# Sexual Violence against Women and Labor Market Outcomes[*]

Jeffrey DeSimone
Department of Economics
University of Texas-Arlington
Email: jdesimone@uta.edu

Joseph J. Sabia
Department of Economics
San Diego State University
Email: jsabia@mail.sdsu.edu

**September 2011**

[*] This research uses data from the National Longitudinal Study of Adolescent Health, designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris, and funded by a grant P01-HD31921 from the National Institute of Child Health and Human Development, with cooperative funding from 17 other agencies. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Persons interested in obtaining data files from the National Longitudinal Study of Adolescent Health should contact Add Health, Carolina Population Center, 123 W. Franklin Street, Chapel Hill, NC 27516-2524 (http://www.cpc.unc.edu/addhealth/contract.html).

## Extended Abstract

The consequences of sexual violence on women have been studied by a wide array of disciplines, including sociology and demography, but the topic has only very recently been addressed at all by economists. Recent economics research has showed that the adverse mental health effects of traumatic life events have the potential to impact longer-term economic outcomes (see, for example, Gruber, 2004; Gertler et al., 2000; Currie and Tekin, 2006). And a recent study by Sabia and Rees (2011) suggests that the depression effects of forced intercourse victimization diminish young females' academic performance. Our work is the first in the economics literature to explore the labor market consequences of sexual violence toward women. Obtaining accurate estimates of the employment and earnings effects of sexual violence is critical in ascertaining the full social costs of this violent crime.

Using data from four waves of the National Longitudinal Study of Adolescent Health, we estimate the relationship between victimization from physically forced sexual violence and subsequent labor market outcomes of young adult females. These data are useful for this purpose because of detailed measures of labor market participation and earnings in young adulthood and because of multiple measures of sexual violence, including forced sexual activity by non-parents, sexual abuse by parents, and being sexually victimized while intoxicated or high on an illegal drug. As such, we are able to explore heterogeneity in the effects of forced sexual violence by identity the perpetrator and the age at first violence.

An additional advantage of the Add Health data is that they permit the researcher to disentangle the labor market consequences of sexual violence from that of difficult-to-measure unobservables at the community-, family-, and individual-levels. This is important for a number of reasons. First, while females certainly do not choose to be the victims of sexual assault, many

victims may live in more dangerous communities or even know their accusers, which suggests that community-level and peer group-level omitted variables may bias estimates of the labor market effects of sexual violence. For instance, if a family of low socioeconomic status with fewer economic opportunities resides in a community with greater crime and more dangerous peers, then each could positively affect the probability of sexual violence and also adversely affect labor market opportunities. This could lead to an overstatement of the labor market consequences of sexual violence if these forms of unobservables are not appropriately controlled for in the usual regression. Moreover, females victimized by their parents may face a number of challenges related to other forms of abuse, neglect, and diminished parental investments, which could also affect socioeconomic status.

Our paper begins with linear probability models (for labor force participation) and ordinary least squares (OLS) estimates for hourly earnings equations. Our baseline models control for a set of basic exogenous background characteristics commonly used in the economics literature: age, race, urbanicity, education, marital status, family structure, and cognitive ability. In earnings equations, we add controls for occupation. In our sample, 13.8 percent of females ages 26-to-34 at Wave IV reported being physically forced to engage in sexual activity with a non-family member. The results (shown in Tables 1-2) suggest that forced sexual violence by a non-family member is negatively related with two measures of female labor force participation: having any earnings in the past year and currently working at least 10 hours per week, as well as with hourly earnings. Sexual violence victimization reduces labor force participation by over two percentage points and earnings by nearly 10 percent, even controlling for standard demographic characteristics and measures of family socioeconomic background, ability and occupation (in the case of earnings).

Next, we examine effects by age of initial victimization (Table 3). Earnings effects for different ages of first having been assaulted are similarly sized and statistically indistinguishable. In contrast, labor force participation effects are concentrated among women first assaulted before age 13 or as teens, with corresponding increased likelihoods of unemployment in the range of 5- to 6-percentage points, rather than during early adulthood.

