

Institute for Economic Studies, Keio University

Keio-IES Discussion Paper Series

**Prohibiting Sex or Prohibiting True Love? An Empirical Assessment of
Effect of Statutory Rape Law on Teenage Marriage in Japan**

Hideo Akabayashi, Akihito Toda

14 March, 2017

DP2017-005

<https://ies.keio.ac.jp/en/publications/7411/>

Keio University



Institute for Economic Studies, Keio University
2-15-45 Mita, Minato-ku, Tokyo 108-8345, Japan

ies-office@adst.keio.ac.jp

14 March, 2017

Prohibiting Sex or Prohibiting True Love? An Empirical Assessment of Effect of Statutory Rape Law on Teenage Marriage in Japan

Hideo Akabayashi, Akihito Toda

Keio-IES DP2017-005

14 March, 2017

JEL classification: J12; K14; K36

Keywords: Marriage; Statutory rape; Punishment; Protection of minors

Abstract

Local statutory rape laws in Japan, where the national marriageable age is 16 for females (18 for males), criminalize sexual acts with those generally under 18 unless the offender and the victim are in "serious love toward marriage." The critiques argue that the vagueness of the law interferes "true love" toward legal marriage, rather than protecting minors. This paper provides some evidence on this question by estimating the effects of the passage of statutory rape rule and the changes in the degree of enforcement at local prefectures on teenage marriage. Using the regional data of cohorts born between 1940-1990, we find that the passage of the law significantly encourages new marital formation of women under 18. We do not find evidence that the law increases the divorce rate of women under 18. Therefore, the statutory rape law is likely to prohibit "true love" sexual relationships, encouraging the formal marital formation as a substitute, without increasing reluctant "cover-up" marriage.

Hideo Akabayashi

Faculty of Economics, Keio University

2-15-45 Mita, Minato-ku, Tokyo 108-8345, Japan

hakab@econ.keio.ac.jp

Akihito Toda

Recruit Works Institute

Recruit GINZA8 Bldg. 8-4-17 Ginza Chuo-ku, Tokyo 1048001 Japan

atoda@r.recruit.co.jp

Acknowledgement: This work was supported by Global COE Program and Keio Gijuku Academic Development Funds.

Prohibiting Sex or Prohibiting True Love? An Empirical
Assessment of Effect of Statutory Rape Law on Teenage
Marriage in Japan*

Hideo Akabayashi

Akihito Toda

Keio University

Recruit Works Institute

February 13, 2017

Abstract

Local statutory rape laws in Japan, where the national marriageable age is 16 for females (18 for males), criminalize sexual acts with those generally under 18 unless the offender and the victim are in “serious love toward marriage.” The critiques argue that the vagueness of the law interferes “true love” toward legal marriage, rather than protecting minors. This paper provides some evidence on this question by estimating the effects of the passage of statutory rape rule and the changes in the degree of enforcement at local prefectures on teenage marriage. Using the regional data of cohorts born between 1940-1990, we find that the passage of the law significantly encourages new marital formation of women under 18. We do not find evidence that the law increases the divorce rate of women under 18. Therefore, the statutory rape law is likely to prohibit “true love” sexual relationships, encouraging the formal marital formation as a substitute, without increasing reluctant “cover-up” marriage.

JEL Classification: J12, K14, K36

*Correspondence: hakab@econ.keio.ac.jp. This research was financially supported by the Keio Univ. Research Funds and GCOE program. We benefited by comments from Masao Ogaki, Colin McKenzie, and participants at WEAI 2009 (Kyoto), FEMES 2009 (Tokyo), and various seminars and conferences. All the remaining errors are ours.

1 Introduction

Most developed countries currently have a declining marriage rate (Blau, Farber, and Winkler, 2005, p.400). Japan is one of the most striking examples in this regard. Japan's fertility rate was 14 per 1,000 population aged 15 to 64 in 1970, but the rate was 8.7 in 2006. Although this figure is higher than some of European countries, in a society like Japan where births outside legally married couples are rare, the falling marriage rate has pushed down a fertility rate, making the whole population start to decline in 2006.

The rate of formal marriage is generally low among countries with a high rate of cohabitation (Michael and Willis). Although cohabitation, and premarital dating in general, often leads to a formal marriage since it allows couples to know each other well, it can be a substitute for formal marriage. Little is known about conditions under which cohabitation and premarital dating can, if any, play a role to increase or to decrease the likelihood of subsequent formal marriage.

This paper focuses on the role of premarital sexual relationships in the formation of formal marriage among youths. In many countries, the legislation of "statutory rape law" that criminalizes sexual acts that involve those under a threshold age (*the age of consent*) has been viewed as an effective way to protect youths from adults' exploitation and unwanted childbearings. The law, on the other hand, also has been criticized as interfering into "true love" relationships that may evolve into a formal marriage. Such a criticism has had a certain power in Japan since cohabitation and out-of-wedlock childbearings have been rare.

This paper provides some evidence on this question. We empirically examine the effects of a passage of statutory rape rules and changes in the degree of enforcement at local prefectures on teenage marriage. We estimate reduced form models of new marital formations by prefecture-age group over the cohorts born between 1940-1990. We find that the passage of statutory rape law significantly stimulates new marital formation of

women under 18, the usual age of consent if the law exists. We, however, do not find evidence that the law increased the divorce rate under 18. Overall, our results suggest that the statutory rape law is likely to prohibit premarital dating stemming from true love while encouraging the formal marital formation as a substitute, without increasing unwanted “cover-up” marriage just to avoid prosecution.

