Determinants of Divorce Rate
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Introduction

Marriage is the foundation of our society, as it produces children, love, economic performance, and has a strong relationship with public policy. Although marriage varies with each culture and generation, its economic implications remain relevant in both developed and developing countries. The question of who gets married and to whom, has strong ties to class division and economic performance. Marriage is largely an economic partnership that has both costs and benefits to individuals and their families. Analyzing the factors that affect the divorce rate can help us understand social and economic trends, and help the government enforce the appropriate public policies.

The goal of our research is to have a greater understanding of how economic factors affect the divorce rate. While people don’t usually associate econometrics with marriage, the goal of our paper is to uncover the economic implications of marriage and subsequently, divorce. The research we conducted gave us an insight of how our dependent variable divorce rate, is influenced by the unemployment rate, percentage of population graduated from high school, income level, age of women at first marriage, and average family size. The unemployment rate is our main interest because we expect it to have the largest influence on the unemployment rate. We expect higher unemployment rates to result in higher divorce rates, indicating a positive relationship. The literature we consulted for our research, confirms that our variables influence the divorce rate.

Literature Review

Literature suggests that the unemployment rate has an immediate effect on the divorce rate,
more so than our other variables (Jensen and Smith, 1990). However, only unemployment of the husband has an effect on the divorce rate, and this effect does not appear to accumulate over time. Researchers found that the unemployment of wives has no significant effect on the probability of divorce. In addition to divorce, the studies also controlled for education, age, children, place of residence, and health. One Japanese study included crime rate and average working hours as explanatory variables (Kawata, 2008). Their results suggested a positive correlation between the unemployment rate and the divorce rate. They also confirmed that the influence of unemployment is immediate.

It is important to note that divorce is not caused by a single factor. While unemployment is correlated with divorce, there are other variables that influence a couple’s decision to dissolve their marriage. One study found that for the first ten years of marriage, the top risk factors for divorce include young age: marring before the age of twenty-five (Stewart and Brentano, 2006). In particular, if age at marriage is younger than 18, the probability of divorce is 48%; 40% for the ages of 18-19; and 29% for the ages 20-24. The risk of divorce for young couples has slight differences for males and females (Schoen, 1975). Researchers found that the probability of divorce was most pronounced for males at central ages at first marriage 18 through 25 and for females at central ages at first marriage 16 through 24. For the marriage ages considered, first marriages of those at the lowest age at marriage were twice as likely to end in divorce as first marriages of those at the highest age at marriage.

For the first ten years of marriage, another top risk factor for divorce was family size or the amount of children at the time of the marriage (Stewart and Brentano, 2006). One study
focused on families with unwanted children during the time of marriage, and found that large family size increased the probability of divorce. These families were stressed and overwhelmed with the responsibilities of having children that they did not plan for. However, families that do plan for children are less likely to get a divorce (Djamba, 2012). A recent study coauthored by researchers at Auburn University at Montgomery in Montgomery, Alabama, indicates that the larger the household, the less likely it is that a couple experiences divorce. The researchers began with the hypothesis that “counties with larger average household size will have lower rates of divorce.” They collected data from the 1990 and 2000 census, using a random sampling of 20% of counties in each state. The results were strong and clear: Overall, average household size was one of the most important correlate of divorce rate at the county level.

Income level and educational attainment are also important correlates divorce. Stewart and Brentano investigated the likelihood of divorce if the husband has a low income of less than $25,000 per year. They found that earning $50,000 per year compared with earning less than $25,000 is associated with a 30% decrease in divorce. An affluent couple stands to lose more if they divorce, thus their high-income level deters them from divorcing as quickly as low-income couples. Couples with low socioeconomic status and lower education are at a higher risk for divorce than those with higher socioeconomic status and education. For example, the probability for couples that accomplished less than high school is 51%, 45% for high school graduates, and only 38% for college-educated couples (Stewart and Brentano, 2006). In sum, literature suggests that income level, educational attainment, employment,
family size, and age at first marriage can help determine the divorce rate.

**Theoretical model**

Synthesizing what is suggested by the literature and real-life experience, we have developed the following model to simulate how different factors exert effects on divorce rate:

\[ D_i = \beta_0 + \beta_1 U_i + \beta_2 E_i + \beta_3 S_i + \beta_4 \ln I_i + \beta_5 A_i + \epsilon_i \quad (Equation \ 1) \]

In this model, divorce rate in the ith state \( D_i \) is determined by five independent variables. Unemployment rate \( U_i \) is our major interest here, because we intend to explore how the economic condition of individuals influences marital well-being. From the knowledge we have, a positive relationship between unemployment rate and divorce rate is expected. Education is another factor that affects divorce rate, and percent of population graduated from high school \( E_i \) is chosen to represent education level. We hypothesize that higher education can reduce the likelihood of divorce. The relationship between average family size \( S_i \) and divorce rate is supported in several literature theories: the larger the family is, the less likely the couple is going to separate. Income level also contributes to marriage stability, and we incorporate the natural log of per capita personal income \( I_i \) in our model as a determinant with negative coefficient. The role of age at marriage cannot be neglected, and our model says estimated median age of women at first marriage \( A_i \) is negatively related to divorce rate. The older a woman is when she get married, the more unlikely that the marriage will terminate. Additionally, an error term \( \epsilon_i \) and a constant term \( \beta_0 \) are also included in the model.