As noted above, the main concern regarding the results described above is whether the observed labor force participation and earnings reductions are truly caused by sexual violence. While victims certainly do not choose to be sexually assaulted, it is unlikely that sexual violence occurs randomly, especially given that the perpetrators often know their victims. Omitted variables at the level of the neighborhood (e.g. crime rates, labor market conditions), school (e.g. educational quality, peer group selection), or family (e.g. specific genetic or environmental characteristics) could potentially impact both sexual violence victimization and labor market outcomes. The richness of the Add Health data, however, allows us to control for many of these important characteristics (see Table 4). We find that our earnings estimates are robust to controlling for county fixed effects, school-by-grade fixed effects, and self-reported peer group substance use. Moreover, when we restrict our sample to identical twins and include controls for family fixed effects, our findings continue to point to important adverse labor market effects of sexual violence.

While suggestive, the robustness of our estimates to controls for county-, school-, and family-level unmeasured heterogeneity does not eliminate the possibility that unobserved individual-specific factors drive the link between sexual violence and labor market outcomes. For instance, predators might target women who engage in risky sexual behavior (whey they might engage in themselves), who are less risk averse in general, or who have higher personal

discount rates, all of which are inversely associated with labor market success. Our findings (see Table 5), however, suggest that individual heterogeneity of this type are not leading to biased estimates. Controlling for several measures of risky sexual behavior and substance use, along with proxies for risk and time preference as well as decision-making style, the labor force participation effect actually increases in magnitude. While the earnings effect declines in size, it remains large (an approximate 7 percent wage penalty), and statistically significant and unchanged when further controls beyond those for risky sexual behavior are added.

We then proceed to investigate whether the effects of sexual violence differ by perpetrator relationship and whether physical force is used (Table 6). Specifically, we compare our results with those for two alternative measures of sexual violence, parental sexual abuse and non-physical sexual violence, where the latter entails lack of consent but no physical assault. Effects are significant and comparable in magnitude (labor force participation) or smaller (earnings) for non-physical sexual violence, but are small and insignificant for parental sexual abuse. This implies that non-family sexual violence can be damaging to labor market prospects even without accompanying physical assault.

Finally, we examine the importance of perhaps the most likely mechanism through which sexual violence victimization would be expected to reduce labor market success: stress-induced degradations in psychological well-being (Table 7). Adding controls for post-traumatic stress disorder (PTSD), depression and other stress disorders reduces the size of the sexual violence effects by about one-third. To address the possibility that these conditions are simply markers for women who are more likely to be victimized, we exploit the longitudinal nature of the data by repeating the exercise with a sample of women who had not yet been assaulted at Wave I, while also controlling for mental health at that wave (i.e. prior to victimization). Results are

similar, as we find that stress-related disorders explain 30 to 50 percent of the adverse labor market consequences of sexual violence.

Taken together, our study demonstrates a strong negative relationship between sexual violence victimization and labor market success among women that persists even after accounting for various potential sources of spurious correlation at the neighborhood, peer group, family and individual levels. Effects are strongest for women first victimized in childhood and adolescence, are stronger when perpetrated by non-family members rather than parents, and arise in part because of stress-related adverse psychological consequences. These findings have important consequences for understanding the full range of social benefits that could be realized from police- or school-based interventions that prevent sexual assault.

**Selected References**

Currie, Janet and Erdal Tekin. 2006. "Does Child Abuse Cause Crime?" IZA Discussion Paper No. 2063.

Gertler, Paul, Sebastian Martinez, David Levine, and Stefano Bertozzi. 2004. "Lost Presence and Presents: How Parental Death Affects Children," Princeton University Working Paper. Available at: http://weblamp.princeton.edu/chw/papers/gertler.pdf

Gruber, J. 2004. "Is making divorce easier bad for children? The long-run implications of unilateral divorce." Journal of Labor Economics, Vol. 22, No. 4, pp. 799–833.

Sabia, Joseph J. and Daniel I. Rees. 2011. "Forced Intercourse, Mental Health, and Human Capital," Working Paper, San Diego State University.