2 Background

2.1 Models of Premarital Relationships and Marriage

The majority of economic and demographic research of premarital relationships has been concerned with modelling and estimating cohabitation decision and its consequences, as opposed to traditional marital relationships. The decision and consequences of premarital sexual acts among youths can be cast in a similar way, and we first review research on the cohabitation.

In demography literature, cohabitation is often viewed “as an alternative form of marriage without the usual legal sanctions: or as the last stage in the courtship process, a type of alternative engagement” (Rindfuss and VandenHeuvel 1990). In economics literature, Willis and Michael (1994), for example, discuss several reasons for cohabitation, or “short-duration marriage.” The first reason for cohabitation is to resolve uncertainty over the characteristics of a partner and the duration of partnership. In this case, a cohabitation should eventually end either in marriage or in dissolution, thus corresponding to the “last courtship” interpretation in demography. The second reason is a postponement. Both partners of a couple may expect to meet a better partner in the future even without any uncertainty over the current partner. In this case, cohabitation is intrinsically temporary, and destined to be desolved unless the transaction costs for searching a new partner exceeds the expected gain by starting a new search of a better partner, similarly to job turnover model (Jovanovic 1979). This is somewhat closer to “alternative

form” interpretation in demography although there are potentially numerous different explanations why cohabitation has become a reasonable alternative.¹

In terms of the consequences of the social acceptance of cohabitation, the literature thus often discusses two competing effects on marriage. If the cohabitation is postponement or another form of marriage, it would substitute for marriage when the private cost for cohabitation falls. Then allowing cohabitation legally or socially would discourage the formal marital formation. If the cohabitation is a way to resolve uncertainty over marriage or the partner, allowing cohabitation would stimulate an eventual marital formation.

Since premarital sexual relationship is clearly one of the motivations of cohabitation, at least a part of the determinants and consequences of premarital sexual behavior can be considered similarly to those of cohabitation. If the local regulation prohibits premarital sexual relation among teens, two competing effects can emerge. If the premarital sexual relation is the last stage of the courtship process, the regulation would *decrease* the marital formation among teens. At the same time, beyond age 18, the formation of marriage would increase because of postponement. Alternatively, if premarital sexual relation is a substitute to the formal marriage, the same regulation would *increase* the formation of a formal marriage. If the local sex regulation only punishes the predators who have no intension to be married with minors other than exploitation, as one of the original motivation of the regulations, the local regulation would neither increase or decrease the marital formation among teens.

¹Stevenson and Wolfer (2008) argue that in the United States, cohabitation has largely been a stepping-stone toward marriage. Although most cohabitations do not end in marriage, most marriages (59 percent) are preceded by cohabitation. This is in sharp contrast with some of the European countries, such as Sweden and France, where cohabitation has become an alternative “permanent” form of household formation.

2.2 Previous Research of Teens' Sexual Behavior and the Policy Effects

The majority of previous papers on teens' sexual behavior, mostly using the U.S. data, focuses on its consequences to nonmarital childbearing, which occupies about 50 % of teens' births (Levine 2001). A direct examination of the causes and consequences of sexual behavior among teens are still rare, however. In terms of the causes of sexual behavior, Oettinger (1999) examines the relationship between enrollment in sex education and subsequent sexual behavior for U.S. teenagers during the 1970s, and find that for females, enrollment in sex education was associated with earlier sexual activity and sometimes pregnancy. Michael and Bickert (2001) explores general determinants of adolescents' dating and sexual behavior using the NLSY97 dataset.

There are fewer studies in the U.S. that focus on the effects of local policy interventions on dating and sexual behavior.² One notable exception is Jepsen and Jepsen (2005). They use the CPS data to estimate the effect of existence of statutory rape law, interacted with the level of enforcement and with the 1996 welfare reform (*PRWORA*), on teens' childbearing, employing a similar empirical approach as Gruber (1994). They find that the presence of statutory rape law significantly lowers the probability of pregnancy for white female.

In the U.S., the marriageable age is usually set equal or above the age of consent in all the states.³ Therefore the violation of marriageable age means the violation of the statutory rape law, and the effect of statutory rape law on marriage is indistinguishable from the effect of marriage law. In Japan, on the other hand, the marriageable age for female is set nationally and is lower than the ages of consent that are set at prefecture level. Therefore, unlike the U.S., formal marriage can always be a substitute for premarital sexual relationship for teenagers in Japan. This setting makes Japan an interesting case for empirically investigating the effects of the age of consent on formal marriage

²There are several papers on the effects of abortion restriction on youths behavior including childbearing. See Levine (2001).

³There are exceptions in case of female pregnancy in some states.

and economic roles of premarital sexual relationship in the marital formation.

