only shift (both ways) the timing of pregnancy. Admittedly, the analysis used only data from a short observation period of six years; from this limited sample it is hard to make any assessment of long-term impacts.

Optimizing time utility by engaging in sexual acts does not have to be dependent on an exogenous event. In his analysis of factors of why people simulate orgasms, Hugo Mialon (2012) found that more educated men and women have a greater tendency to fake their climax. He concluded that their time opportunity costs are higher and that therefore (most likely) they do not want to spend too much time having (lengthy) sex. This line of explanation is also supported by works from the field of sexology, which show that women's sexual vocalization correlates with men's climax rather than with their own (Brewer and Hendrie 2011). In a follow up, women confirmed this behavior as strategic, while two thirds of them admitted that they use this strategy to expedite their partner's climax. As the reasons for employing the same strategy, the same number of women listed the following: termination of discomfort, boredom, or a tiresome activity and time issues.

## The Risks of STDs

A significant portion of the costs of sex is the risk of contracting sexually transmitted diseases (STDs). In a population in which STDs have been widespread, the costs of sex rise drastically with each and every additional sexual partner and therefore a “casual” sexual life is very costly. Logically, regulations prohibiting sex before and outside marriage may spontaneously occur, develop and strengthen due to social pressure. Once an effective treatment is found or the sexually transmitted disease becomes rare, the resulting atmosphere enables a more promiscuous life and thus an increase in sexual activity.

Having this in mind, Andrew Francis (2013) empirically tested whether the sexual revolution in sixties in the USA can be explained as a consequence of the discovery of penicillin. From the end of the 1940s to the beginning of 1950s, penicillin radically reduced the prevalence of syphilis, which was the most threatening STD at that time. The near eradication of syphilis was conversely followed by a significant increase in gonorrhea, which rose by 300% from 1957 to 1975. Similarly, during this era the number of births of children out of wedlock and the number of deliveries by teenage mothers rose. All such indicators suggest that the level of unprotected or leisure sexual activities increased. Controlling for a number of covariant variables such as the availability of contraceptives, the number of parental advisory services, opinions on premarital sex and abortions etc., Francis indeed proved that the increase in sexual activity in this period was a delayed result of reducing syphilis along with the fear of contracting it. (Admittedly, it is nearly impossible to filter out all economic, social and

cultural changes that occurred in the US over several decades, as suggested by Tucker (2013)).

Another very persuasive indication of people rationally calculating perceived risks of STDs and therefore the costs of sex is yet another study by Francis (2008) concerning the selection of the gender of one's sexual partners. Francis showed that the risk of a man contracting HIV/AIDS from another man is approximately a thousand times higher than the risk of contracting it from a woman. Similarly for women, sex with men bears higher risks. As a certain percentage of the population is bisexual, such individuals can choose (to a large extent) whether their sexual partner is a man or a woman. Correspondingly, one can infer that bisexual men should "shift" their preferences more towards women in times of higher risks of contracting STDs and also bisexual women should prefer women as sexual partners more often.

To conduct his research, Francis utilized data from the National Health and Social Life Survey in which the respondents answered questions regarding their sexual life, including a question about whether they have relatives with HIV/AIDS. Francis assumed that having a relative who has HIV/AIDS increases the awareness of the dangers of the disease and that such individuals would seek a safer sexual life or safer sexual partner. Francis confirmed that a person with HIV/AIDS in the family correlates with men's homosexuality negatively, whereas it correlates positively with women's homosexual behavior. Such a result, however, is in contradiction with the genetic-biological model of homosexuality, which concludes that the probability of a man having homosexual preferences increases if his kin includes a homosexual. The study confirms the sexual economic rationales of such people – a higher awareness of HIV/AIDS led to a shift to safer sexual partners. Francis also showed that people whose kin include someone with HIV/AIDS have a lower prevalence of syphilis (compared to the general population) – which, again, confirms that such individuals practice safer sex; monogamy among men increased as well.