**Table 1. OLS Estimates of Relationship between Sexual Violence and Labor Force Participation**

| | (1) | (2) | (3) |
|---|---|---|---|
| | ***Panel I: Any Earnings Last Year*** | | |
| Sexual Violence | -0.022**<br>(0.010) | -0.023**<br>(0.010) | -0.022**<br>(0.010) |
| N | 7,547 | 7,547 | 7,547 |
| | ***Panel II: Current Employment ≥ 10 Hours Per Week*** | | |
| Sexual Violence | -0.021<br>(0.015) | -0.022<br>(0.015) | -0.025*<br>(0.015) |
| N | 7,758 | 7,758 | 7,758 |
| | | | |
| *Controls:* | | | |
| Age, Race, Educ, Marital Status, Children, Urban? | Yes | Yes | Yes |
| PPVT Score? | No | Yes | Yes |
| Family SES? | No | No | Yes |

***Significant at 1% level **Significant at 5% level *Significant at 10% level
Notes: OLS regressions are obtained using data from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. Standard errors are corrected for clustering on the school. Females who were pregnant at the time of the Wave IV analysis were excluded from the sample.

**Table 2. OLS Estimates of Relationship between Sexual Violence and Log (Hourly Earnings)**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Sexual Violence | -0.098***<br>(0.026) | -0.091***<br>(0.026) | -0.093***<br>(0.025) | -0.095***<br>(0.025) |
| N | 6,799 | 6,799 | 6,799 | 6,799 |
| | | | | |
| *Controls:* | | | | |
| Age, Race, Educ, Marital Status, Children, Urban, Job tenure? | Yes | Yes | Yes | Yes |
| Occupation? | No | Yes | Yes | Yes |
| PPVT Score? | No | No | Yes | Yes |
| Family SES? | No | No | No | Yes |

***Significant at 1% level **Significant at 5% level *Significant at 10% level
Notes: OLS regressions are obtained using data from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. Standard errors are corrected for clustering on the school. Females who were pregnant at the time of the Wave IV analysis were excluded from the sample.

**Table 3. Heterogeneity in Effects of Sexual Violence, by Age at First Assault**

| | (1)<br>**Any Earnings Last Year** | (2)<br>**Current Employment ≥ 10 Hours Per Week** | (3)<br>**Log (Hourly Earnings)** |
|---|---|---|---|
| Sexual Violence between Ages 0 and 12 | -0.050*<br>(0.026) | -0.063**<br>(0.031) | -0.104**<br>(0.049) |
| Sexual Violence between Ages 13 and 19 | -0.007<br>(0.013) | -0.045*<br>(0.023) | -0.094**<br>(0.037) |
| Sexual Violence between Ages 20 and 24 | -0.014<br>(0.021) | 0.060<br>(0.036) | -0.075<br>(0.053) |
| Sexual Violence at Ages ≥ 25 years | -0.068<br>(0,054) | 0.007<br>(0.065) | -0.071<br>(0.102) |
| N | 7,533 | 7,744 | 6,788 |

***Significant at 1% level **Significant at 5% level *Significant at 10% level
Notes: OLS regressions are obtained using data from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. Standard errors are corrected for clustering on the school. Females who were pregnant at the time of the Wave IV analysis were excluded from the sample. The models in columns (1) and (2) include the full set of controls used in column (3) of Table 1; the model in column (3) includes the full set of controls used in column (4) of Table 2.

**Table 4. Robustness of Effect of Sexual Violence on Labor Market Outcomes to Controls for Local, Peer, and Family Environments**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | ***Panel I: Any Earnings Last Year*** | | | | | | |
| Sexual Violence | -0.022** (0.010) | -0.024** (0.011) | -0.022** (0.010) | -0.028** (0.011) | -0.027** (0.011) | 0.002 (0.074) | -0.124 (0.156) |
| N | 7,547 | 7,547 | 7,547 | 7,547 | 7,547 | 1,717 | 576 |
| | ***Panel II: Current Employment ≥ 10 Hours Per Week*** | | | | | | |
| Sexual Violence | -0.025* (0.015) | -0.029* (0.015) | -0.026* (0.015) | -0.023 (0.017) | -0.022 (0.017) | -0.0001 (0.126) | 0.058 (0.308) |
| N | 7,758 | 7,758 | 7,758 | 7,758 | 7,758 | 1,763 | 592 |
| | ***Panel III: Log (Hourly Earnings)*** | | | | | | |
| Sexual Violence | -0.095*** (0.025) | -0.096*** (0.024) | -0.093*** (0.025) | -0.098*** (0.026) | -0.098*** (0.026) | -0.049 (0.175) | -0.160 (0.471) |
| N | 6,799 | 6,799 | 6,799 | 6,799 | 6,799 | 1,868 | 514 |
| | | | | | | | |
| *Controls:* | | | | | | | |
| County Fixed Effects? | No | Yes | No | No | No | No | No |
| School Fixed Effects? | No | No | Yes | Yes | Yes | No | No |
| School-by-Grade Fixed Effects? | No | No | No | Yes | Yes | No | No |
| Peer Group Behavior (Smoking, Alcohol, Marijuana)? | No | No | No | No | Yes | No | No |
| Family Fixed Effects on Sisters? | No | No | No | No | No | Yes | No |
| Family Fixed Effects on Twins? | No | No | No | No | No | No | Yes |