The model adopts the semilog functional form. Based on the literature we have studies, we
hypothesize that the relationship between divorce rate and all four variables other than income should have a constant slope, so linear form is applied on unemployment rate, education, family size, and age at marriage in order to explore the linear relationship. However, we are more interested in the elasticity of divorce rate with respect to income; that is, how 1 percent change in per capital personal income would change divorce rate. Therefore, we choose to use the natural log of income, which we expect to fit the truth better.

Data

All five sets of data come from SAGE State Stats through Skillman Library’s services & help link. We use the data from the year of 2011, because it is the most recent year that contains all the variables studied in our theoretical model. Only 44 states and District of Columbia are included in the sample data, because divorce rate is not available for California and 5 other states. From checking the data as well as the summary statistics (table 1 on Page 7), we do not see any obvious sign of outlier in the sample. Since our data set virtually covers the whole population in the US, randomness of sample selecting is not a major concern in this particular case.

The unit of variables requires extra attention in the development of theory, since we use three of the six variables are in the form of proportion and semilog regression model also need to be treated meticulously. The unit of divorce rate, percent of population graduated from high school, and unemployment rate is percent. Average family size has a unit of person. Estimated median age of women at first marriage is in year. Per capital personal income is presented in thousands of dollars in our model, and it becomes 1 percent change in thousands
of dollars after adding the log.

**Table 1** Data Summary

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divorce Rate (percent)</td>
<td>45</td>
<td>3.755556</td>
<td>.7984518</td>
<td>2.4</td>
<td>5.6</td>
</tr>
<tr>
<td>Unemployment Rate (percent)</td>
<td>45</td>
<td>7.704444</td>
<td>1.894124</td>
<td>3.3</td>
<td>12.6</td>
</tr>
<tr>
<td>Percent of Population Graduated from High School (percent)</td>
<td>45</td>
<td>87.64222</td>
<td>3.130096</td>
<td>81.1</td>
<td>92.3</td>
</tr>
<tr>
<td>Average Family Size (person)</td>
<td>45</td>
<td>3.151111</td>
<td>.1486641</td>
<td>2.8</td>
<td>3.6</td>
</tr>
<tr>
<td>Per Capita Personal Income (thousand dollars)</td>
<td>45</td>
<td>41.53844</td>
<td>7.888336</td>
<td>32</td>
<td>73.78</td>
</tr>
<tr>
<td>Estimated Median Age of Women at First Marriage (year)</td>
<td>45</td>
<td>26.65333</td>
<td>1.376359</td>
<td>23.3</td>
<td>30.1</td>
</tr>
</tbody>
</table>

**Empirical Results**

Based on the outcome of *Stata* regression, we got the following estimation of the theoretical model:

\[
\hat{D}_i = 17.43 + 0.1816U_i - 0.01650E_i - 1.186S_i + 0.1775\ln I_i - 0.3959A \quad (Equation 2)
\]

\[
(0.071) \quad (0.041) \quad (0.72) \quad (0.88) \quad (0.12)
\]

\[
t_k = 2.55 \quad -0.40 \quad -1.66 \quad 0.20 \quad -3.35
\]

(Standard errors in parentheses)

The estimated model supports the theory that divorce rate is positively related to
unemployment rate: 1 percent of increase in unemployment rate will cause 0.1816 percent of
increase in divorce rate. The estimation also states that one percent of increase in percentage
of population graduated from high school leads to 0.01650 percent of decrease in divorce rate.
Similarly, divorce rate is negatively related to family size; when average family size in the ith
state increase by 1 unit, divorce rate will decrease by 1.186 percent. The coefficient of the
natural log of income shows that divorce rate increases by 0.001175 unit whenever per capita
personal income rises by 1 percent. Lastly, divorce rate will drop by 0.3959 percent if
estimated median age of women at first marriage increases by 1 year.

