

Marital Disruption and the Economic Status of Women in South Korea

: Endogenous Switching Regression Approach

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Marital disruption is a constantly increasing phenomenon in South Korea. Many studies show that women usually experience the worst financial consequences out of marriage states, although there are few investigations on South Korea. The aim of this paper is to provide new evidence for Korea about the wives' family-income changes accompanying marital splits, using data from on the 2007 wave of Korean Longitudinal Survey of Women & Family, using endogenous switching regression model. The results in this paper show that there is evidence of self-selection into marriage and divorce state based on unobservable factors. Hence, individuals under marriage (divorce) state have unobserved characteristics that allow them to earn more (less) than average married women. This paper provides several interesting findings; (1) the sample married wives to have 472 % under the married state (2) the sample divorced women would have a 198% increase in their family-incomes under the marriage state. This study concludes that women as a whole are indeed economically vulnerable outside of marriage.

Keywords: Marital Disruption, Divorce, Switching Regression, Family-Income Differentials, Self-Selection

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I . Introduction

There is a considerable literature concerned with the economic consequences of marital breakdown since it is likely to be an important consideration influencing decisions to separate or remain together. Early researches from the US and Europe show that marital splits are accompanied by substantial declines in income for separating wives on average, whereas separating husbands' income on average seem unaffected or even improve slightly in some cases (Burkhauser et al., 1991; Fritzell, 1990; Jarvis and Jenkins, 1999; Manting and Bouman 2006, Poortman, 2000, 2002; Smock 1993, 1994; see Smock, Manning, and Gupta 1999 for a review of the literature). In theory, there is a primary theoretical explanation of the premium to a man's wage from being married, which marriage makes a man more productive through household specialization. The specialization hypothesis argues that marriage actually enables men to focus their time or effort on their labor market activities and thus obtain additional income to the household (Becker, 1981, 1985; Korenman and Neumark, 1991, 1992). Wife is also better off in this model by obtaining their spouses' higher wages as simply a support person for a breadwinner.

The social norm regarding household specialization in Korea is that women are likely to be considered as primary caregiver for the domestic duties, and men as breadwinner. However, the social changes in Korea over the last four decades have dampened the returns to marriage for many men through the household specialization. The main marker of these changes is the strong increase in women's labour force participation. According to Kwon (2008), the rates of the women's labor force participation in Korea have steadily increased from 37% in 1963 to 49.4% in 2010, while that of men has seen a moderate fall. In particular, she finds that the increase in married women has led to an overall increase in women's labor force participation in general. As women have increased the participation in paid work, the time spent for home production

activities by husbands and wives has converged by a decrease in the amount done by women (Gershuny and Robinson, 1988). If the marriage advantage that has been observed for husband is the result of household specialization, then married women should receive similar marriage premium to their husbands. Hence in societies where husband and wives are expected to contribute to both the family income and household responsibilities, the marital status of women would be seen as an important factor in formatting women's economic well-beings.

Korea has experienced controversial changes in marriage since the financial crisis of the late 1990s. A particular feature of Korean family patterns is the significant increase in marital breakdowns. The crude divorce rate dramatically increased from 1.1 divorce decrees granted per thousand persons in 1990 to 2.5 in 2009, while the crude marriage rate decreased from 10.6 in 1980 to 6.2 by 2009 (Statistics Korea). The rising incidence of marital dissolution has received substantial attention among social scientists and policymakers. In fact, of all households, according to an official report by the Korea Institute for Health and Social Affairs (KIHASA) and Statistics Korea, the proportion of female-headed households increased from 14.7% in 1980 to 18.5 in 2000 to 22.2% in 2010. The growing proportion of mother-only families has drawn the attention of policymakers. A central reason for this concern is that poverty rates among mother-only families are indisputably high. Kim (1999) finds that 87% of ever-married women living without husbands undergo marked declines in economic condition. For instance, the monthly average income of the female-headed household is reported to be 1,847,000 won (\$1,640¹⁾), 53.7% of the male-headed households' 3,342,000 won (\$2,780)(KNSO, 2010). Further, Kum (2002) concludes that 43.7% of household headed only by wives are the most poor in Korea. Also, KNSO (2010) finds that the average monthly expenditure of households headed by ever-married women without husbands present (1,536,500

1) In 2010, \$1=1,200 won on average

won; \$1,283) is much lower than the male-headed households' monthly average expenditure, 2,780,000 won (\$2,310), or the total households' average monthly expenditure, 2,437,300 won (\$2,030). There is little dispute that women without husbands are worse off economically than households headed by men of similar age.²⁾ As the review by Holden and Smock (1991), and other authors, have pointed out, there are significant inequalities in the labour market and in the home. These include: the greater career labour market attachment of husbands compared to wives; the greater earnings of working husbands than working wives, wives' primary responsibility for caring for children (especially after the marital split), and the failure of many separated husbands to pay sufficient maintenance to their former spouse to support their children. In addition, households headed by women are more likely to be poor than their wives living with their spouses or than they themselves were when still married (e.g., Gallagher 1996; Galston 1996; Ooms 1998; Kim 1999; Kum, 2002). Such comparisons result in the seemingly obvious conclusion that married women will tend to exhibit economic advantages relative to women living outside of marriage.

