Household Debt and Marital Stability

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This study examines the relationship between household debt and divorce. Six waves of Korean Labor and Income Panel Survey (KLIPS) household data are used for analysis. In order to account for unobserved heterogeneity of households that might be related to divorce probabilities, random effects models are estimated. The results suggest that household debt, regardless of the types and the sources of borrowing, does not increase the probability of divorce significantly. This finding contradicts the common belief that financial issues have become an increasingly important reason for divorce in recent years. Implications of the findings and suggestions for further research are discussed.

Key Words: household debt, divorce, random effects logit

I.   Introduction

Korea has witnessed a dramatic increase in divorce during recent decades. For the last ten years the number of divorce has increased from 59,313 cases in 1993 to 167,096 cases in 2003 according to the Korea National Statistical Office. Paralleled was the unprecedented surge of household debt or debt ratio, resulting in 51.4% of total number of households with positive amounts of debt in 2000 according to the Korea National Statistical Office.

The simultaneity of the two striking trends has raised suspicion that there might exist some type of correlation between family's financial adversity and marital instability. In particular, media and the public have lately paid attention to the concerns that an

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increasing fraction of divorce cases in the recent years may be attributable to the couple's financial problems. In fact, the official statistics reports that 16.4% of the couples who filed for divorce in the year 2003 indicated that economic hardship was the primary reason for their marital breakup. This percentage is eight times higher than 2.3% of 1993 (Korea National Statistical Office, 2003).

This study explores the underlying mechanism in the relationship between the size of household financial liabilities and marital stability. Specifically it investigates whether the debt of a household is a factor that threatens marital stability of the couple and causes divorce. With scarcity of literature on this issue, findings from this study contribute to the understanding of the causes of rising divorce rates in Korean society, and also provide important policy implications relating to consumer finance.

Economic theory of family formation and dissolution suggests that divorce occurs when the net benefit of remaining married becomes negative (Becker, 1973; Becker, Landes & Michael, 1977; Weiss, 1997). Included in the net benefit is the level of household debt and/or debt-to-asset ratio. Because not all the debts accumulated during the marriage are subject to division in divorce settlements in Korea, the large household debt is likely to reduce the advantage of remaining married as compared to the benefit of divorce for either of the spouses.

There is also literature indicating the causal connection runs in the opposite direction. Cubeddu and Rios-Rull (1997) presents a model showing that higher marital risks may discourage accumulation of financial capital within the household. In other words, it is possible that the couples anticipating higher chances of divorce may overspend and build up larger debt. As a strategy to deal with such simultaneity, this study estimates the effect of the household debt accumulated from the preceding periods upon the divorce probability in the present in a fixed-effects framework. The longitudinal character of the Korean Labor and Income Panel Survey data used for this study allows such estimation possible. Random effects logit is used for estimation. Results suggest that household debt does not increase the likelihood of divorce significantly when income and demographic variables are controlled for.

The remainder of the paper is organized as follows. Section II will describe the data and empirical models and summarize the sample used in this study. Section III will

present the findings from regression. The concluding remarks and policy implications are discussed in Section IV.

II.   Data and Methods

1. Data

We use the household survey data from Korea Labor and Income Panel Study (KLIPS) 1998-2003 waves. KLIPS is a longitudinal survey of 5,000 randomly selected households and individuals in Korea on their labor market activities, human capital, income and consumption. Each individual household is followed through the subsequent survey waves, which allows for the panel structure. New household samples are added each year as one household from the original panel splits to multiple living units. Data on the current amount of outstanding debt, along with information on the type of debt, are collected at the household level each year.

The sample for this study consists of households, whose heads were married at the time they entered the survey. After dropping observations that are unusable due to missing values, the total of 4,967 households or 19,127 household×year observations are used for analysis. The study also utilizes information on various demographic and socio-economic characteristics of the household head that may change over time.

This paper treats divorce as a dynamic event rather than a lasting marital status: a household is considered as being divorced in year t if the household has at least one member moved out as a result of divorce between year t-1 and t. There are only 60 incidences of divorce occurred during our sample period.[1] All the income, assets and debt amounts are adjusted for inflation-free units using the Consumer Price Index.

2. Empirical model

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[1] The small number of divorce occurrences may create problems assessing the impact of debt on divorce.