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: OLS regressions are obtained using data from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. Standard errors are corrected for clustering on the school. Females who were pregnant at the time of the Wave IV analysis were excluded from the sample. All models in Panels I and II include the full set of controls used in column (3) of Table 1. All models in Panel III include the full set of controls used in column (4) of Table 2.

**Table 5. Robustness of Effect of Sexual Violence to Controls for Individual Risk-Taking**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | ***Panel I: Any Earnings Last Year*** | | | | | | |
| Sexual Violence | -0.022**<br>(0.010) | -0.026**<br>(0.010) | -0.023**<br>(0.010) | -0.022**<br>(0.010) | -0.021**<br>(0.010) | -0.022**<br>(0.010) | -0.025**<br>(0.010) |
| N | 7,547 | 7,547 | 7,547 | 7,547 | 7,547 | 7,547 | 7,547 |
| | ***Panel II: Current Employment ≥ 10 Hours Per Week*** | | | | | | |
| Sexual Violence | -0.025*<br>(0.015) | -0.045***<br>(0.016) | -0.029*<br>(0.015) | -0.027*<br>(0.015) | -0.023<br>(0.015) | -0.024<br>(0.015) | -0.043***<br>(0.016) |
| N | 7,758 | 7,758 | 7,758 | 7,758 | 7,558 | 7,758 | 7,758 |
| | ***Panel III: Log (Hourly Earnings)*** | | | | | | |
| Sexual Violence | -0.095***<br>(0.025) | -0.073***<br>(0.021) | -0.062***<br>(0.019) | -0.067***<br>(0.019) | -0.065***<br>(0.019) | -0.063***<br>(0.019) | -0.066***<br>(0.020) |
| N | 6,799 | 6,799 | 6,799 | 6,799 | 6,799 | 6,799 | 6,799 |
| | | | | | | | |
| *Controls:* | | | | | | | |
| Number of Voluntary Sex Partners? | No | Yes | No | No | No | No | Yes |
| Age at First Vaginal Sexual Intercourse? | No | Yes | No | No | No | No | Yes |
| Anal Sex? | No | Yes | No | No | No | No | Yes |
| Contraceptive Use? | No | Yes | No | No | No | No | Yes |
| Smoking, Binge Drinking, and Marijuana? | No | No | Yes | No | No | No | Yes |
| Tastes for Risk? | No | No | No | Yes | No | No | Yes |
| Decision-making style? | No | No | No | No | Yes | No | Yes |
| Personal discount rate? | No | No | No | No | No | Yes | Yes |

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: OLS regressions are obtained using data from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. Standard errors are corrected for clustering on the school. Females who were pregnant at the time of the Wave IV analysis were excluded from the sample. All models in Panels I and II include the full set of controls used in column (3) of Table 1. All models in Panel III include the full set of controls used in column (4) of Table 2.