However, as Smock, Manning, and Gupta (1999) point out, there are several limitations of previous literatures for the magnitude of economic vulnerability outside of marriage. In that, it is uncertain whether the positive association between divorce and the decline of income following divorce represents that divorce is a cause of economic disadvantage and a consequence as well. First, divorce is more common within less educated and economically disadvantaged groups; that is, divorced women and women who remain married have somewhat different sets of characteristics and these characteristics are relevant to economic well-being. Secondly, divorced women are likely to differ from women who stay married in ways that are not easily measured (see Holden and Smock 1991). Taken together, these suggest that the factors which affect the economic and labor market status of divorced women may not as much affect that of those

2) See McLanahan et al (1989), Sawhill (1988)

who remain married. Consequently, the aims of this paper is to investigate (1) would their family-income, if divorced women were to remain married, improve as same as that of women who remain married. (2) would their family-income, if married women were to divorce, be worsen as same as that of women who divorce. If divorced women attain the higher level of economic advantage by remaining in marriage than married women, then policy to encourage couples to remain married would be strongly established. In addition, if married women fare the economical disadvantage following the divorce or separation, then this question would provide the support with the previous studies for the women's economic vulnerability outside of marriage, and the important implications for understanding the gender wage differences in Korea.

Drawing on the 2007 wave of the Korean Longitudinal Survey of Women & Family (KLoWF), I address these two questions by estimating endogenous switching regression models that assess the effects of a woman's marital status (remaining in marriages state versus retreating from the marriage) on the monthly family-incomes while taking account of differences in the observed and unobservable characteristics between the married women and ones who divorced. In addition, I used the parameters estimated from the models used in this study to simulate the following questions: (1) the average females' family-income increase (or decrease) from their marriage (2) the expected family-income of women who actually divorce in sample if they were in the marriage states (3) the expected family-income of women who actually remain married in sample if they were in the divorce states.

II . Empirical specification

This section presents a framework to highlight the role of family-income differentials in influencing the individual decision regarding marital status. I

interpret marital family-income differentials in terms of expected benefits or disadvantages of staying in a particular marital state. This study assumes, for the time being, that expected benefits are equal to the difference in the log-family-income between the two marital states. The general endogenous switching model is as follows. For the individual woman i , let FI_{1i} represents measured family-income of individual i if she stays married and FI_{2i} represents her observed family-income if she separates or divorces. Let X_i indicate a vector of individual characteristics that could influence individual family-incomes and the likelihood of marital disruption. Thus, a model for the effect of marital decision and other characteristics on the individual family-incomes is:

$$\ln FI_{1i} = \alpha_1 X_i + \epsilon_{1i} \quad (1)$$

$$\ln FI_{2i} = \alpha_2 X_i + \epsilon_{2i} \quad (2)$$

where $\ln FI_{1i}$ and $\ln FI_{2i}$ are the natural logarithm of monthly family-incomes in the married and divorced (or separate) states, respectively; α_1 and α_2 are parameters, and ϵ_{1i} and ϵ_{2i} are the normal random disturbance terms with zero means and variances σ_1^2 and σ_2^2 . If unobserved variables affect both the probability of marital decision and the individual family-incomes, then estimates of α_1 and α_2 will be biased. Thus, log-family-income equations (1) and (2) should be estimated jointly with a selection equation predicting marital status. Assuming that women have latent variable L_i^* , which represent their unobservable index of the propensity of individual i to be observed as married at a point in time. Let the probability of staying in the marriage be a function of predetermined explanatory variables (Y_i) that affect the individual decision regarding marital status. Therefore,

$$L_i^* = \beta Y_i + \delta_1 \ln FI_{1i} + \delta_2 \ln FI_{2i} + u_i \quad (3)$$

where β is an unknown vector of coefficients, while δ_1 and δ_2 indicate inducements toward marriage of earnings in the two marital states. The error term u_i is the normal random disturbance terms with zero means and variances σ_u^2 .