Although the previously described changes in sexual behavior can hardly be considered surprising, many studies indicate that a lower risk of contracting an STD does not universally lead to an increase in sexual activity among individuals. The widespread use of vaccinations for girls and young women against sexually transmitted Human Papilloma Virus (HPV), which may eventually cause cervical cancer, originally led to concerns that the perception of a lower risk of contracting an HPV infection would cause girls to engage in riskier sexual activity. However, such concerns were not confirmed. In one study (Mayhew et al. 2014), the majority of vaccinated girls did not perceive that the risk of contracting a sexually transmitted disease (except for HPV) decreased, nor did they consider their subsequent sexual behavior riskier. Surprisingly, girls who (wrongly) believed that the risk of contracting a sexually transmitted disease (except for HPV)

is lower due to the vaccination had a lower probability of initiating sex in the subsequent six months. Mayhew et al. interpret this result as a failure of the parents and physicians to communicate information regarding the HPV vaccine and the risks of STDs to girls who were not expected to initiate sex in the near future. That lack of information might have caused the girls' incorrect perception of the associated risks.

A different study by Bednarczyk, Davis, Ault, Orenstein, and Omer (Bednarczyk et al. 2012) focused on an analysis of real health data of vaccinated girls. The authors inferred higher sexual activity based on the patients' health records concerning the incidence of STDs, testing for or diagnosing pregnancy or seeking advice about the use of hormonal contraception. The figures concerning sexual activity did not significantly differ for girls who were vaccinated against HPV (although the vaccinated girls more often sought advice about the use of hormonal contraception). Correspondingly, the study's results show that the vaccination against HPV did not lead to a lower initiation age or to an increase in sexual activity. (However, the girls were vaccinated at the age of 11–12 and the health data evaluation occurred three years later; hence, generalizing the results to the mature population is quite difficult.)

### Unwanted Pregnancies and Other Variables

Legalization of abortion is yet another significant determinant of the cost of sexual activities. If access to abortion is prohibited or highly regulated (subject to approval by medical boards), the costs (whether financial or psychological) of getting an abortion are higher. Illegal abortions present a health risk and are more costly for a wide spectrum of reasons – from the necessity of bribing officials or hospitals to an additional premium in the black market for the associated health risks (estimates suggest that there are approximately 20 million illegal abortions, which result in the deaths of approximately 80,000 women). Correspondingly, logic dictates that the easier the access to abortion is, the more people should be sexually active and vice versa.

Compiling data across a 20-year period from 41 countries, Klick, Neelsen, and Stratmann (Klick et al. 2012) tracked how the legality of abortion affected sexual behavior. As detailed and precise international data on the frequency of sexual activity does not exist, they used the prevalence of gonorrhea as a proxy (based again on the hypothesis that the more people are engaged in sexual behavior the easier it is for gonorrhea to spread). They proved that the lessening of legal barriers to abortion leads to increases in the prevalence of gonorrhea, i.e. simpler and faster access to abortions leads to an increase in unprotected sexual activity. This conclusion is supported by the fact that although the number of abortions rose, birth rates remained unaffected by the changes in legislature – sexual

activity necessarily increased. Easier access to post-coital emergency contraception has a similar effect (Durrance 2013). When post-coital emergency contraceptives could legally be obtained without a prescription in Washington state in 1998, the prevalence of gonorrhea (and other STIs) increased in the following years. Although legal abortions bear certainly significant costs at least on the emotional level, easy access to abortions clearly boosts sexual activity.

A boost in sexual activity can also result from the social welfare system. If welfare for households with children is generous, private (individual) costs of raising a child decline; correspondingly, so do the costs of unprotected sex. In the case of unwanted or unplanned pregnancy, a mother-to-be can decide to carry the child, thereby shifting the costs of the pregnancy partly on the social system – a typical example of moral hazard. Using U.S. data from 1994 to 98, Ressler, Waters, and Watson (Ressler et al. 2006) confirmed that higher welfare support for mothers with children correlates with a higher prevalence of STDs (using combined data for syphilis, gonorrhea and chlamydia). A similar case can be observed with the prevalence of AIDS (Ressler, Waters, Hill, & Watson, Ressler et al. 2005). Both studies confirm higher sexual activity (in the form of unprotected sex) in the states with generous welfare policies – which serve to some extent as a sort of insurance against unwanted pregnancy and unwillingness to undergo an abortion.