2.3 Marriageable Age and Statutory Rape Law in Japan

There are four national laws that have laid the grounds for limiting sexual behavior and marriage for youths in Japan. First, the *Civil Code* of Japan (1896, Article 731) sets the marriageable age to be 18 and over for male and 16 and over for female.⁴ Second, the *Penal Code* of Japan (1896, Article 176-7) defines a forced sexual intercourse with a woman of age 13 and over, and any form of sexual intercourse with a woman under 13 as rape. Third, the *Anti-Prostitution Law* (1956, Article 3) states that “No person may either do prostitution or become the customer of it,” but no judicial penalty is defined for this act.⁵ Finally, responding to the domestic and international criticism for not sufficiently protecting children from prostitutions, the Japanese government passed the *Act on Punishment of Activities Relating to Child Prostitution and Child Pornography, and the Protection of Children* (1999. *Child Protection Law* hereafter) that prohibits and criminalizes sexual intercourse or any conduct similar to sexual intercourse for fee with a minor, a person under age 18 under the Japanese law.

Local prefectural bylaws, typically titled as “Bylaw for Protecting and Nurturing Adolescents,” have played a role to define and criminalize “statutory rape,” consensual sexual relationships when one of the individuals involved is younger than the legal age of consent, to a varying degree.⁶ The bylaws usually define the age below which an individual is legally incapable of consenting to sexual activities, and the minimum punishment for violators. The first prefecture which passed this type of bylaw was Okayama, and an increasing number of prefectures have adopted regulations to consensual sex. The

⁴Parental or guardians’ consent is needed for marriage below age 20 (the legal age of majority in Japan).

⁵However, acts to promote prostitutions such as soliciting for purposes of prostitution, procuring a person for prostitution, coercing a person into prostitution, receiving compensation from the prostitution of others, are prohibited and punished.

⁶Those local bylaws also have played a role to prohibit sexual acts with minors for fee before the *Child Protection Law* was enacted at the national level. They also regulate pornography and sexual service businesses.

number of prefectures which have such a bylaw were 12 in 1950s, added by 19 in 1960s, by 13 in 1970s, and by 2 in 1980s. By 1998 all the prefectures except Nagano had similar codes in the bylaw.

There are some major differences in the statutory rape law between Japan and the U.S. where all the similar previous studies are concerned with. In the U.S. any sexual acts with a victim below the age of consent for sex is automatically illegal, and marriageable age is equal or above the age of consent.⁷ Therefore, even if someone is seriously considering marriage, he or she automatically becomes a criminal by having sex with a minor, although the actual enforcement varies across states.⁸

In Japan, on the other hand, the marriageable age for women with parental consent is 16. All the current prefectural bylaws set the age of consent for certain sexual acts to be 18, and most of the bylaws define that “inappropriate sexual acts” to be illegal. The previous Supreme Court decision on what constitute “inappropriate sexual acts” states that “sexual acts among partners who are not in serious love toward formal marriage.”⁹ There is obvious criticism that the previous court rules are too vague and conservative in defining modern diverse sexual relationships in reality. The opponents argue that the court interpretation of the bylaws generates a risk for anyone in a serious relationship with a marriageable minor of being arbitrarily prosecuted and punished *ex post*, after the relationship ends up in separation, discouraging any “true love” relationships and marriage. This situation provides additional dimensions to the effects of the Japanese policy, making interesting, as well as complicating, our motivation and analysis.

A rise in the number of similar bylaws across nation in 1970s is said to be triggered by a rise in the youth crime and the establishment of “Youth Problem Division” in the National Police Agency (Fujii 1997). Although the enactment of prefectural bylaws and introduction of statutory rape code might be a policy response of the rising youth crimes,

⁷There are a couple of states (e.g., Florida) that set the age of consent above the marriageable age with parental consent. In this case, married couples are exempt.

⁸See Posner and Silbaugh (1996) for an exhaustive description of the statutory rape laws in the U.S.

⁹*Supreme Court Grand Bench Judgement (Case 1982(A)621) October 23, 1985.*

given that the application of the national penal codes is the same for adolescents under 20, there is no particular reason why sexual and marital behavior below age 18 might be affected by unobservable local trends differently from the behavior beyond age 18. These policy differences over time and prefectures across the age threshold altogether provide us with identifying variations.

3 Data and Econometric Specification

In order to estimate the effect of statutory rape law on formal marriage, we use the passage of age of consent for inappropriate sexual acts, the degree of enforcement measured by the level of punishment, and age of women who are newly married as key explanatory variables. In order to measure the likelihood of legal marriage by age group, we use published data from the *Vital Statistics of Japan* (VSJ). The VSJ is a yearly population survey that includes counts of all the reported formal marriage by age of women. Although there is no individual microdata available from the survey, the nature of the VSJ provides us with the possibility to detect the effect of local law and enforcement on the teens' marital formation with the maximum precision.

The econometric specification is similar to Gruber (1994) and described as follows. Let N_{ijs} be the stock of single women of cohort j in prefecture i at age s . Note that the year of survey of cohort j at age s , denoted by t , is expressed as $s = t - j$. Then we define the rate of new marital formation by $Y_{ijs} = 1 - N_{ijs}/N_{ijs-1}$.

As our policy treatment variables, let SRL_{ijs} be an indicator that takes 1 if women of cohort j in prefecture i faces a statutory rape law at age s . In other words, if the prefecture i has the legal age of consent for inappropriate sexual acts, $SRL_{ijs} = 1$ if s is below the legal age of consent. Similarly, $SRLF_{ijs}$ and $SRLP_{ijs}$ are the degree of penalties, measured by the maximum fine and the maximum length of imprisonment, respectively, if one is found guilty for statutory rape against a woman of cohort j at age

s in prefecture i . Note that these two penalty variables automatically take 0 if SRL_{ijs} takes 0, although they do not necessarily take positive values even if SRL_{ijs} takes 1.

