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Does High Unemployment Rate Result in a High Divorce Rate?: A Test for Japan

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Abstract. The purpose of this paper is to examine if the increase in the unemployment rate has any effect on the divorce rate. We use time series data and cross section data for the whole of Japan in order to examine this assertion. We also include crime rate and average working hours as explanatory variables. We conducted cointegration analysis to avoid spurious correlation for the time series data. We apply OLS for the time series and cross section data. The results suggest a positive correlation between the unemployment rate and the divorce rate. We also confirm that the influence of unemployment over divorce is immediate.

Keywords: unemployment, marital dissolution.

JEL classification: J12, J65.

Resumen. El objetivo de este artículo es determinar si el incremento en la tasa de desempleo tiene algún efecto sobre la tasa de divorcios. Con este fin se utilizan series de tiempo y datos de corte transversal para Japón. También se incluyen la tasa de crímenes y el promedio de las horas trabajadas como variables explicativas. Adicionalmente se efectúa análisis de cointegración con el fin de evitar relaciones espúreas entre las series de tiempo. Los resultados sugieren que existe una correlación positiva entre la tasa de desempleo y la tasa de divorcios. También confirmamos que existe una relación cronológica cercana entre el desempleo y el divorcio.

Palabras clave: desempleo, divorcio.

Clasificación JEL: J12, J65.

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1. Introduction

When and why we bring an end to our marriage? It is a tough question to answer. Nevertheless, there is an indication in Japan that as the unemployment rate increases, the divorce rate registers a hike as well. In fact, this tendency seems statistically evident when we apply a simple correlation analysis. Some public institutions and other sources have already pointed out this fact on the Internet[1]. Such evidence can be classified into two types: one, using time series data, and the other, using cross-section data. Both indicate a close relationship between the unemployment rate and divorce rate.

However, these calculations are very amateur with regard to the methods employed in their analysis. Therefore, certain issues remain unresolved. First, according to our knowledge, there are no academic papers that study this phenomenon in the context of Japan. Besides, existing studies have not applied the appropriate procedures such as cointegration analysis (unit root test and cointegration test); therefore, we cannot confirm whether this correlation is genuine or spurious. This paper, therefore, uses a statistically rigorous procedure to validate the authenticity of the relationship.

Fortunately, there have been some existing studies in other countries on this matter. Our analysis can be classified as a branch of family economics whose roots can be traced to the prominent works of Becker (1974a, b) as they comprise the fundamental literature that deals with marital instability. Though other methods exist, Becker's model is the one that is most used in studies dealing with marital issues that use similar statistical methods (Eliason, 2004). The basic explanation provided for divorce is that the people in concern discontinued their marriage when they felt that the net benefit from divorce is more than the net benefit from continuing the marriage.

Some researchers argue that the impact of job loss goes as follows. When couples decide to marry, they may not know each other completely. As time goes by, couples' understanding of each other grows and sometimes as well, unexpected occurrences take place or unobserved characteristics of the spouses are revealed. Therefore, if the newly-gained information and/or unexpected incidents decrease the net benefit from the marriage, a divorce takes place. A job loss can be one of such unexpected incidents (Jensen and Smith, 1990; Boheim and Ermisch, 2001; Kraft, 2001).

However, a job loss does not necessarily increase the possibility of a divorce. This is because the dismissed spouses may find it difficult to remarry due to their low income, as pointed out by Eliason (2004). Therefore, an empirical study is crucial; in this paper, we use time series data along with cross section data for Japanese couples.