A couple will choose to divorce when its joint utility derived from the married state is lower than in the divorced state. That is,

$$\text{Divorce} = 1 \text{ iff } V^D(\cdot) - V^M(\cdot) > 0 \text{ and 0 otherwise,} \qquad (1)$$

where $V(\cdot)$ denotes the couple's joint indirect utility, and the superscripts D and M stand for divorced and married statuses respectively. The joint utility can be determined by family economic conditions, which include the amounts as well as the sources of income, assets, and household debt.[2] This study examines how the size of debt of each household affects the probability of the couple's marriage ending in divorce. If debt affects (lowers) the joint utility of marriage and divorce in different magnitudes, i.e., $dV^D/d(\text{debt}) \neq dV^M/d(\text{debt})$, household debt will have a significant effect on the probability of divorce.

Since the net benefit of divorce, $V^D(\cdot) - V^M(\cdot)$, may also depend on many other factors that can be captured by socio-demographic characteristics of the household, the net benefit is modeled as a linear combination of demographic factors, income, assets and debt of the household. Overall economic performances such as unemployment and/or inflation rates may also influence the net benefit. Therefore in the reduced form the net benefit of divorce can be written as:

$$V^D_{it} - V^M_{it} = \alpha \, \text{debt}_{it-1} + X_{it}'\boldsymbol{\beta} + Y_t'\boldsymbol{\gamma} + \varphi_i \qquad (2)$$

where i indexes individual households, and t the year of survey. The variable 'debt' measures the total outstanding debt of individual household that changes over time. X is the vector of socio-economic and demographic variables including the age and schooling of the household head, the size of the household, and household income.[3] Y is a vector of variables measuring year-specific macroeconomic performance, such as unemployment and inflation rates. φ is the household fixed effect term that accounts for unobserved characteristics of the couple that may as well determine divorce propensity.

The value of net benefit is unobservable, however, and we can only see the binary discrete measure, whether to divorce or remain married. The probability that the i-th couple divorces at year t is

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[2] Due to the prevalence of missing values, asset variables are not included in the regression estimation in this study.

[3] Literature suggests that the number of children is negatively correlated with the divorce probability. KLIPS observes the number of children, but due to the large number of missing values, the size of the household is used instead. The size of the household can also be indicative of other compositional characteristics of the household.

$$\text{Prob}(divorce_{it}) = \text{Prob}(\alpha\, debt_{it-1} + X_{it}'\boldsymbol{\beta} + Y_t'\boldsymbol{\gamma} + \varphi_i > 0)$$

$$= F(\alpha\, debt_{it-1} + X_{it}'\boldsymbol{\beta} + Y_t'\boldsymbol{\gamma} + \varphi_i) \qquad (3)$$

where F is any cumulative distribution function, which, for computational convenience, is assumed to follow logit in this study. The coefficients are measured by logit regressions. A positive and significant α would mean that a household's financial burden increases the net benefit of divorce and therefore at the margin the likelihood of marital dissolution.

Due to the limited variability of marital status within households, fixed effects estimation would restrict the sample to those that ever divorce. Given the limited number of ever-divorced households in our sample, the household-specific disturbance is handled only in the random effects framework in this study.

3. Description of the sample

Table 1 presents the definitions and summary statistics of the variables used in the analysis. Note that the unit of observation is household-year. Only 0.3% of the total observations are divorced.[4] This also indicates approximately 1.2% of the households included in the sample have experienced divorced during the six-year sample period.

The sample includes various age groups. Nine percent of the sample household-years have heads who are 34 years old or younger; in one third of the sample household-years, the household heads are over 54.[5] One-third of the sample households are headed by persons who had less than high school education. Another one-third had heads with college or graduate degrees. Households with 4 members are the most common type. The average annual income of the household measured in the year 2000 won is 12 million. Wage earned accounts for the most of it.

When we compare the divorced and not-divorced observations, divorced households tend to be younger, more likely to be high school graduates, have fewer people in the household, and have slightly lower income than the households that did not have a member divorced in the past year. Because none of the divorced households in the sample

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[4] This number may seem small, but recall that this study defines divorce as an event, not as the current marital status.