If $I_i^* \geq 0$, Individual i is married, otherwise not. The two log-family-income equations and the switching regression constitute the models of this study. Relying on the assumption that $(\epsilon_{1i}, \epsilon_{2i}$ and $u_i)$ are $N(0, \Sigma)$, maximum likelihood estimates of the models consisting of equations (1)-(3) may be obtained. If individuals self-select into married state (single state) based on unobservable factors, we may have a problem with selection bias. If there exists a nonzero covariance between the determination of log-family-incomes and marital states, we may have a problem with selection bias. To control for this potential selection bias, I estimate the two family-income equations and the switching equation simultaneously using full-information maximum likelihood, assuming that that $\epsilon_{1i}, \epsilon_{2i}$ and u_i have a trivariate normal distribution $N(0, \Sigma)$, where the covariance matrix Σ equals

$$\Sigma = \begin{bmatrix} \sigma_1^2 & \cdot & \rho_{1u} \\ \cdot & \sigma_2^2 & \rho_{2u} \\ \rho_{1u} & \rho_{2u} & \sigma_u^2 \end{bmatrix} \quad (4)$$

where ρ_{1u} is the covariance of u_i and ϵ_{1i} , and ρ_{2u} is the covariance of u_i and ϵ_{2i} . The covariance of ϵ_{1i} and ϵ_{2i} is not defined since ϵ_{1i} is not correlated with ϵ_{2i} . I normalize the variance of the random disturbance term in the switching equation to one, i.e., $\sigma_u^2 = 1$.

It is well known that empirical models such as the one outlined above are sensitive to the distributional assumption and the specification of both the switching equation and the log-family-income equations. For improving the identification of the model, all variables that enter equations (1) and (2) are also

included in equation (3), while five variables are included only in the selection equation, which influence marital decision but may be excluded from the log-family-income equations. I include the number of children aged 0-4, 5-9, number of aged 0-18, the presence of alternative caregivers in household and health condition in the switching equation.

III. Data and Specifications

This study uses the Korean Longitudinal Survey of Women & Family (KLoWF), collected in 2007. The KLoWF provides information on the characteristics and behavior of Korean households and their members. This data set is suitable for this study because of its rich set of demographic and human capital characteristics for women. The sample is restricted to married mothers aged between 25 and 55. After imposing these restrictions and omitting households with missing relevant information, 6,575 married females were obtained. This study does not distinguish between separation and divorce because separation may not quickly, or even ultimately, result in divorce, particularly among less advantaged couples (Morgan 1991; Peterson 1989; Sweet and Bumpass 1987). This study excludes 171 women who lost their spouses through death. Among these women, 6,107 females are living with her spouse, while 297 women report “divorced” or “separated”. Demographic variables drawn from the KLoWF include the number of children aged 0-4, 5-9 and the total number of children aged 0-18; the categories of age distinguished as 25-30, 31-35, 36-40, 41-45 and 46-50 residence in the big city populated above a million and among 16 cities in Korea; residence in 16 regions; individualistic health condition ranged from 1(very good) to 5(worst condition) and the presence of alternative caregivers in household. The human capital variables include the education levels of the mother are categorized as “Never educated”, “Primary school graduation”,

“Middle school graduation”, “Technical or commercial high school diploma”, “Academic high school diploma” and “Diploma above the college”. The work experiences measured by the total years of working in current job are categorized as 0-1, 2-5, 6-10, 11-15, 16-20 and above 20 years. The monthly wages of wives are categorized as monthly wages=0, 0<monthly wages<101, 100<monthly wages<201, 200<monthly wages<301 and 300<monthly wages<401. The indicator for the full-time worker is also included in this study. Family-income data are defined as monthly family-incomes in the reference week.

Table 1 shows that divorced female have fewer children in all aged-categories of children. The wives staying in marriage are on average younger and have somewhat higher levels of educational attainment compared with the divorced. Also, there are relatively more women residing in big cities who remain married compared with the regional distribution of the sample, while more women who divorce residing in Seoul. Approximately 39% of divorced women report working, while only 18% of females living with their spouse are working in reference week. This finding is consistent with past research indicating that women who divorce tend to have higher labor market participation than do other females (Cherlin 1992; Kum, 2002). The monthly family-income reported in reference week show that there is a family-income difference between women who remain married and those who dissolved in marriage. The average monthly family-income of wives staying in marriage is about 110% higher than that of wives who divorce. The family-income gap between these two groups of wives is not directly comparable, because they have different observed characteristics related to family-incomes, such as education levels, age, schooling, labour market experience. In this study, I need the statistical comparisons to show that (1) if divorced women had remained married, they would have the same family-income as that observed for married women (2) if married women were to divorce, they would fare as poorly as divorce women.