Finally, let ν_{is} be a fixed prefecture-age effect, μ_j be a fixed cohort effect, AGE_s be an age dummy, X_{ijs} be a vector of observable characteristics, and ε_{ijs} be the other unobservable disturbance. Then we assume that a new marital formation is modelled as follows.

$$Y_{ijs} = \alpha + X_{ijs}\beta + \nu_{is} + \mu_j + (AGE_s \cdot SRL_{ijs})\delta_s + (AGE_s \cdot SRLF_{ijs})\gamma_s + (AGE_s \cdot SRLP_{ijs})\lambda_s + \varepsilon_{ijs}.$$

In this formulation, ν_{is} is intended to capture any local propensity of marriage by age. For example, some local areas have tradition such that women tend to get married by age 25. μ_j is included because of a clear aggregate tendency to increasingly delay marriage in Japan in the past years. Given these fixed effects, δ_s is supposed to capture the effect of a passage of statutory rape law on marriage of women of age s , averaged over the range of cohorts and prefectures in the sample. In practice, the age effect when the law exists is captured with the effect on 18 as the reference group. Similarly, γ_s and λ_s are intended to capture effects of law enforcement represented by the maximum fine and imprisonment, respectively.

In our estimation below, X_{ijs} includes the female high school enrollment rate of cohort s in prefecture i at age 15, and the local job opening ratio in prefecture i in year $t(= s - j)$. The previous local bylaws were found at the *National Diet Library* and recorded to create a dataset. about changes in the Statutory Rape Law and the degrees of enforcement to details.

Some remarks follow. First, Y_{ijs} theoretically represents the rate of marital formation from the local pool of single women in previous year. In practice, however, we need to create the denominator by subtracting the new marriage counts from the number of junior high school graduates every year. Such a construction of this variable may involve

a large measurement error in the denominator, and may create the division bias in the estimation. Therefore, in the following, we will alternatively use $\tilde{Y}_{ijs} = 1 - N_{ijs}/N_{ij14}$, instead of Y_{ijs} , where N_{ij14} is the number of local junior high school graduates which do not changes as the graduates age. In fact, the choice of dependent variables will not create any differences in the major results as shown below.

Second, the maximum age to be included in the estimation is found crucial for obtaining meaningful results for the effect of law on the teenage marriage. We include the new marriage from age 15 to 19 in the estimation.¹⁰ since it is found that both the rate of marriage and the migration across prefectures increase dramatically after age 20 (the age of majority), and that including age groups beyond 20 will make our estimation of teen age marriage behavior highly misleading.

Finally, although we include cohort dummies in the above econometric specification, we also present the estimation results with the calendar year fixed effect. Year may have an effect on marriage independent of age or cohort since some years may create a specific shock on marital behavior (e.g., Year 2000, Olympic Year, etc.). In fact, this alternation does not create any major difference in our results.

Table 1 shows the summary statistics of the dependent and major independent variables used in our estimation by year. It is shown that the marriage rate at 16 and 17 is slightly rising in the past 15 years, contrary to the overall tendency to delay the first marriage which is noticeable in the marriage rate at age 19. It is also shown that the prefectures with the statutory rape law have increased and the degrees of enforcement have been raised during early 70s and late 90s.

¹⁰ Although the legal marriageable age for female is 16, the marriage document submitted to local offices is effective once accepted, even if the age is below 16. There are positive number of marriage at age 15 in the data.

4 Estimation Results and Interpretations

4.1 Statutory Rape Law and New Marital Formation

Tables 2-3 show the main estimation results. Both tables are the results using Y_{ijs} as a dependent variable and the results using \tilde{Y}_{ijs} as a dependent variable. Tables 2 includes birth cohort dummies as a control while Table 3 includes year dummies instead. All the tables show the ordinary least square (OLS) results controlling for age effects with age 15 as an omitted category. Columns 1 and 4 show the OLS results that do not control for prefectural fixed effects while columns 2-3 and 5-6 show the OLS results that control for prefecture-age fixed effects. The base estimations (Columns 1-2 and 4-5) include a dummy for the existence of local statutory rape law, SLR , interacted with age dummies, prefectural job opening ratio, and prefectural female high school enrollment ratio at 15. In the other columns (3 and 6), we include additional law enforcement variables (Max. length of imprisonment, Max fine) interacted with age dummies.

Looking at Columns (1)-(3) in Table 2, it is found that the effect of SLR on marriage is positive and that the positive sign survives over the ages 15-17, suggesting that the law tends to encourage a marital formation. However, the interaction terms of SLR with age dummies show negative signs when ages are 18 and 19, suggesting the effect of the law tends to disappear beyond age 18.

The two law enforcement measures seem not to have any systematic signs. “Job Opening Ratio” always has a significantly positive sign. It is interpreted that the a higher opening ratio creates a positive income effect on the side of men, that positively influences the propensity of marriage on the side of women. High school enrollment tends to have a significantly negative sign, suggesting that a female junior high school graduate is opt for choosing to get married early if she finds enrolling in high school is not an attractive option.

By looking at Columns (4)-(6) in Table 2, using \tilde{Y}_{ijs} instead of Y_{ijs} does not funda-

mentally changes the results. Furthermore, the results in Table 3 is very similar to the results in Table 2, suggesting that controlling for birth cohorts are sufficient to get rid of the effects of time trend on marital formation over the period.