[5] Divorce incidence among the heads who are 65 or older is extremely rare.

have income from social insurance or government transfer payments, those two income variables are dropped from the regression analysis.

Table 2 shows the summary statistics of debt. An average household debt amounts to million won. In general, divorced households have the lower amount of debt than the non-divorced counterparts. Borrowings from financial institution explain the largest fraction of household debt. We also compute debt to income ratio, as a way to deal with the suspicion that the amount of debt can actually indicate the degree of credit constraint. Interestingly, the debt to income ratio is higher for divorced households than for married households in the case of borrowings from non-financial institutions. Figure 1 compares the distribution of debt by taking natural log for divorced and married households that have any positive amount of debt. For both types of households, the peak 3, and the property of the distribution seems quite similar.

III. Findings

The regressions are estimated in three ways. First, we estimate the logit coefficients without the fixed effects term (Table 3). Despite the possibility of potential bias due to heteroscedacity, treating each household-year as a separate observation is considered acceptable when the panel has a relatively limited number of waves (Fisher and Lyons, 2004; Allison 1995). Second, random effect coefficients are estimated to capture the household-specific unobserved variations in the joint indirect utility of divorce and/or of remaining married (Table 4). Third, random effect coefficients of debt are measured by breaking down by the debt category in order to examine whether debt has different effect on divorce depending on the sources and types of borrowing (Table 5).

1. Household Debt

In column (1) of Table 3, the amount of debt seems negatively correlated with the probability of divorce, suggesting that the more one borrows, the less likely they are to divorce, although the correlation is not statistically significant. The sign of the coefficient to the debt variable flips as demographic and economic variables enter the regression

estimation but the relationship remains insignificant (columns 2 and 3). Even after accounting for the effect of macroeconomic fluctuations upon divorce probabilities, the size of household debt still remains unrelated to marital breakups of the couple in the household (column 4). The result does not change when the debt to income ratio is considered in place of the absolute size of the debt (column 5).

Table 4 reports similar findings. Due to the extremely small size of the divorced sample, random effects estimation fails to converge when year-specific macroeconomic variables enter the regression and is not presented. Debt shows positive coefficients in the models specified with demographic and income variables (columns 2 and 3), although the effects are not significantly large.

Table 5 shows how the types and sources of debt have differing effects on divorce probabilities. There is not a single type of debt that significantly increases or decreases the likelihood of divorce. The irrelevance of debt as a threatening factor to marital stability may be an interesting finding, which suggests that the concurrence of rising divorce and ever-expanding consumer credit markets be only coincidental unlike what the more popular views suspect.

2. Other Findings

Some demographic variables are shown to have consistently significant coefficients for the probability of divorce. For example, controlling for income and earnings, higher education appears to decrease the probability of divorce. In all models estimated, households headed by college graduates are significantly less likely to have divorce than those with the heads of less than high school education. Though not as striking as the effect of schooling, the age of the household head seems to be negatively correlated with divorce probability. Age may also signify the duration of marriage, which normally increases the returns to remaining married. These findings are consistent with the findings from previous literature in other countries (La Cava & Simon, 2003; Lyons 2003).

All income variables are positively correlated with the probability of divorce holding age and education of the head constant. The negative coefficient of the total income only reflects the effect of the omitted income variables, social insurance and

transfer payments. Unlike the common beliefs, recession in the economy turns out to decrease the likelihood of divorce.

IV.   Concluding Remarks

1. Summary and Conclusion

This study tests whether there is a causal relation between household debt and marital stability. Divorce is considered to signify low marital stability. The research question is motivated by increasing accusation of the expansion of household credit and insolvency as a cause for the dramatic rise in divorce rates during the same period in Korea. The data for statistical analysis come from the six waves of Korean Labor and Income Panel Survey (KLIPS) from its first survey in 1998. Household survey data is used for analysis in this paper.

Despite of the common belief that poor family financial situation may threaten marital stability and cause divorce, the study finds that there is no significant correlation between household debt and divorce. A more consistent predictor of divorce is low household income rather than the debt.

Some limitations of research might have affected the findings. The variables measuring the values of financial and physical assets of the household have a large number of missing values and could not be used for analysis. Since for many households debt is closely linked to the housing and other real estate purchases, omission of asset variables might have caused significant bias in estimation. A higher amount of debt may indicate the couple's better access to credit and be a sign of positive marital prospect and low likelihood of divorce. If this effect is significantly large, it might have canceled out the negative effect of debt on marital stability, leading to insignificant coefficients to debt.