Table 1. Definitions, sample means and standard deviations of variables

Variable	Total		Staying in marriage		Divorced/ Separated	
	Sample Mean	Std. Dev.	Sample Mean	Std. Dev.	Sample Mean	Std. Dev.
Family Income (in 10,000 won=about \$1.2)	312.6	(290.8)	320.4	(290.2)	152.2	(256.2)
Full-time if employed (Permanent worker)	0.519	(0.499)	0.529	(0.499)	0.426	(0.497)
Wage0 (monthly wage=0)	0.700	(0.457)	0.714	(0.451)	0.430	(0.496)
Wage100 (0<monthly wage<101)	0.144	(0.351)	0.137	(0.344)	0.286	(0.452)
Wage200 (100<monthly wage<201)	0.098	(0.298)	0.092	(0.289)	0.225	(0.418)
Wage300 (200<monthly wage<301)	0.034	(0.183)	0.034	(0.183)	0.040	(0.197)
Wage400 (300<monthly wage<401)	0.012	(0.111)	0.012	(0.111)	0.013	(0.115)
Experience if employed(total years working in current job)	4.355	(5.833)	4.553	(5.966)	2.504	(3.955)
Exp_01 (total year raged 0-1)	0.439	(0.496)	0.424	(0.494)	0.583	(0.495)
Exp_25 (total year raged 2-5)	0.301	(0.459)	0.301	(0.459)	0.304	(0.462)
Exp_610 (total year raged 6-10)	0.123	(0.328)	0.129	(0.335)	0.070	(0.256)
Exp_1115 (total year raged 11-15)	0.069	(0.254)	0.075	(0.264)	0.017	(0.131)
Exp_1620 (total year raged 16-20)	0.038	(0.192)	0.042	(0.200)	0.009	(0.093)
Exp_20up (total year raged above 20)	0.027	(0.164)	0.029	(0.167)	0.017	(0.131)
Non_Edu (Never educated)	0.077	(0.266)	0.075	(0.264)	0.104	(0.306)
Edu_primary (primary school graduation)	0.104	(0.305)	0.099	(0.299)	0.192	(0.394)
Edu_middle school (middle school graduation)	0.275	(0.446)	0.274	(0.446)	0.296	(0.457)
Edu_tech_high school (technical or commercial high school diploma)	0.195	(0.396)	0.192	(0.394)	0.253	(0.435)
Edu_academy_high school (academic high school diploma)	0.135	(0.341)	0.138	(0.345)	0.061	(0.239)
Edu_above_college (diploma above the college)	0.196	(0.397)	0.201	(0.401)	0.091	(0.288)
Age (Age of female)	40.908	(7.604)	40.741	(7.616)	44.347	(6.454)
Age 25-30 (aged 25-30)	0.083	(0.276)	0.086	(0.281)	0.017	(0.129)
Age 31-35 (aged 31-35)	0.192	(0.394)	0.197	(0.398)	0.084	(0.278)
Age 36-40 (aged 35-40)	0.238	(0.426)	0.241	(0.428)	0.165	(0.372)
Age 41-45 (aged 41-45)	0.185	(0.388)	0.180	(0.384)	0.286	(0.453)
Age 46-50 (aged 46-50)	0.158	(0.365)	0.155	(0.362)	0.228	(0.420)

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Variable	Total		Staying in marriage		Divorced/ Separated	
	Sample Mean	Std. Dev.	Sample Mean	Std. Dev.	Sample Mean	Std. Dev.
Child_04 (Number of children aged 0-4)	0.351	(0.619)	0.364	(0.628)	0.077	(0.280)
Child_59 (Number of children aged 5-9)	0.403	(0.651)	0.410	(0.656)	0.242	(0.528)
Child_018 (Number of children aged 0-18)	1.328	(0.972)	1.345	(0.971)	0.987	(0.923)
# of Adults over aged 18	2.335	(0.836)	2.378	(0.790)	1.451	(1.199)
Assist (the presence of alternative caregivers in household)	0.081	(0.272)	0.079	(0.270)	0.114	(0.319)
Health (health condition ranged from 1(very good) to 5(worst))	2.219	(0.909)	2.189	(0.888)	2.838	(1.097)
Metro* (Living in the big city)	0.574	(0.495)	0.575	(0.494)	0.542	(0.499)
Area1 (Living in Seoul)	0.114	(0.318)	0.114	(0.318)	0.125	(0.331)
Area2 (Living in Busan)	0.079	(0.269)	0.079	(0.270)	0.071	(0.257)
Area3 (Living in Daegu)	0.056	(0.230)	0.056	(0.229)	0.061	(0.239)
Area4 (Living in Incheon)	0.058	(0.233)	0.057	(0.232)	0.074	(0.262)
Area5 (Living in Gwangju)	0.047	(0.212)	0.048	(0.214)	0.024	(0.152)
Area6 (Living in Daejeon)	0.053	(0.224)	0.053	(0.224)	0.054	(0.226)
Area7 (Living in Ulsan)	0.048	(0.214)	0.049	(0.216)	0.020	(0.141)
Area8 (Living in Gyonggi-do)	0.119	(0.324)	0.120	(0.324)	0.114	(0.319)
Area9 (Living in Gangwon-do)	0.045	(0.208)	0.045	(0.208)	0.051	(0.219)
Area10 (Living in Chungcheongbuk-do)	0.048	(0.214)	0.046	(0.210)	0.081	(0.273)
Area11 (Living in Chungcheongnam-do)	0.057	(0.232)	0.058	(0.233)	0.047	(0.212)
Area12 (Living in Jeollabuk-do)	0.049	(0.217)	0.049	(0.216)	0.057	(0.233)
Area13 (Living in Jeollanam-do)	0.055	(0.227)	0.055	(0.227)	0.057	(0.233)
Area14 (Living in Gyeongsangbuk-do)	0.068	(0.252)	0.068	(0.253)	0.057	(0.233)
Area15 (Living in Gyeongsangnam-do)	0.075	(0.263)	0.075	(0.264)	0.067	(0.251)
Area16 (Living in Jeju-do)	0.029	(0.168)	0.028	(0.166)	0.040	(0.197)
# of Observations	6404		6107		297	
# of Observations if employed	1,194(18.6%)		1,079(17.7%)		115(38.9%)	