4.2 Is Marriage under Statutory Rape Law Stable?

The previous results are largely consistent with the view that statutory rape law tends to prohibit the freedom of sexual behavior and discourage “true love” relationships among teens, some of which have been substituted for by a formal marriage. There is, however, some possibility that an increase in formal marriage is simply a consequence of “cover-up” marriage in order to avoid the subsequent prosecution. The marriageable age for women is 16 in Japan, and unlike the U.S., the local bylaws prohibit only “inappropriate sexual acts.” Therefore, there might be cases in which “not-so-serious” relationships ended up with a formal marriage after the sexual acts had been known by the other adults or the family of the teenage partner, such as due to the pregnancy, only for the purpose to insist that their acts came from “true love” to the local law enforcement.

Although it is difficult to distinguish “cover-up” marriage and “substitution” marriage at the time of marital formation, we can suppose that a cover-up marriage is more likely to break up than the marriage that was chosen from “true love” as a substitute of premarital dating. Therefore, if the divorce rate of women under 18 is found higher than the divorce rate of women over 18 only when the statutory rape law exists, we can conclude that the law increased the teenage marriage that is only easy to break up, consistently with the “cover-up” hypothesis.

Testing this hypothesis ideally requires individual panel data with the year of marriage and divorce over the sample periods. The first limitation of our data is that the VSJ includes the number of divorces by age only at the time of divorce, not by age of marriage or the length of marriage. Therefore, the exposure to the law at the time of marriage is not clear. The second limitation of the VSJ is that it started to release

the divorce counts by age only after 1979, after the first wave of the statutory rape law enactment. Despite these limitations, we estimate the effects of the law on the contemporaneous divorce rate using exactly the same specification as the marriage formation estimation.

The results is shown in Table 4. The specifications in Table 4 are limited to those controlling for the cohort and age-prefecture dummies, but the results do not change under alternative specifications. Overall, we are not able to find any systematic effect of the enactment of the statutory rape law on the divorce rate. The signs on $SLR \times \text{Aged } 18$ or $SLR \times \text{Aged } 19$ are statistically insignificant, and if anything, are negative. The only caveat is that statistically significant effects are observed in the maximum fine and its interactions with age dummies (Column (4)-(6)), which have no effect on marriage.¹¹

5 Conclusion

In a modern society, statutory rape law has been generally viewed as a way to protect youths from adults' exploitation and teenage childbearing. The same law also has been criticized as interfering into "true love" and "serious marriage," especially in Japan where the cohabitation and the out-of-wedlock childbearing are still rare. This paper provides new evidence on this question using the Japanese data by estimating the effects of the passage of statutory rape rule and changes in the degree of enforcement at local prefectures on teenage marriage.

By estimating models of new marital formations by prefecture-age group over the cohorts born between 1940-1990, we find that the passage of statutory rape law significantly encourages new marital formation of women under 18, the age of consent when

¹¹An alternative way to test the cover-up hypothesis would be to examine whether the pregnancy preceding to the legal marriage increased when the statutory rape law exists. The VSJ includes birth counts by age of mother and prefecture; however, it does not include detailed information on neither the relative timing of births to marriage nor separate birth counts by married and unmarried couples. We leave studying this issue using more detailed birth data for future research.

the law exists. On the other hands, our measures of the degrees of enforcement do not have any systematic effects on marriage. We do not find evidence that the law increases the divorce rate of women under 18. Therefore, the statutory rape law is likely to prohibit “true love” sexual relationships, encouraging the formal marital formation as a substitute, without increasing unwanted “cover-up” marriage.

It is, nonetheless, an open question whether such “substitution” marriage, even if they do not lead to immediate divorce, would enhance the social welfare of the affected youths in the long-run. First, we need more detailed individual data on educational achievement, childbearings, income, and divorce with the lengths of marriage. Second, it is important to know how an increase of teenage marriage may influence the welfare of their children. Finally, the overall welfare effect of the statutory rape law to the Japanese society depends on how the law potentially discourages sexual relationships by partners who do not have an intention to commit to marriage, and how the existence of a commitment device, such as the statutory rape law that prohibits “inappropriate sexual acts,” would selectively encourage the formation of marriage that is otherwise difficult to develop in an incomplete market. These are some of the issues worth investigating in the future.

6 Appendix

6.1 The Penal Code:

Article 176 (Forcible Indecency)

A person who, through assault or intimidation, forcibly commits an indecent act upon a male or female of not less than thirteen years of age shall be punished by imprisonment with work for not less than 6 months but not more than 10 years. The same shall apply to a person who commits an indecent act upon a male or female under thirteen years of age.

Article 177 (Rape)

A person who, through assault or intimidation, forcibly commits sexual intercourse with a female of not less than thirteen years of age commits the crime of rape and shall be punished by imprisonment with work for a definite term of not less than 3 years. The same shall apply to a person who commits sexual intercourse with a female under thirteen years of age.