**Table 6. Comparisons of Labor Market Effects of Sexual Violence to Effects of Non-Physical Sexual Assault and Parental Sexual Abuse**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | ***Panel I: Any Earnings Last Year*** | | | |
| Sexual Violence | -0.025**<br>(0.011) | | | -0.014<br>(0.012) |
| Non-Physical Sexual Assault | | -0.024**<br>(0.010) | | -0.017<br>(0.011) |
| Parental Sexual Abuse | | | -0.011<br>(0.016) | -0.006<br>(0.015) |
| N | 7,547 | 7,547 | 7,547 | 7,547 |
| | ***Panel II: Current Employment ≥ 10 Hours Per Week*** | | | |
| Sexual Violence | -0.043***<br>(0.016) | | | -0.047**<br>(0.015) |
| Non-Physical Sexual Assault | | -0.019<br>(0.013) | | 0.002<br>(0.015) |
| Parental Sexual Abuse | | | 0.008<br>(0.021) | 0.015<br>(0.021) |
| N | 7,758 | 7,758 | 7,758 | 7,758 |
| | ***Panel III: Log (Hourly Earnings)*** | | | |
| Sexual Violence | -0.066***<br>(0.020) | | | -0.057***<br>(0.021) |
| Non-Physical Sexual Assault | | -0.037*<br>(0.019) | | -0.011<br>(0.020) |
| Parental Sexual Abuse | | | -0.010<br>(0.027) | -0.0005<br>(0.026) |
| N | 6,799 | 6,799 | 6,799 | 6,799 |

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: OLS regressions are obtained using data from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. Standard errors are corrected for clustering on the school. Females who were pregnant at the time of the Wave IV analysis were excluded from the sample. All models include the full set of controls used in column (7) of Table 5.

**Table 7. Examination of Psychological Well-Being as Pathway through which Sexual Violence Affects Labor Market Outcomes**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | ***Panel I: Any Earnings Last Year*** | | | |
| Sexual Violence | -0.026** (0.011) | -0.018* (0.011) | -0.018 (0.013) | -0.009 (0.013) |
| PTSD | | -0.063*** (0.021) | | -0.056** (0.025) |
| CES-D Scale | | -0.001 (0.002) | | -0.002 (0.002) |
| Depression Diagnosis | | -0.013 (0.010) | | -0.017* (0.009) |
| Cohen Stress Scale | | 0.0003 (0.002) | | 0.0002 (0.001) |
| Pre-Sexual Violence CES-D | | | | 0.001** (0.0004) |
| Sample of non-victims at Wave I | No | No | Yes | Yes |
| N | 7,540 | 7,540 | 7,020 | 7,020 |
| | ***Panel II: Current Employment ≥ 10 Hours Per Week*** | | | |
| Sexual Violence | -0.044*** (0.016) | -0.028* (0.016) | -0.028 (0.021) | -0.016 (0.021) |
| PTSD | | -0.095*** (0.026) | | -0.087*** (0.029) |
| CES-D Scale | | -0.003 (0.003) | | -0.002 (0.003) |
| Depression Diagnosis | | -0.012 (0.017) | | -0.016 (0.018) |
| Cohen Stress Scale | | -0.005* (0.003) | | -0.004 (0.003) |
| Pre-Sexual Violence CES-D | | | | -0.0001 (0.001) |
| Sample of non-victims at Wave I | No | No | Yes | Yes |
| N | 7,749 | 7,749 | 7,243 | 7,243 |
| | ***Panel III: Log (Hourly Earnings)*** | | | |

| | | | | |
|---|---|---|---|---|
| Sexual Violence | -0.068***<br>(0.019) | -0.049**<br>(0.020) | -0.060**<br>(0.024) | -0.043*<br>(0.025) |
| PTSD | | -0.090*<br>(0.047) | | -0.103**<br>(0.052) |
| CES-D Scale | | -0.004<br>(0.003) | | -0.005<br>(0.003) |
| Depression Diagnosis | | -0.011<br>(0.09) | | -0.007<br>(0.020) |
| Cohen Stress Scale | | -0.010***<br>(0.003) | | -0.009***<br>(0.003) |
| Pre-Sexual Violence CES-D | | | | 0.0004<br>(0.009) |
| Sample of non-victims at Wave I | No | No | Yes | Yes |
| N | 6,770 | 6,770 | 6,359 | 6,359 |

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: OLS regressions are obtained using data from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. Standard errors are corrected for clustering on the school. Females who were pregnant at the time of the Wave IV analysis were excluded from the sample. All models include the full set of controls used in column (7) of Table 5.