All variables have the sign of coefficients that meets our expectation except for income. In
the theoretical model, we believe that high income will increase marriage stability, but the
regression actually gives a positive relationship between the logarithm of income and divorce
rate. This unexpected change in sign might be a result of potentially omitted variables, which
could lead to bias in the estimation. Yet as far as we investigate, there are not any apparently
omitted variables. Also, variance caused by multicollinearity may also influence the sign of
coefficient. Although is certain that we do not have perfect multicollinearity in the model, the
independent variables are unavoidably interrelated to a certain extent. For example, per capita
income and percentage of population graduated from high school are likely to be positively
correlated, but both of them are important factors according to literature. Therefore, we
cannot simply eliminate any of them. In addition, since the sample size is fairly small, the
sign and magnitude of the estimated coefficients tend to be more sensitive to any change in
the equation. All these three possibilities can explain the expected sign.
R² is used to measure the fitness of the regression equation. The value of R² in this model is 0.4219, which explains a relatively large portion of the sample data. The adjusted R² we get is 0.3478; it's lower than R² but still acceptable. Considering that divorce is a very complicated social phenomenon that takes into account of many different factors, our model explained the data fairly well.

To assess the statistical significance of the estimates, t-test is conducted to the estimated coefficients. We select the one-sided, 10% critical t value associated with 39 degree of freedom (t_c=1.30). Compared with values of t_k from the regression, we find that the estimated coefficients of unemployment rate, average family size, and estimated median age of women at first marriage are statistically significant in the expected direction. However, t_c is greater than t_k for both percent of population graduated from high school and per capita personal income. It points out that the estimates are not statistically significant for these two variables despite the theoretical significance they share in literature.

We plotted residuals on graphs in order to do eyeballing test. (See Appendix B) None of the graphs show evidence of serious heteroskedasticity with regard to any of the independent variables. Although the research took a cross-sectional design, the dependent variable in our model is divorce rate, whose size does not vary significantly across states. Therefore, It is unlikely that our model has any considerable problem with heteroskedasticity.

**Conclusion**

The model confirms the positive relationship between unemployment rate and divorce rate, which is also commonly supported by the literature. The result of estimation stands firmly
and it provides a good interpretation of the reality. According to our estimated model, unemployment rate, family size, and age at marriage are important factors that determine the likelihood of divorce rate. The large magnitude of the coefficient of average family size is very surprising, and it can easily offset the effect of any other variables. Also, the magnitude of women’s age at first marriage is also relatively large, which leaves an interesting take-home message, especially for students like us who are about to step in the society and to choose a life-long partner: Don’t rush into marriage. For now, our model is not able to prove the importance of income or education to divorce rate. Hopefully further research and improvement in the design of the study could give a better explanation of how these two factors affect divorce rate.

Our future research could increase sample size by changing state level to county level. A large sample size can reduce variance effectively and make the result even stronger. Designing a panel data study is also a practical approach to improve. The main interest of our model is unemployment rate, which is tightly associated with the economic cycle over time. We are looking forward to discovering more from observing how the change in unemployment impacts change in divorce rate. Another crucial element to take into account gender difference in the society. The current model uses unemployment rate and per capita income for the entire population. It would tell a more accurate story if men and women are discussed separately. For now, we expected men’s economic status plays a more important role in family stability that that of women. In the future, this structure might change as women get more involved in the society.
Bibliography


National Council on Family Relations.


### Appendix A

#### Stata Regression

Number of observations = 45  
$F(5, 39) = 12.97$  
Prob > $F = 0.0000$  
R-squared = 0.4219  
Root MSE = 0.64482

| Divorce rate                          | Coefficient | Robust Std. Error | t   | P>|t|   | 95% Confident Interval       |
|---------------------------------------|-------------|-------------------|-----|-------|-----------------------------|
| Unemployment Rate (percent)           | 0.181163    | 0.0713206         | 2.55| 0.015 | 0.0373704 - 0.3258895       |
| Percent of Population Graduated from High School (percent) | -0.0164894  | 0.0408587         | -0.40| 0.689 | -0.099134 - 0.0661552       |
| Average Family Size (person)         | -1.186286   | 0.7164226         | -1.66| 0.106 | -2.635388 - 0.2628153       |
| In Income (thousand dollars)          | 0.1775326   | 0.8791077         | 0.20| 0.841 | -1.600631 - 1.955696        |
| Estimated Median Age of Women at First Marriage (year) | -0.3959452  | 0.1181278         | -3.35| 0.002 | -0.6348811 - 0.1570092      |
| Constant                              | 17.43387    | 5.118179          | 3.41| 0.002 | 7.081372 - 27.78636         |
Appendix B

Figure 1 Residuals with respect to Unemployment Rate

Figure 2 Residuals with respect to Percentage of Population Graduated from High School
**Figure 3** Residuals with respect to Average Family Size

**Figure 4** Residuals with respect to Natural Log of Per Capita Personal Income
Figure 5 Residuals with respect to Age of Women at First Marriage