[1]The following are a few web sites from the Kagawa prefecture, Japan:
http://www.pref.kagawa.jp/toukei/toukei_i/tokeii13.htm
http://www.dai-ichi-life.co.jp/news/pdf/nr05_53.pdf (the web site of Dai-ich Mutual Life Insurance Company)

2. Brief Review of Existing Studies

In a related move, we briefly take a look at the former studies on this issue that have been conducted in other countries. Studies on this issue are relatively scarce, and almost all come from Europe: Denmark (Jensen and Smith, 1990), Germany (Kraft, 2001), United Kingdom (Boheim and Ermisch, 2001), Sweden (Eliason, 2004), and Norway (Hansen, 2005; Rege, Telle, and Votruba, 2007). Naturally, if we include papers dealing with issues that are less related, the numbers increase. To name a few, Charles and Stephens (2004) and Stevenson and Wolfers (2007) overview divorce from an economic point of view including the relationship between job loss and divorce in their studies. Strom (2003) reviews this topic from sociological and psychological perspectives.

Jensen and Smith (1990) used panel data of about 3000 Danish married couples from 1979 to 1985 and revealed that husband's unemployment immediately influences the probability of marital dissolution. They also suggested that the wife's unemployment does not significantly affect marital dissolution. It was estimated that around 6% of the divorces were due to reasons of unemployment.

Kraft (2001) used panel data for a sample of 7,300 from the 39,959 available German household records from 1987 to 1996. Compared with Jensen and Smith (1990), Kraft's work featured a better analysis in that (1) it applied panel method for probit and logit, (2) it used separation instead of divorce as a variable, and (3) the number of observations was higher (Jensen and Smith, 1990, p. 68). He concluded that an unemployment spell of several months significantly increases the possibility of divorce.

Boheim and Ermisch (2001) used panel data of 5,500 households for the time period 1991-1998. Their results suggested that a negative economic change increases the probability of marital dissolution. Boheim and Ermisch also stated that unexpected financial gains have a negative affect on marital dissolution. They compared cohabiting and married couples and found that the possibility of marital dissolution for the former is twice as large as it is for the latter.

Eliason (2004) analyzed administrative data of Sweden and examined both immediate and long term implications of job loss over marital dissolution. Eliason showed that a job loss not only has an immediate impact on the possibility of marital dissolution but also that this effect is long lasting.

Hansen (2005) used panel data of 8,933 Norwegian couples from 1989 to 1996 and suggested that job loss increases the possibility of divorce. He found that in Norway, the impact of the husband's job loss is lower whereas the job loss of the wife is higher if compared to the other countries. However, in Norway, as in other countries, the impact of the husband's job loss is more than that of the wife's job loss.

Rege, Telle, and Votruba (2007) used panel data of 80,932 married Norwegian couples and showed an 11% rise in the number of divorce cases until 2003 in households affected by the husband's job loss due to plant closures, between 1995 and 2000, as compared to households wherein the husband did not have

suffered job loss. They also revealed that households affected by plant closures do not show a drastic reduction in earnings that "suggests that the effect of husband's plant closure on divorce is not due to an unexpected reduction in earning" (Rege, Telle, and Votruba, 2007, p. 20). The authors then argue the applicability of role theory in this case.

Compared to the above existing studies, our paper has the following distinctive features. First, we use both time series and cross section data. This can be advantageous as results can be empirically obtained using a lesser amount of data and disadvantageous in the sense that the reliability of the method hinges on limited aggregated data. Second, we apply cointegration analysis to avoid spurious regression. Finally, we searched for lag periods between the occurrence of high unemployment and increase in divorce rate.

3. Materials

3.1. Divorce Situation and Variable Candidate

We briefly outline the marital dissolution scenario in Japan. Descriptions below are mainly based on MHLW (2000), where explanations are provided in both Japanese and English. In Japan, divorce is categorized into four types: (1) divorce by mutual agreement, (2) divorce by arbitrament, (3) divorce by trial, and (4) judicial divorce. The first type requires no regal permission and almost 90% of the divorces are of this type. The fourth one is based on Section 770 of the Civil Law of Japan. Otherwise, when the two parties are unable to reach an agreement, they approach the court to seek arbitration (divorces by arbitrament) or request trial (divorces by trial).

Reasons argued for divorce are available only for divorces by arbitrament and divorces by trial, which are provided by the Supreme Court of Japan. Based on GSSC (2006), the most frequent reason for divorce is "personality clash" for both husband (62.6%) and wife (44.3%), which is followed by "violence" (28.7%), "unchastity" for wife (26.1%), and "unchastity" for husband (17.8%) (Table 1).