2. Suggestions for Further Research

Based on the findings from this study, we would like to suggest the followings.

First, KLIPS has individual-level data, which contains more detailed information on economic and labor market activities. Since labor force participation – especially the

female labor force participation – is identified as an important factor in marriage-divorce literature, the individual data file can be matched to the household data for further investigation.

Second, it might be worthwhile to restrict the sample to the ones who marry during the survey periods (after 1998) and follow them through a longer period. Due to the limited number of panels so far, this method would not be relevant for now. However, such specification would help control the heterogeneity of the sample and allow a more robust estimation.

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Table 1
Descriptive Statistics: Demographic and Socio-Economic Variables

Variable Name	Definition	All (n=19,127)		divorce=0 (n=19,067)		divorce=1 (n=60)	
		Mean	S.D	Mean	S.D	Mean	S.D
divorce[1]	Divorce in the past year	0.0031	0.0559				
age34[1]	Household head is 34 or younger	0.0923	0.2894	0.0922	0.2893	0.1167	0.3237
age35_44[1]	Household head is 35-44 years old	0.2849	0.4514	0.2845	0.4512	0.4167	0.4972
age45_54[1]	Household head is 45-54 years old	0.2994	0.4580	0.2994	0.4580	0.2833	0.4544
age55[1]	Household head is 55 or older	0.3234	0.4678	0.3239	0.4680	0.1833	0.3902
lths[1]	Household head had less than high school education	0.3267	0.4690	0.3267	0.4690	0.3000	0.4621
hs[1]	Household head has high school diploma only	0.3994	0.4898	0.3988	0.4897	0.6000	0.4940
coll[1]	Household head has college or higher degree	0.2740	0.4460	0.2745	0.4463	0.1000	0.3025
hhsize2[1]	Household size is 2	0.2040	0.4030	0.2035	0.4026	0.3500	0.4810
hhsize3[1]	Household size is 3	0.2028	0.4021	0.2023	0.4017	0.3500	0.4810
hhsize4[1]	Household size is 4	0.4172	0.4931	0.4181	0.4933	0.1500	0.3601
hhsize5[1]	Household size is 5 or more	0.1760	0.3809	0.1761	0.3809	0.1500	0.3601
Earning[2]	Annual household earning of the household	11.04	15.88	11.05	15.89	10.50	10.26
fin_inc[2]	Annual household income from financial assets	0.38	2.71	0.38	2.71	0.06	0.43
est_inc[2]	Annual household income from real estate assets	0.52	5.61	0.52	5.61	0.64	2.75
soc_ins[2]	Annual household income from social insurance	0.05	2.09	0.05	2.10	0.00	0.00
Transfer[2]	Annual household income from transfer payments	0.01	0.07	0.01	0.07	0.00	0.00
other_inc[2]	Annual household income from other sources	0.32	5.31	0.32	5.32	0.17	1.12
tot_inc[2]	Total annual household income	12.32	18.88	12.32	18.90	11.37	11.07
real_asset[2]	Value of real estate assets	1095.55	7794.26	1093.64	7795.52	1527.27	7561.73
fin_asset[2]	Value of financial assets	14.78	42.39	14.83	42.47	4.42	13.38

Note: Each observation represents one household-year.