References

- [1] Blau, Francine, Marianne Farber, and Anne Winkler, 2006, *The Economics of Men, Women, and Work*. 5th ed. Prentice Hall.
- [2] Fujii, Seiji. 1997. “*Healthy Nurturing Plan*” of *Minors under 18* (“18 sai Miman Kenzen Ikusei Keikaku” Gendai-Jinbun-Sha (in Japanese).
- [3] Gruber, Jonathan. 1994. “The Incidence of Mandated Maternity Benefits.” *American Economic Review*. 84(3): pp.622-641.
- [4] Jepsen, Christopher A. and Lisa K. Jepsen. 2006. “The Effects of Statutory Rape Laws on Nonmarital Teenage Childbearing.” *Contemporary Economic Policy*. 24(1). pp. 35-51.
- [5] Jovanovic, Boyan. 1979. “Job Matching and the Theory of Turnover,” *Journal of Political Economy*, 87(5) Part I, pp. 972-990.
- [6] Laumann, Edward O. and Robert T. Michael. 2001. *Sex, Love, and Health in America : Private Choices and Public Policies*. Chicago: University of Chicago Press.
- [7] Levine, Phillip B. 2001. “The Sexual Activity and Birth-Control Use of American Teenagers.” In *Risky Behavior among Youths.: An Economic Analysis*. by Jonathan Gruber..Chicago: The University of Chicago Press.
- [8] Michael, Robert T., and Courtney Bickert. 2001. “Exploring Determinants of Adolescents’ Early Sexual Behavior.” In *Social Awakening: Adolescent Behavior as Adulthood Approaches*. Russell Sage Foundation.
- [9] Oettinger, Gerald S. 1999. “The Effects of Sex Education on Teen Sexual Activity and Teen Pregnancy.” *Journal of Political Economy*. 107 (3) pp. 606-44.
- [10] Posner, Richard A. and Katharine B. Silbaugh. 1996. *A Guide to America’s Sex Laws*. Chicago: University of Chicago Press.

- [11] Rindfuss, Ronald R., and Audrey VandenHeuvel. 1990. "Cohabitation: A Precursor to Marriage or an Alternative to Being Single?" *Population and Development Review*. 16(4): pp. 703-726.
- [12] Stevenson, Betsey and Justin Wolfers. 2007. "Marriage and Divorce: Changes and their Driving Forces." *Journal of Economic Perspectives*. 21(2). pp. 27–52.
- [13] Willis, Robert. J. and Robert T. Michael. 1994. "Innovation in Family Formation: Evidence on Cohabitation in the United States." In *The Family, The Market, and The State in Ageing Societies*. John Ermisch and Naohiro Ogawa. Oxford: Clarendon Press.

Table 1. Summary Statistics

Year	Prefectures with Statutory Rape Law	Ave. fine [ten thousand yen]	Ave. [imprison [months]	Rate of new marriage (%)				Ave. high school enrollment at 15
				Age 16	Age 17	Age 18	Age 19	
1956	2	0.109	0.130	0.088				0.461
1957	2	0.109	0.130	0.084	0.281			0.445
1958	3	0.109	0.130	0.082	0.282	0.877		0.450
1959	3	0.109	0.130	0.071	0.248	0.827	2.075	0.477
1960	3	0.109	0.130	0.065	0.246	0.805	2.033	0.496
1961	4	0.109	0.130	0.064	0.233	0.777	1.977	0.523
1962	5	0.174	0.130	0.066	0.248	0.770	1.973	0.570
1963	5	0.174	0.130	0.062	0.248	0.780	1.913	0.587
1964	5	0.174	0.130	0.066	0.247	0.809	1.906	0.612
1965	6	0.239	0.130	0.057	0.245	0.807	1.948	0.650
1966	7	0.239	0.130	0.053	0.214	0.741	1.915	0.663
1967	8	0.304	0.130	0.058	0.226	0.733	1.919	0.687
1968	9	0.413	0.130	0.060	0.224	0.670	1.703	0.707
1969	9	0.413	0.130	0.062	0.232	0.717	1.715	0.725
1970	9	0.404	0.128	0.062	0.248	0.763	1.810	0.747
1971	9	0.511	0.128	0.070	0.282	0.854	2.046	0.768
1972	9	0.511	0.128	0.075	0.299	0.901	2.125	0.796
1973	9	0.511	0.128	0.083	0.295	0.876	2.095	0.823
1974	9	0.511	0.128	0.082	0.279	0.816	1.932	0.852
1975	9	0.511	0.128	0.085	0.248	0.698	1.725	0.867
1976	9	0.511	0.128	0.073	0.228	0.644	1.535	0.888
1977	11	0.681	0.128	0.069	0.213	0.623	1.442	0.900
1978	27	3.979	1.915	0.072	0.215	0.602	1.427	0.918
1979	34	6.787	3.574	0.077	0.221	0.634	1.423	0.924
1980	40	8.064	5.362	0.084	0.234	0.626	1.477	0.928

Table 1. Summary Statistics (continued)