One of the reasons why "personality clash" results in divorce may be the time limitations experienced by both the parties that make reconciliation and/or mutual understanding difficult. There are two possibilities: one is that the duration of the marriage is short and the other is that the time that both parties devote to each other is short. Support for the former possibility arises from the fact that as the duration of cohabitation increases, the divorce rate decreases. The divorce rates are 38.8%, 22.1%, 12.5%, 9.7%, and 16.9% for marriage durations of less than 5 years, 5 to 10 years, 10 to 15 years, 15 to 20 years, and over 20 years, respectively. In this analysis, we will use the information pertaining to personality clash.

"Violence" is also an important factor in divorce and will be considered in the analysis. On the other hand, the data for "unchastity" is not available and creating a proxy variable would be difficult. Therefore, "unchastity" will

Table 1. Proportion of claims for divorces by motive

Motive	Divorce filed by husband	Divorce filed by wife
Personality clash	12,354 (62.6%)	20,126 (44.3%)
Unchastity	3,517 (17.8%)	11,867 (26.1%)
Violence	1,260 (6.4%)	13,041 (28.7%)
Mental abuse	2,654 (13.5%)	11,085 (24.4%)
Refusal to provide money for living expenses	479 (2.9%)	10,992 (24.2%)
Wasteful habits	2,681 (16.1%)	7,488 (16.5%)
Others	16,646 (84.4%)	29,523 (65.0%)
Total	19,730	45,440

Note: Multiple answers with a maximum of three motives

Source: GSSC (2006)

not be considered. In addition, "refusal to provide money for living expenses" accounts for 24.2% of the divorces amongst women, which suggests that money is an important factor for marriage continuation.

As we have already seen, both parties compare the benefits of marriage with its costs and if the costs outweigh the benefits, the result may be a divorce. "Personality clash," "violence," and "unchastity" increase the costs; "refusal to provide money for living expenses" decreases the benefits. Likewise, although it is not clearly mentioned in GSSC (2006), unemployment also reduces the benefits of marriage. It influences both costs and benefits of marriage. Loss of employment implies loss of income, perhaps leading to the "refusal to provide money for living expenses" reason for divorce. Additionally the stressful situation of being unemployed increases the costs of living together.

3.2. Data

In this paper, we conduct two analyses-time series analysis and cross section analysis. Based on the above outline of divorces in Japan and under the limitations of our data, we use (1) divorce rate as the explained variable and (2) ratio of unemployed in labor force, (3) crime rate, and (4) average working hours (for men and for women) as explanatory variables. The details are as follows (see also Table 2).

For the time series analysis:

(1) Divorce rate = number of divorces/total population

Number of divorces: MHLW (2008), Table 2-1, Number of divorces (head).

Total population: MIAC (2008a), Table 2-1, Population, Total (1,000 heads).

(2) Ratio of unemployed in labor force

MIAC (2008a), Table 16-1, Ratio of unemployed in labor force (%).

It is calculated as (Number of people who are employed/population aged 15 years and over) * 100

(3) Crime rate = Number of crimes/total population

Number of crimes: MIAC (2008b), Table 28-17, Indecency, rape, and bigamy (head)

Total population: MIAC (2008a), Table 2-1: Population, Total (1,000 heads).

(4) Average weekly working hours

MIAC (2008c), Table 19-4, Average weekly working hours (hours).

For the cross section analysis:

(1) Divorce rate

MIAC (2008a), Table 2-23, Divorce rate (1,000 heads).

(2) Ratio of unemployed in labor force = Number of unemployed/total population

Unemployment: MIAC (2008a), Table 16-8, Unemployed (1,000 heads).

Total population: MIAC (2008a), Table 2-3, Population (1,000 heads).