* Metro area includes Seoul, Daegu, Gwangju, Ulsan, Busan, Incheon, Daejeon and Gyoggi-do which populated above a million.

IV. Estimation Results

Results of the two selectivity-corrected female's family-income equations are presented in table 2 for married and divorced states. The family-income equations contain a set of variables capturing education, experience, age and wages of women. I use the categorized dummies in order to capture non-linear and differential returns associated with different levels of each variable in current marital states. The education level above the college is the reference category. The effects are very large, for instance 87%, 56%, 28%, 26% and 14% family-income decrease if a woman remains married for Never educated, Primary school graduation, Middle school graduation, Technical or commercial high school diploma and Academic high school diploma, respectively. The results indicate that a 40% family-income decreases if a woman divorces for Never educated and the effects of another educational attainment do not attain the statistical significance. In terms of the age, age above 50 is the reference category. Age has effects that are positive with plausible magnitudes in both family-income equations. For instances, The about 20-58% family-income tends to decrease for the ages categorized as 25-30, 31-35 in the married and all ages categories in the divorced, compared with the one categorized as age above 50. Unsurprisingly, the effects of wives' wage are very large, for instance 79%, 81%, 62%, 38% and 26% family-income decrease for wage0, wage100, wage200, wage300 and wage400, respectively if a woman remains married. The results show the wage effects of the divorced tend to have the dramatic family-income decrease, for instance, 155%, 128% and 78% for wage0, wage100 and wage200. The huge drops in family-income of the divorced in each wage categories might be expectable, since the women living without their spouses are the main sources of their family-income. Women living in Metro have higher family-incomes than women residing outside Metro for women staying in marriage. The effects of the number of adults living with a woman

are significantly positive in the marriage states, but statistically insignificant in the females who divorce. In terms of the female's working status, the effects of working in full-time jobs are significantly positive but small, for instance a 7% family-income increase if a woman lives with her husband.

The correlation coefficients ρ_{1u} and ρ_{2u} are both significantly negative both for the correlation between the log-family-income equations of two marital states and the marital selection equation. Since ρ_{1u} and ρ_{2u} are negative and significantly different from zero, the model suggests that women who remain married (or who divorce) would be expected to have somewhat higher family-incomes in marriage (or divorce state) than would a random sample of all women who have identical observed characteristics. The overall interpretation of this finding is that staying in marriage may be slightly biased in favor of women with potentially higher family-incomes. ρ_{1u} and ρ_{2u} are statistically significant, suggesting that, unmeasured differences associated with marital status are relatively important in explaining marital status differences in family-incomes. The Wald test for joint independence of the three equations is reported in the last line of table 2. The test reject the hypothesis that two family-income equations and marital equation are independent each other in 5% significance level.

Table 3 presents the parameters for the determinants of marital decision estimated from endogenous switching regression. The educational variables play an important role in determining whether a marriage and divorce state. Women with high school or university as their highest educational attainment have a lower probability of choosing the marriage state than individuals with a compulsory education. The total number of children living in the household has a positive impact on a female's probability of choosing a married state, while the number of children aged 5-9 has negative effect on the marriage state. The results for the age imply that the women aged in 41-45 have a lower likelihood to be remaining in the married state than the ones aged above 45 years old,

while the wives aged 25-30 a higher probability to be staying in marriage state. The presence of alternative caregivers in household and an extra health severity of the females tend to lead the probability of being in married state to decrease. The effect of presence of alternative caregivers, however, might be controversial. As the sample statistics in table 2 and results in estimated marital decision indicate, the divorced tend to have higher chance to have child-caregivers in their households. This result might have the reverse causality on the needs of caregivers after the wives choose the divorced state.

Finally, I also compare females' expected family-income under the marriage and the divorce states. Based on Maddala (1983) and Lokshin & Sajaia(2004), the estimation results presented in Tables 2 and 3 can now be used to analyze the family-income gaps between the married and the divorced. This has been done in Table 4. Table 4 allows us to compare predicted family-incomes for a wife in her actual marital states with the family-incomes she would experience in another states. For instance, the third column and third row shows the difference of expected log-family-income of the divorced between if they were in marriage status and in divorce status. I predict log-monthly family-incomes of 5.606 in the married state and log-monthly family-incomes of 3.892 in the divorce state. The difference of expected log-monthly family-income between staying in marriage and divorce (Uncon-diff) indicates that an average female i 's expected log-monthly family-income under the marriage state minus her expected family-incomes under the divorce state irrespective of her decision of marital state. This represents the 455% family-income increase for an average female staying in marriage.