Year	Prefectures with Statutory Rape Law	Ave. fine [ten thousand yen]	Ave. imprison [months]	Rate of new marriage (%)				Ave. high school enrollment at 15
				Age 16	Age 17	Age 18	Age 19	
1981	41	8.170	5.489	0.079	0.234	0.673	1.445	0.930
1982	42	8.383	5.745	0.087	0.253	0.681	1.540	0.933
1983	42	8.532	6.000	0.098	0.256	0.731	1.526	0.934
1984	42	8.681	6.255	0.089	0.287	0.686	1.487	0.929
1985	43	9.213	7.149	0.087	0.247	0.752	1.354	0.931
1986	45	9.638	7.787	0.080	0.229	0.623	1.404	0.933
1987	45	9.638	7.787	0.077	0.216	0.596	1.244	0.935
1988	45	9.745	8.043	0.073	0.222	0.594	1.228	0.936
1989	45	9.745	8.043	0.065	0.204	0.570	1.264	0.938
1990	45	9.851	8.553	0.063	0.204	0.588	1.283	0.940
1991	45	9.851	8.553	0.066	0.199	0.605	1.276	0.942
1992	45	14.426	8.809	0.067	0.195	0.598	1.278	0.946
1993	45	39.638	10.213	0.069	0.201	0.601	1.291	0.950
1994	45	40.489	10.468	0.073	0.202	0.590	1.257	0.954
1995	45	40.489	10.468	0.083	0.200	0.603	1.245	0.957
1996	45	40.489	10.468	0.079	0.214	0.606	1.226	0.959
1997	45	57.085	14.681	0.080	0.216	0.654	1.279	0.960
1998	46	59.638	14.936	0.090	0.258	0.699	1.364	0.960
1999	46	61.128	15.192	0.102	0.277	0.732	1.409	0.979
2000	46	62.192	15.447	0.125	0.318	0.843	1.511	0.978
2001	46	62.192	15.447	0.128	0.323	0.886	1.607	0.978
2002	46	63.681	15.575	0.131	0.325	0.842	1.554	0.978
2003	46	63.681	15.575	0.116	0.283	0.792	1.460	0.977
2004	46	63.681	15.575	0.115	0.257	0.721	1.400	0.979
2005	46	63.681	15.575	0.088	0.234	0.682	1.282	0.980
2006	46	65.809	16.085	0.092	0.255	0.681	1.229	0.981

Table 2. Estimation Results for the Effect of Statutory Rape Law (1): Birth cohort fixed effect model.

Column:	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Var.	Y_{ijs}	Y_{ijs}	Y_{ijs}	\tilde{Y}_{ijs}	\tilde{Y}_{ijs}	\tilde{Y}_{ijs}
SLR(Law Enacted)	0.073 (0.067)	0.006 (0.039)	-0.019 (0.140)	0.071 (0.066)	0.005 (0.039)	-0.019 (0.140)
× Age 15	0.020 (0.045)	0.082 (0.029)**	0.008 (0.166)	0.021 (0.045)	0.081 (0.029)**	0.008 (0.165)
× Age 16	0.045 (0.041)	0.095 (0.027)**	0.018 (0.152)	0.045 (0.041)	0.094 (0.026)**	0.018 (0.151)
× Age 17	0.039 (0.030)	0.072 (0.021)**	0.011 (0.111)	0.039 (0.030)	0.072 (0.021)**	0.011 (0.110)
× Age 19	-0.288 (0.062)**	-0.363 (0.047)**	0.011 (0.227)	-0.282 (0.060)**	-0.356 (0.046)**	0.010 (0.218)
SRLP(Max. length of Imprisonment) [ten years]			0.019 (0.031)			0.019 (0.031)
× Age 15			-0.027 (0.031)			-0.026 (0.031)
× Age 16			-0.022 (0.029)			-0.022 (0.028)
× Age 17			-0.015 (0.023)			-0.014 (0.023)
× Age 19			-0.099 (0.039)*			-0.099 (0.038)*
SRLF (Max. fine) [hundred yen]			-0.002 (0.138)			-0.002 (0.137)
× Age 15			0.096 (0.163)			0.096 (0.162)
× Age 16			0.095 (0.149)			0.095 (0.148)
× Age 17			0.073 (0.109)			0.073 (0.108)
× Age 19			-0.297 (0.220)			-0.289 (0.212)
Job opening ratio	0.035 (0.028)	0.092 (0.015)**	0.092 (0.015)**	0.035 (0.027)	0.090 (0.015)**	0.090 (0.015)**
High school enrollment at 15	-0.555 (0.486)	-0.097 (0.400)	-0.103 (0.401)	-0.543 (0.476)	-0.094 (0.392)	-0.099 (0.393)
Constant	1.162 (0.265)**	0.504 (0.392)	0.519 (0.389)	1.151 (0.259)**	0.499 (0.385)	0.513 (0.382)
Prefecture × Age dummy	No	Yes	Yes	No	Yes	Yes
Adjusted R-squared	0.84	0.32	0.32	0.84	0.32	0.33

Note: The dependent variable is the rate of new marital formation (Y_{ijs}) in percentage for columns (1)-(3), and the ratio of new marital formation count to population at age 14 (\tilde{Y}_{ijs}) in percentage for columns (4)-(6). The range of age is 15-19, and the base category is 18. All the specification includes age dummies and birth cohort dummies. Number of observation is 9,265. The robust standard errors are in parentheses. * significant at 5%, ** significant at 1%.

Table 3. Estimation Results for the Effect of Statutory Rape Law (2): Year fixed effect model.