(3) Crime rate = Number of crimes / Total population

Number of crimes: MIAC (2008a), Table 25-2, General offences under penal code (head)

Total population: MIAC (2008a), Table 2-3, Population (1,000 heads).

(4) Average monthly working hours

MIAC (2008d), Labor. No. 213, No. 214 (hour per month).

Table 2. Explanation of the variables

Notation	Explanation	unit	year	Source
TIME SERIES				
D	Divorce rate	%	1958-2006	MHLW (2008); MIAC (2008a) Table 2-1
U	Ratio of unemployed in labor force	%	1958-2006	MIAC (2008a) Table 16-1
C	Crime rate	%	1958-2002	MIAC (2008b); MIAC (2008a) Table 2-1
Hm, Hw	Average weekly working hours	hours	1958-2002	MIAC (2008c)
CROSS SECTION				
D	Divorce rate	%	2005	MIAC (2008a) Table 2-23
U	Ratio of unemployed in labor force	%	2005	MIAC (2008a) Table 16-8 Table 2-3
C	Crime rate	%	2005	MIAC (2008a) Table 25-2 Table 2-3
Hm, Hw	Average monthly working hours	hours	2006	MIAC (2008d)

We add explanatory variables other than unemployment because of the following reasons. First, there are several motivations for divorce, as we have already seen above. Second, the feedback from our estimation, which will be discussed in greater detail later, implied that explanatory variables should be included. When we ignore variables other than unemployment, the D.W. statistic is often lower than the R^2, which suggests misspecification of the model. In our case it may suggest omission of explanatory variables. We included "crime rate" and "average working hours" because, as mentioned above, they increase the cost of marriage. Here "average working hours" is the proxy variable for "personality clash."

Last, we state the sign conditions. "Ratio of unemployed in labor force" should have a negative sign because it decreases the benefits of marriage. "Crime rate" and "average working hours (male)" should have a negative sign because they increase the costs of marriage. However, in the case of "average working hours (female)," it is difficult to ascertain the sign (positive/negative). This is because on one hand, as working hours increase, both parties have lesser time at hand to communicate with each other. On the other hand, working women with increased working hours, which is often less than that of men, may reduce stress between spouses.

4. Methods

4.1. Cointegration Analysis

As unit root test, we selected the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test. The null hypothesis is that the time series does not have a unit root (time series data is stationary). We supposed two types of test equations: with trend, and with trend and intercept. We used EViews 6 for the test; the bandwidth was automatically selected based on the Newey-West using Bartlett kernel. Explained variable and explanatory variables were used as crude data and as translation into logarithm. When the data is transformed, the results of the unit root test may differ. Therefore, we applied unit root test for all variables mentioned above.

When the variable is not stationary, we conducted a cointegration test. We also used EViews 6, where "VAR-based cointegration tests using the methodology developed in Johansen" (QMS, 2007, p. 363) are applied. Because EViews 6 provides five cases, which are different in their assumption of the deterministic trend, we use this summary report for deciding whether or not the cointegrating equation exists. As is well known, as long as the cointegrating equation exists among the $I(1)$ variables, long term relationship for these variables can be estimated.

4.2. Estimation Equations

Our basic interest is the relationship between the divorce rate and unemployment rate. However, if the important explanatory variable is not included in the model, the results may suffer from omitted variable bias. In fact, when we use our data, the D.W. statistic is lower than the R^2, which suggests misspecification of the model.

When the D.W. statistic is lower than the R^2, there are several ways of improving the model. First, we can add other explanatory variables; second, we can add endogenous variable with lag; third and last, we can apply the Cochrane-Orcutt (CO) method. However, if endogenous variable with lag is included in the model and CO method is applied simultaneously using ordinary least square, then the result is not valid because the unbiasedness and consistency of the estimate is no longer guaranteed.

Therefore, we will use several explanatory variables in addition to unemployment rate and we also apply CO method when the D.W. statistic is low. In case of EViews 6, for CO method, we only include the AR(1) term in the estimation equation. Because the error term may autocorrelate by more than one order, we also include AR(2) and higher order terms and find the proper order based on p-value and AIC.