As already mentioned, the costs of sex do not consist solely of health and financial costs. In particular, promiscuity and infidelity could bear significant psychological costs, because betrayal of one's partner is usually followed by denouncement and social stigma. Nevertheless, such psychological tendencies and cultural norms do not change abruptly and it is therefore hard to inspect their specific impact on sexual behavior. But the introduction of same-sex marriage (or of registered partnerships) may be used as an illustrative example. It can be expected that if an informal relationship of same-sex partners is made legitimate and official, the cost of breaking up (in such relationship) increases as the emotional and financial costs rise. This may correspondingly lead to higher fidelity and sexual responsibility of those in question and therefore decrease the prevalence of STDs. The official legalization or recognition of same-sex couples can also cause a decrease in "disguised" heterosexual marriages, leading to a further drop in the prevalence of STDs due to inter homo- and heterosexual contact.

Thomas Dee (2008) compared the development of the prevalence of STDs in nine European countries which during 1989 and 2003 introduced some form of legalization of same-sex partnerships and compared the data with data from European countries which introduced no such legalization. Even though the legalization led to only a small number of same-sex couples entering into that country's legalized form of same-sex partnership/marriage, the legalization itself led to a considerable drop (of approximately 43%) in the prevalence

of syphilis, which is a very common disease among homosexual men. In the case of other STDs, however, the effect was not as strong. Similarly, Francis et al. (2012) replicated the original study and found a similar weak effect in the U.S.

## Economic Rationality and Sexual Behavior

A great number of factors together impact the sexual behavior of individuals – from the proportion of men and women in the population, the family structure, peer and social pressure, consumption of alcohol and other drugs to the popularity of various TV shows and movies, along with the regulation of mandatory HIV positive registrations and other economic, cultural and religious factors. The aim of this paper was to show that a simple approach of economic rationality in calculating costs and benefits of sexual decision-making and its changes can be a very inspirational and useful tool for explaining human sexual behavior (Chesson 2012; Posner 1994).

Admittedly, changes in sexual activity resulting from changes in associated costs do not have to be permanent and in the long term they may produce a contrary result. As shown, a decrease in the cost of sex leads to an increase in sexual activity, which may lead to an increase in the prevalence of STDs. While sex is thus becoming more risky, the demand for sex should eventually start decreasing. However, the cost increase may alter the composition of the market participants. Risk-averse individuals could start leaving the market, which could lead to a negative selection of risk-attracted individuals who will stay on the market, thus boosting the contagion of STDs. Human sexuality is a very dynamic phenomenon and its future character is hard to predict.

The lesson that can be learned from this review paper is that an efficient cure or treatment, well-minded regulation and the introduction of policies designed to increase the safety of sexual behavior may in some cases end up increasing STDs. Although in the 1980s and 1990s the hysteria and panic from HIV/AIDS caused people to be more cautious in their sexual behavior, modern medical treatment, which has increased the wellbeing and longevity of HIV patients, has lowered perceptions of the associated costs and caused an increase in promiscuity (Lakdawalla, Sood, & Goldman, Lakdawalla et al. 2006).

Homeostasis of risk results: people accept a certain level of general health risks, but if the risk decreases due to a drop in one element, people are happy to increase risky behavior via another element. Similar or the same unexpected effects of an increase in promiscuity may have been induced by an unlimited abortion policy or benevolent social system protecting against some of the costs of unintended pregnancy. On the other hand, the example of marriage between people of the same sex shows that an increase in social recognition and acceptance or legalization of the relationship may lead to more responsible sexual behavior.



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