[1] Dummy variables

[2] Unit: 1 million Won. Inflation-adjusted using the year 2000 as the base

Table 2
Summary Statistics: Debt

Variable Name	Definition	All (n=19,127)		divorce=0 (n=19,067)		divorce=1 (n=60)		t-statistic
		Mean	S.D	Mean	S.D	Mean	S.D	
debt[1]	Total outstanding debt	17.7709	68.0214	17.7790	68.1129	15.1916	25.8925	0.2942
debt_1[1]	Amount borrowed from financial institution	12.4889	65.7977	12.4948	65.9229	11.0929	20.4299	0.1647
debt_2[1]	Amount borrowed from non-financial institution	0.4481	4.0158	0.4496	4.0239	0.0835	0.6468	0.7047
debt_3[1]	Amount borrowed informally	1.7454	9.7084	1.7455	9.7220	1.7129	5.6627	0.0260
debt_4[1]	Deposits received	4.6386	23.1127	4.6485	23.1527	2.3023	9.5369	0.7846
debt_5[1]	Amount advanced	0.0510	0.7385	0.0512	0.7401	0.0000	0.0000	0.5356
debt_6[1]	Other borrowing (credit etc)	0.1100	2.6416	0.1105	2.6471	0.0000	0.0000	0.3233
debt_ratio	Debt / total income	7.5309	88.4752	7.5430	88.6041	3.4121	7.7397	0.3426
debt_ratio_1	Debt_1 / total income	3.3920	23.1737	3.3994	23.2181	1.5087	3.2210	0.5984
debt_ratio_2	Debt_2 / total income	0.1354	2.1523	0.1342	2.1464	0.4537	3.3340	-1.0889
debt_ratio_3	Debt_3 / total income	0.9007	9.6103	0.9015	9.6280	0.6902	2.4489	0.1612
debt_ratio_4	Debt_4 / total income	1.0441	8.3525	1.0452	8.3666	0.7595	3.1313	0.2509
debt_ratio_5	Debt_5 / total income	0.0111	0.2722	0.0111	0.2728	0.0000	0.0000	0.2994
debt_ratio_6	Debt_6 / total income	0.0535	2.7426	0.0537	2.7479	0.0000	0.0000	0.1435

[1] Unit: 1 million Won. Inflation-adjusted using the year 2000 as the base.

Figure 1
Kernel Density of Ln(Debt) for divorced and not-divorced households
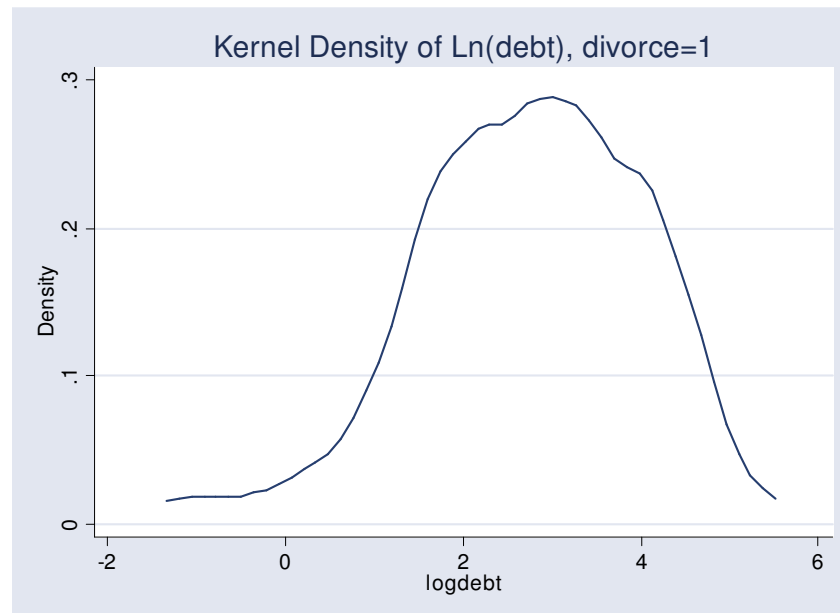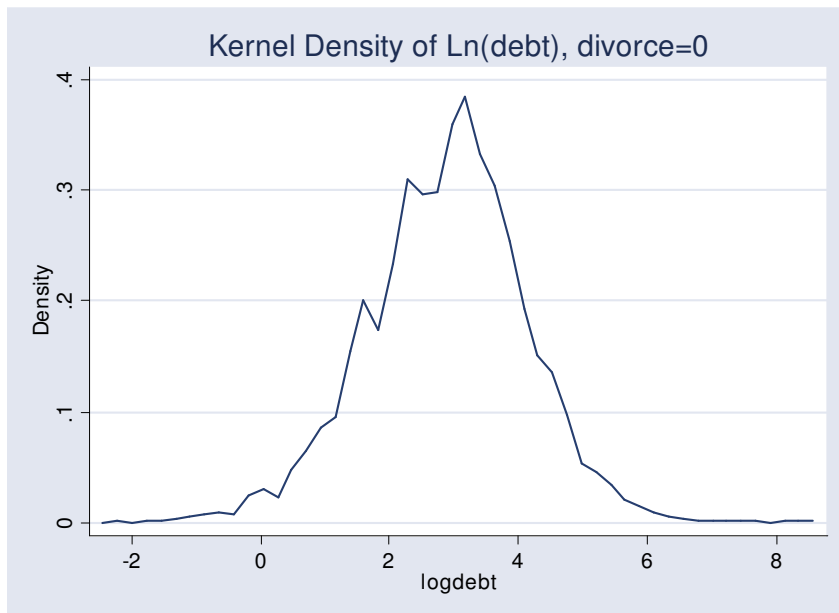
Notes: Sample reduced to observations with positive amounts of debt.