We suppose the following two types of estimation equations. To ensure comparison, we will use the same variables for time series and cross-section

analyses.

$$D = \beta_1^1 + \beta_2^1 U_{t-\tau} + \beta_3^1 C_t + \beta_4^1 Tm_t + \beta_5^1 Tw_t + \varepsilon_t^1$$

$$\ln D = \beta_1^2 + \beta_2^2 \ln U_{t-\tau} + \beta_3^2 \ln C_t + \beta_4^2 \ln Tm_t + \beta_5^2 \ln Tw_t + \varepsilon_t^2$$

where,

D: divorce rate

U: ratio of unemployed in labor force

C: crime rate

Tm, Tw: average working hours for men and women, respectively

t: year

τ: time lag ($\tau = 0, 1, \ldots$)

ε: unobserved errors

We decide the best model based on the basis of AIC and p-value. (1) We start with the full model and delete explanatory variables one by one based on the p-value until all explanatory variables except the intercept are significant at 5% level. (2) If the D.W. statistic is lower than the R^2, we construct a full model and add AR(n)s to it. Next, we delete AR(n)s from the higher order equation until all AR(n)s are significant at the 5% level. We repeat the procedure mentioned in (1) while including AR(n)s. (3) We perform the same procedure for all the models where time lag τ changes from 0 to 5, and find the best model based on p-value and AIC.

5. Results

5.1. Unit Root Test

The results of the unit root test are tabulated in Tables 3 to 6. Critical levels differ and are based on the test equation assumption. If only the trend is included, critical values for 1%, 5%, and 10% are 0.739, 0.463, and 0.347, respectively. If trend and intercept are included, critical values are 0.216, 0.146, and 0.119, respectively.

At the level where crude data is used for the unit root test, the null hypothesis is rejected significantly at the 10% level for all the linear variables and at 5% level for most of the linear variables. On the other hand, the null hypothesis is rejected significantly at the 5% level for all the linear variables if only the trend is included in the test equation; however, if both trend and intercept are included, the null hypothesis is not rejected for almost all variables. When first difference is taken, the null hypothesis is rejected for almost all the variables.

Based on the above observations, we treat these variables as follows: when the variables are linear, they are considered to be non-stationary and cointegration test is conducted; and when the variables are logarithmic, they are considered to be stationary and the usual estimation method to explain the long term relationship between the explained and explanatory variables is applied.

Table 3. Results of the unit root tests (linear, level)

	trend			trend & intercept		
	LM Stat.		bandwidth	LM Stat.		bandwidth
D	0.842	***	5	0.121	*	5
U	0.733	**	5	0.146	**	5
C	0.655	**	5	0.133	*	5
Hm	0.562	**	5	0.141	*	5
Hw	0.837	***	5	0.184	**	5

Note 1: Null hypothesis of the time series is stationary

Note 2: ***, **, * are significant at 1%, 5%, and 10%, respectively

Table 4. Results of the unit root tests (linear, first difference)

	trend		trend & intercept		
	LM Stat.	bandwidth	LM Stat.		bandwidth
D	0.096	4	0.062		3
U	0.152	4	0.083		3
C	0.203	4	0.205	**	4
Hm	0.116	1	0.070		0
Hw	0.278	4	0.084		7

Note 1: Null hypothesis of the time series is stationary

Note 2: ***, **, * are significant at 1%, 5%, and 10%, respectively

Table 5. Results of the unit root tests (logarithm, level)

	trend			trend & intercept		
	LM Stat.		bandwidth	LM Stat.		bandwidth
$\ln D$	0.871	***	5	0.060		4
$\ln U$	0.761	***	5	0.102		5
$\ln C$	0.662	**	5	0.137	*	5
$\ln Hm$	0.563	**	5	0.142	*	5
$\ln Hw$	0.831	***	5	0.193	**	5