To further analyze family-income differentials, I predict conditional log-family-incomes for individuals with different marital status. Let conditional log-family-income differential 1(Sample Married-MD) defined as the expected log-family-income that a sample married female's expected log-family-income (5.599) under the marriage state minus the expected log-family-income that a

sample married female could earn if she were to be in divorce (3.855). The mean of conditional log-family-income differential 1 (1.743) indicates that the sample married females have a 472% family-income increase from staying in marriage state. Let conditional log-family-income differential 2 (Sample Divorced-MD) defined as the expected log-family-income that a sample divorced female's expected log-family-income (5.778) under the marriage state minus the expected log-family-income that a sample divorced female could earn if she were to be in divorce (4.685). Surprisingly, the mean of conditional log-family-income differential 2 (1.093) indicates that the sample divorced females could have a 198% family-income increase if they were to stay in marriage state. This result shows that if a divorced woman were to remain married, she would experience somewhat worse economic circumstances than women who actually remain married.

In addition, I also predict a female's relative expected log-family-income whether she staying in marriage or divorce states. Let conditional relative log-family-income differential 1 (Sample MM-General MM) defined as the conditional expectation of married females' log-family-income under the marriage (5.599) minus the unconditional expectation of females' log-family-income under the marriage (5.610). In that, conditional relative log-family-income differential 1 compare a sample married female i 's average log-family-income under the marriage state to the log-family-income of a general female with the same characteristics under the marriage. The result of this difference (-0.011) indicates that if they were in the marriage, females who actually stay in marriage tend to have 1% lower log-family-incomes than those who did not. Let conditional relative log-family-income differential 2 (Sample MD-General MD) defined as the conditional expectation of married females' log-family-income under the divorce (3.855) minus the unconditional expectation of females' log-family-income under the divorce (3.881). In that, conditional relative log-family-income differential 2 compares a sample married female i 's average

log-family-income under the divorce state to the log-family-income of a general female with the same characteristics under the divorce. The mean of this difference (-0.026) indicates that if they were in the divorce state, females who actually stay in marriage would have 3% lower log-family-incomes than those who did not. This result shows that married women's expected levels of family-income in divorce are virtually the same as those for women who actually divorce. Let conditional relative log-family-income differential 3 (Sample DD-General DD) defined as the conditional expectation of divorced females' log-family-income under the divorce (4.685) minus the unconditional expectation of females' log-family-income under the divorce (4.120). In that, conditional relative log-family-income differential 3 compares a sample divorced female i 's average log-family-income under the divorce state to the log-family-income of a general female with the same characteristics under the divorce. The mean of this difference (0.565) indicates that if they were in the divorce state, females who actually divorce would have 76% higher log-family-incomes than those who stay in marriage state. Let conditional relative log-family-income differential 4 (Sample DM-General DM) defined as the conditional expectation of divorced females' log family-income under the marriage (5.778) minus the unconditional expectation of females' log-family-income under the marriage (5.528). In that, conditional relative log-family-income differential 4 represents the average log-family-income differential when sample divorced female i 's average log-family-income under the marriage state minus the average log-family-income that general females could earn if they were to work in the marriage state. The mean of this difference (0.250) indicates that if they were in the marriage state, females who actually divorce would have 28% higher log-family-incomes than those who stay in marriage state. In conclusion, the sampled women staying in marriage states tend to have the probability to earn lower family-income whether they are under the marriage or divorce states than those who divorce.

Table 2. FIML estimates of log-family-income equations for the marriage and divorce states