Column:	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Var.	Y_{ijs}	Y_{ijs}	Y_{ijs}	\tilde{Y}_{ijs}	\tilde{Y}_{ijs}	\tilde{Y}_{ijs}
SLR(Law Enacted)	0.091 (0.069)	0.035 (0.041)	-0.001 (0.139)	0.089 (0.068)	0.005 (0.039)	-0.019 (0.140)
× Age 15	0.003 (0.048)	0.073 (0.032)*	0.012 (0.176)	0.004 (0.047)	0.081 (0.029)**	0.008 (0.165)
× Age 16	0.039 (0.042)	0.094 (0.028)**	0.024 (0.153)	0.040 (0.042)	0.094 (0.026)**	0.018 (0.151)
× Age 17	0.036 (0.031)	0.072 (0.021)**	0.015 (0.111)	0.036 (0.030)	0.072 (0.021)**	0.011 (0.110)
× Age 19	-0.288 (0.062)**	-0.367 (0.047)**	0.009 (0.227)	-0.283 (0.060)**	-0.356 (0.046)**	0.010 (0.218)
SRLP(Max. length of Imprisonment) [ten years]			0.020 (0.029)			0.019 (0.031)
× Age 15			-0.031 (0.031)			-0.026 (0.031)
× Age 16			-0.017 (0.028)			-0.022 (0.028)
× Age 17			-0.012 (0.023)			-0.014 (0.023)
× Age 19			-0.102 (0.039)*			-0.099 (0.038)*
SRLF (Max. fine) [hundred yen]			0.011 (0.134)			-0.002 (0.137)
× Age 15			0.088 (0.176)			0.096 (0.162)
× Age 16			0.085 (0.151)			0.095 (0.148)
× Age 17			0.068 (0.110)			0.073 (0.108)
× Age 19			-0.298 (0.221)			-0.289 (0.212)
Job opening ratio	0.047 (0.033)	0.138 (0.023)**	0.136 (0.022)**	0.046 (0.033)	0.090 (0.015)**	0.090 (0.015)**
High school enrollment at 15	-0.814 (0.451)	-0.475 (0.343)	-0.420 (0.363)	-0.799 (0.442)	-0.094 (0.392)	-0.099 (0.393)
Constant	1.229 (0.282)**	0.615 (0.315)	0.573 (0.334)	1.217 (0.277)**	0.499 (0.385)	0.513 (0.382)
Prefecture × Age dummy	No	Yes	Yes	No	Yes	Yes
Adjusted R-squared	0.84	0.34	0.35	0.85	0.32	0.33

Note: The dependent variable is the rate of new marital formation (Y_{ijs}) in percentage for columns (1)-(3), and the ratio of new marital formation count to population at age 14 (\tilde{Y}_{ijs}) in percentage for columns (4)-(6). The range of age is 15-19, and the base category is 18. All the specification includes age dummies and year dummies. Number of observation is 9265. The robust standard errors are in parentheses. * significant at 5%, ** significant at 1%.

Table 4. Estimation Results for the Effect of Statutory Rape Law on Divorce.

Column:	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Var.	D_{ijs}	D_{ijs}	D_{ijs}	\tilde{D}_{ijs}	\tilde{D}_{ijs}	\tilde{D}_{ijs}
SLR(Law Enacted)	0.116 (0.157)	0.204 (0.221)	0.003 (0.237)	0.006 (0.005)	-0.004 (0.003)	-0.005 (0.004)
× Age 16	0.093 (0.325)	-0.486 (0.522)	-0.537 (0.682)	-0.015 (0.004)**	-0.013 (0.003)**	0.003 (0.004)
× Age 17	0.234 (0.164)	0.391 (0.413)	0.704 (0.482)	-0.011 (0.003)**	-0.009 (0.003)**	0.004 (0.004)
× Age 19	-0.083 (0.156)	-0.120 (0.266)	0.021 (0.297)	0.018 (0.005)**	0.016 (0.004)**	0.000 (0.005)
SLRP (Max. length of Imprisonment) [ten years]			0.588 (1.499)			0.006 (0.020)
× Age 16			9.422 (6.330)			-0.012 (0.036)
× Age 17			-1.266 (3.559)			-0.015 (0.024)
× Age 19			-1.485 (1.919)			0.020 (0.056)
SRLF (Max. fine) [hundred yen]			0.710 (0.367)			0.004 (0.004)
× Age 16			-1.987 (1.027)			-0.042 (0.006)**
× Age 17			-0.476 (0.674)			-0.031 (0.004)**
× Age 19			-0.031 (0.297)			0.038 (0.008)**
Job opening ratio	0.016 (0.179)	0.130 (0.214)	0.154 (0.211)	-0.002 (0.003)	0.003 (0.001)*	0.004 (0.001)**
High school enrollment at 15	-1.287 (2.810)	-2.999 (3.931)	-2.724 (3.814)	-0.302 (0.105)**	-0.023 (0.053)	-0.018 (0.053)
Constant	8.635 (3.219)*	9.391 (3.785)*	8.905 (3.677)*	0.274 (0.095)**	0.022 (0.049)	0.078 (0.053)
Prefecture × Age dummy	No	Yes	Yes	No	Yes	Yes
Adjusted R-squared	0.09	0.06	0.07	0.70	0.30	0.40
Observations	5251	5251	5251	5264	5264	5264

Note: The dependent variable is the rate of new divorce (D_{ijs}) calculated as the age-specific divorces by the cumulative marriages for columns(1)-(3), and the ratio of new divorces to population at age 14 (\tilde{D}_{ijs}) for columns (4)-(6), respectively, in percentage. The range of age is 16-19, and the base category is 18. All the specification includes age dummies and birth cohort dummies. The robust standard errors are in parentheses. * significant at 5%, ** significant at 1%.