Note 1: Null hypothesis of the time series is stationary

Note 2: ***, **, * are significant at 1%, 5%, and 10%, respectively

5.2. Cointegration Test

When the time series variables are used as crude data, unit root test suggests that they are non-stationary. However, if cointegrating equation exists, we

Table 6. Results of the unit root tests (logarithm, first difference)

	trend		**trend & intercept**		
	LM Stat.	bandwidth	LM Stat.		bandwidth
$\ln D$	0.075	4	0.070		4
$\ln U$	0.200	3	0.112		3
$\ln C$	0.212	5	0.202	**	5
$\ln Hm$	0.120	1	0.071		0
$\ln Hw$	0.324	3	0.080		7

Note 1: Null hypothesis of the time series is stationary

Note 2: ***, **, * are significant at 1%, 5%, and 10%, respectively

can still use this data to estimate the long term relationship between explained and explanatory variables. As we will see in the later section, cross section analysis suggests that the significant explanatory variables are unemployment rate and crime rate, and time series log variable analysis suggests that the only significant explanatory variable is unemployment rate. Therefore, we use the cointegration test for the following three cases: (1) all explained and explanatory variables are included, (2) crime rate and unemployment rate are the only variables that are included, and (3) only the unemployment rate is considered.

The results are as tabulated in Table 7. In case (1), under several assumptions on data trend and test type, cointegrating equation is statistically proved to exist, based on both Trace statistics and maximum eigenvalue statistics. However, in case (2), existence of a cointegrating equation is not statistically validated. In case (3) the existence of only one cointegrating equation is statistically validated. These results suggest that we cannot build a proper model using crude data. Therefore, we use logarithmic data for time series analysis.

Table 7. Results of the cointegration test

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type:	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
(1) *D U C Hm Hw*					
Trace	1	1	0	1	0
Max-Eig	2	1	1	0	0
(2) *D U C*					
Trace	0	0	0	0	0
Max-Eig	0	0	0	0	0
(3) *D U*					
Trace	0	0	0	0	2
Max-Eig	0	1	0	0	0

5.3. Estimation Results

The models used in time series analysis are tabulated in Table 8. As suggested by *Model 1*, on the basis of the D.W. statistic and p value, there exists autocorrelation of the error term, we have supposed second order autocorrelation. *Model 2* is the full model, where sign conditions of the explanatory variables are satisfied. By deleting explanatory variables based on p value, we obtain *Model 3* as the best model, where only unemployment rate is significant. We searched for the best time lag value τ. Based on AIC, the differences are too small to deduce the best model but the R^2 and p values are largest when $\tau = 0$. Table 8 illustrates the data when $\tau = 0$. We deduce that increase in unemployment rate has an immediate affect divorce rate.

With regard to the cross section analysis, we have tabulated two models for two cases. *Linear (1)* and *Log (1)* are the full models. Average monthly working hours for men *Hm* has a negative sign (thus, contradicting our sign condition) whereas for women, *Hw* has opposing signs for the two models– *Linear (1)* and *Log (1)*. However, as the significance level of the parameter is low, we do not examine the reason. *Linear (2)* and *Log (2)* are the best models wherein not only the unemployment rate but also the crime rate are significant as explanatory variables.

6. Discussion

First, we should note that the results may vary from country to country because of differing social, cultural, and economic conditions. Therefore, our result should not be compared to the findings from other countries. However, the results may share some common features such as Petty-Clark's Law on industry development, which is based on an empirical rule. All of the existing studies suggest that job losses increase the possibility of a divorce, which is also confirmed by our analysis. Besides, our result suggests that the impact of unemployment has an immediate affect on marital dissolution.

While all of the former studies mentioned in this paper used panel data, we use time series and cross section data because of data limitations. This difference may suggest the following. First, the reason why studies on this topic are scarce may be attributed to this data limitation. Second, we used a considerably smaller dataset as compared to the former studies and have successfully managed to show results. This suggests that a simpler analysis may be enough to examine whether or not a job loss increases the possibility of marital dissolution.