Variable	Log-family-income equation for the married wives			Log-family-income equation for the wives who divorce		
	Coefficients	Robust Std. Err	P-value	Coefficients	Robust Std. Err	P-value
Full-time	0.066	0.032	0.038	-0.018	0.118	0.878
Non_Edu	-0.874	0.049	0.000	-0.400	0.224	0.075
Edu_primary	-0.564	0.035	0.000	0.095	0.226	0.676
Edu_middle school	-0.281	0.019	0.000	0.134	0.160	0.403
Edu_tech_high school	-0.269	0.022	0.000	0.088	0.203	0.664
Edu_academy_high school	-0.140	0.022	0.000	0.300	0.191	0.117
Exp_01	0.028	0.069	0.681	0.250	0.274	0.363
Exp_25	0.016	0.071	0.824	0.214	0.277	0.439
Exp_610	0.155	0.076	0.041	0.179	0.354	0.612
Exp_1115	-0.014	0.084	0.864	-0.278	0.477	0.559
Exp_20up	0.018	0.070	0.798	0.051	0.306	0.866
Age 25-30	-0.234	0.039	0.000	-0.306	0.318	0.336
Age 31-35	-0.107	0.036	0.003	-0.537	0.263	0.041
Age 36-40	0.015	0.036	0.670	-0.586	0.171	0.001
Age 41-45	0.087	0.035	0.014	-0.394	0.136	0.004
Age 46-50	0.089	0.035	0.010	-0.343	0.145	0.018
Wage0	-0.795	0.063	0.000	-1.548	0.400	0.000
Wage100	-0.812	0.065	0.000	-1.285	0.428	0.003
Wage200	-0.625	0.064	0.000	-0.789	0.436	0.070
Wage300	-0.384	0.069	0.000	-0.209	0.397	0.599
Wage400	-0.265	0.077	0.001	0.142	0.456	0.755
# of Adults	0.061	0.012	0.000	-0.030	0.128	0.815
Metro	0.226	0.042	0.000	0.715	0.470	0.129
Constant	6.357	0.107	0.000	5.013	0.697	0.000
σ_{ii} (i=1(married)or 2(divorced))	0.542	0.022	0.000	0.794	0.108	0.092
ρ_{iu} (i=1(married)or 2(divorced))	-0.327	0.132	0.022	-0.504	0.240	0.085

Note: The model includes all regional variables, but the estimated results are not reported.

Table 3. The Marriage selection equation

Variables	Coefficients	Robust Std. Err	P-value
Full-time	0.015	0.128	0.905
Non_Edu	-0.188	0.180	0.298
Edu_primary	-0.652	0.149	0.000
Edu_middle school	-0.503	0.122	0.000
Edu_tech_high school	-0.574	0.126	0.000
Edu_academy_high school	-0.224	0.163	0.169
Exp_01	-0.606	0.441	0.169
Exp_25	-0.543	0.449	0.226
Exp_610	-0.146	0.466	0.753
Exp_1115	0.179	0.536	0.739
Exp_20up	-0.293	0.443	0.509
Child_04	0.136	0.124	0.271
Child_59	-0.148	0.074	0.045
Child_018	0.461	0.061	0.000
Age 25-30	0.693	0.262	0.008
Age 31-35	0.159	0.195	0.415
Age 36-40	-0.032	0.166	0.846
Age 41-45	-0.320	0.152	0.034
Age 46-50	-0.075	0.116	0.520
Wage0	-0.041	0.430	0.925
Wage100	-0.458	0.440	0.298
Wage200	-0.702	0.444	0.114
Wage300	-0.561	0.478	0.240
Wage400	-0.275	0.531	0.605
# of Adults	0.808	0.108	0.000
Assist	-0.782	0.135	0.000
Health	-0.308	0.042	0.000
Metro	0.514	0.267	0.055
Constant	1.159	0.742	0.118
Log-Likelihood		-5835.3973	
Wald test of independence of three equations	Chi2 Statistics: 7.98	Prob>chi2: 0.0047	

Note: The model includes all regional variables, but the estimated results are not reported.

Table 4. The married/divorced family-income differentials

		Mean differ- ences	Std. Err	# of Obs.
Expected log-family-income between marriage and divorce (Uncon-diff)	$E(\ln W_{1i} x_{1i}) - E(\ln W_{2i} x_{2i})$ (5.606) - (3.892)	1.714	0.006	6,404
Conditional log-family-income differential 1 (Sample Married-MD)	$E(\ln W_{1i} L_i = 1, x_{1i}) - E(\ln W_{2i} L_i = 1, x_{1i})$ (5.599) - (3.855)	1.743	0.006	6,107
Conditional log-family-income differential 2 (Sample Divorced-MD)	$E(\ln W_{1i} L_i = 0, x_{2i}) - E(\ln W_{2i} L_i = 0, x_{2i})$ (5.778) - (4.685)	1.093	0.026	297
Conditional relative log-family-income differential 1 (Sample MM-General MM)	$E(\ln W_{1i} L_i = 1, x_{1i}) - E(\ln W_{1i} x_{1i})$ (5.599) - (5.610)	-0.011	0.000	6,107
Conditional relative log-family-income differential 2 (Sample MD-General MD)	$E(\ln W_{2i} L_i = 1, x_{1i}) - E(\ln W_{2i} x_{2i})$ (3.855) - (3.881)	-0.026	0.000	6,107
Conditional relative log-family-income differential 3 (Sample DD-General DD)	$E(\ln W_{2i} L_i = 0, x_{2i}) - E(\ln W_{2i} x_{2i})$ (4.685) - (4.120)	0.565	0.018	297
Conditional relative log-family-income differential 4 (Sample DM-General DM)	$E(\ln W_{1i} L_i = 0, x_{2i}) - E(\ln W_{1i} x_{1i})$ (5.778) - (5.528)	0.250	0.008	297

Note: All figures in the table are significant in 1% level.

V. Conclusion

The purpose of this study is to examine whether there are any family-income differentials between women who remain in marriage and divorce in Korea and to draw the implications of these differences. To examine this question, I relied on recently collected Korean women's labour market data and used a switching regression model. The switching regression comparisons allow us to examine each type of females' premium (penalty) from marriage (divorce) and compare their family-incomes in marriage and divorce states. I find that the potential family-income benefits of marriage are large for the women who divorce. In that, divorced women would certainly enjoy much higher levels of family-incomewere they to remain married. This finding supports a large body of literatures showing that women experiencing a divorce tend to suffer a substantial loss of income (e.g. Berkhauser et al., 1991; Fritzell, 1990; Jarvis and Jenkins, 1999; Manting and Bouman 2006, Poortman, 2000, 2000; Smock 1993, 1994). The results of this study, for instance, show that on average the sample female would increase their family-incomes by staying in marriage, but the impacts are different for each subgroup; the all sample women appear to have significantly a 455% increase in marriage states, and the sample married wives to have 472% under the married state. Surprisingly, the sample divorced women would have a 198% increase in their family-incomes under the marriage state. If females who actually stay in marriage were in the divorce state, they would have 3% lower log-family-incomes than those who did not. In that, I conclude that women as a whole are indeed economically vulnerable outside of marriage. Thus, if policies were in place to encourage people to stay in their marriages, the overall economic advantages of marriage would probably be stronger than currently observed.

Finally, this study implies that women generally are economically vulnerable outside marriage. By virtue of the division of labor in marriage (Becker 1981),

many women tend to have lower labour market attachment, and therefore facing lower earnings than do their husbands (McLanahan 1985; Garfinkel and McLanahan 1986; McLanahan and Bumpass 1988; Sorensen and McLanahan 1987; Bianchi 1995). This division of responsibility in household is compounded by women's disproportionate financial and time responsibility for children, marked gender gap in wages, the incompatibility of primary parenting and full-time work after divorce. Numerous studies concur that separation and divorce have detrimental economic consequences for women comparing to ones of divorced men. (Hoffman 1977; Mott and Moore 1978, 1979; Corcoran 1979; Nestel et al. 1983; Weiss 1984; Duncan and Hoffman 1985; Weitzman 1985; Burkhauser and Duncan 1989; Stirling 1989; Holden and Smock 1991). The results of this study imply that the typical married women would experience the severe financial distress once outside the marriage, thus underscoring women's economic insecurity. Clearly, if staying in marriage benefits society and becomes an important social goal, then effective public policy will require a much better understanding of the personal incentives and structural constraints that affect marriage.

이경우는 미국 University of Florida에서 경제학 석사, Georgia State University에서 경제학 박사학위를 받았으며, 현재 연세대학교 상경대학 경제학부에서 연구교수로 재직 중이다. 주요 관심분야는 보건경제(여성노동, 저출산, 공공의료보험 등)이며, 재정정책, 응용계량경제를 연구하고 있다.
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한국 이혼여성의 가족해체 후 경제적 위험성과 생산성의 변화 : 교차회귀분석 접근법

이 경 우
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한국의 조이혼율은 1990년 1.1에서 2009년 2.5로서 두 배 이상의 증가를 나타내고 있다. 미국, 캐나다, 호주의 사례를 분석한 연구들은 일반적으로 가족해체 후 경제적인 상황이 남성보다 여성의 경우 더욱 심각하게 악화됨을 보고하고 있다. 하지만 한국의 이혼 여성에 대한 경제적 상황 변화와 생산성의 변화에 대한 연구는 아직 미미한 단계에 있다. 따라서 본 연구는 2007년 여성가족패널을 이용하여 가족해체 후 여성이 직면하는 예상 가구소득의 변화를 분석해보았다. 결혼과 이혼이라는 여성의 선택에 있어서 내생적으로 발생하는 관측 불가능한 자가선택(self-selection)문제를 해결하기 위해 내생적 교차회귀분석모형(Endogenous Switching Regression)을 사용하였다. 본 연구의 결과는 이혼여성을 일반적인 기혼여성과 비교했을 때, 평균적으로 가구소득이 심각하게 감소하고 있음을 나타내고 있다. 또한 본 연구는 모든 여성 표본으로부터 결혼을 유지하고 있을 경우 472%의 가구소득이 증가하는 반면, 놀랍게도 표본 이혼여성이 이혼을 선택하지 않았다면, 즉 결혼생활을 유지할 수 있었다면 현재보다 가구소득이 198% 증가할 수 있음을 나타내고 있다. 이는 이혼한 여성과 그렇지 않은 여성에게 동일한 수준의 생산성 및 관측 불가능한 요인들을 간과했을 경우 결혼해체 후 직면하게 되는 여성의 경제적 위험성을 과소평가할 수 있음을 시사하고 있다.

주요용어: 이혼, 교차회귀분석, 자가선택, 가족해체, 조이혼율