Our results may not have suffered from spurious correlation because we have applied cointegration analysis (unit root test and cointegration test). In addition, we conducted cross section analysis and arrived at the same conclusion. However, the implication of Rege, Telle, and Votruba (2007) view that "the effect of husband's plant closure on divorce is not due to an unexpected reduction in earning" is still suggestive in our case. Because of data limitations,

Table 8. Results of estimation (time series analysis)

	Model 1		**Model 2**		**Model 3**	
variable						
intercept	-0.35	***	2.25		0.65	
	(-11.30)		(0.60)		(1.21)	
$\ln U$	0.69	***	0.12		0.13	**
	(20.68)		(1.99)		(2.38)	
$\ln C$			0.04			
			(0.50)			
$\ln Hm$			0.37			
			(0.41)			
$\ln Hw$			-0.56			
			(-0.48)			
AR(1)			1.39	***	1.46	***
			(8.28)		(9.92)	
AR(2)			-0.40	**	-0.48	***
			(-2.39)		(-3.27)	
R^2	0.9029					
Adj.R^2			0.9901		0.9923	
F-stat.	427.87		697.71		1964.54	
AIC	-1.55		-3.90		-4.07	
D.W. stat.	0.30		2.00		2.02	

Note 1: t values are given in parentheses

Note 2: ***, **, * are significant at 1%, 5%, and 10%, respectively

we do not examine this point, and leave it for future research.

Due to the simple analysis, certain issues remain, some of which have been mentioned in previous papers. First, Jensen and Smith (1990, p. 227) suggested that the husband's unemployment has an immediate influence on dissolution and the effect does not seem to accumulate over time. This tendency seems to be a common feature throughout nations, but we have been unable to examine it because of data limitations.

Second, Kraft (2001) stated that the difference in wealth accumulation dur-

Table 9. Results of estimation (cross section analysis)

	Linear (1)		**Linear (2)**			**Log (1)**		**Log (2)**	
variable									
intercept	2.15		1.02	***	intercept	1.21		1.55	***
	(0.93)		(9.12)			(0.20)		(8.31)	
U	12.68	***	12.81	***	$\ln U$	0.42	***	0.42	***
	(7.55)		(8.00)			(7.29)		(7.77)	
C	0.01	***	0.01	***	$\ln C$	0.13	***	0.13	***
	(2.73)		(3.23)			(3.39)		(3.67)	
Hm	-0.0041				$\ln Hm$	-0.42			
	(-0.38)					(-0.41)			
Hw	-0.0019				$\ln Hw$	0.49			
	(-0.15)					(0.42)			
Adj.R^2	0.62		0.63		Adj.R^2	0.61		0.63	
F-stat.	19.40		40.25		F-stat.	19.21		39.90	
AIC	-0.87		-0.95		AIC	-2.23		-2.31	

Note 1: t values are given in parentheses
Note 2: ***, **, * are significant at 1%, 5%, and 10%, respectively

ing marriage may influence the probability of divorce. In addition, as we have already mentioned, job loss is the sudden incidence of a reduction in the benefits of marriage, especially so for a wife whose husband has lost his job. Jensen and Smith (1990) pointed out that the different types of unemployment (temporary layoff and permanent layoff) can be compared and the former may have less influence because its acceptance is more tolerable. Moreover, we need to consider the suggestion of Rege, Telle, and Votruba (2007), as mentioned above. It is therefore required that job losses be classified. Given these, an analysis using individual data is essential for future studies on this phenomenon in Japan.

7. Conclusion

The purpose of this paper is to examine whether or not unemployment increases the rate of marital dissolution; we confirm that this is indeed the case in Japan. Our result also suggests that the impact of unemployment on the possibility of marital dissolution is immediate. Our analytical method is different from other existing papers in that we utilized lesser amount of data for analysis and demonstrate that this simpler analysis is also valid for the examination of the relationship between unemployment and marital dissolution. However, for a detailed study and to examine remaining issues, which are common in previous papers and also in our paper, it is essential to accumulate and/or gather individual-level data.

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