Table 3
Logit Estimation of the Probability of Divorce

	(1)		(2)		(3)		(4)		(5)	
	coeff	s.e	coeff	s.e	coeff	s.e	coeff	s.e	coeff	s.e
Debt	-1.1E-03	(0.003)	4.9E-04	(0.001)	4.0E-04	(0.001)	4.3E-04	(0.002)		
Debt_ratio									-0.005	(0.012)
age34 (omitted)										
age35_44			0.663	(0.443)	0.694	(0.444)	0.873	(0.445)	0.691	(0.453)
age45_54			0.258	(0.490)	0.298	(0.491)	0.471	(0.490)*	0.285	(0.502)
age55			-0.755	(0.528)	-0.601	(0.530)	-0.408	(0.531)	-0.772	(0.570)
Lths (omitted)										
hs			0.259	(0.322)	0.242	(0.322)	0.347	(0.323)	0.236	(0.340)
coll			-1.317	(0.503)***	-1.347	(0.509)***	-1.108	(0.510)*	-1.140	(0.521)**
hhsize2 (omitted)										
hhsize3			-0.174	(0.317)	-0.224	(0.318)	-0.114	(0.321)	0.035	(0.347)
hhsize4			-1.936	(0.419)***	-2.004	(0.422)***	-1.859	(0.426)***	-1.679	(0.445)***
hhsize5			-0.898	(0.416)**	-0.989	(0.422)**	-0.735	(0.428)*	-0.541	(0.450)
earning					534.33	(0.053)***	370.30	(0.057)***	384.73	(0.056)***
fin_inc					534.11	(0.287)***	370.15	(0.275)***	384.58	(0.276)***
est_inc					534.33	(0.055)***	370.33	(0.058)***	384.75	(0.057)***
other_inc					534.32	(0.000)***	370.32	(0.000)***	384.74	(0.000)***
tot_inc					-534.328	(0.052)***	-370.325	(0.055)***	-384.746	(0.054)***
unemployment rate							-0.653	(0.161)***	-0.568	(0.168)***
inflation rate							-0.279	(0.136)**	-0.336	(0.146)**
Constant	-5.743	(0.139)***	-5.051	(0.491)***	-5.051	(0.494)***	-1.480	(0.943)	-1.596	(1.005)
# Observations	19,127		19,127		19,127		19,127		18,397	
Log Likelihood	-405.71		-377.91		-374.71		-357.27		-327.26	
Pseudo R sqr	0.0002		0.0687		0.0766		0.1195		0.1126	

* p<.10 ** p<.05 *** p<.01

Table 4
Random Effects Logit Estimation of the Probability of Divorce

	(1) coeff	(1) s.e	(2) coeff	(2) s.e	(3) coeff	(3) s.e	(4) coeff	(4) s.e
Debt	-1.1E-03	(0.003)	4.9E-04	(0.001)	4.0E-04	(0.001)		
Debt_ratio							-0.007	(0.013)
age34 (omitted)								
age35_44			0.663	(0.443)	0.694	(0.444)	0.538	(0.451)
age45_54			0.258	(0.490)	0.298	(0.491)	0.124	(0.502)
age55			-0.755	(0.528)	-0.601	(0.530)	-0.969	(0.570)**
Lths (omitted)								
hs			0.259	(0.322)	0.242	(0.322)	0.128	(0.339)
coll			-1.317	(0.503)***	-1.347	(0.509)***	-1.364	(0.518)***
hhsize2 (omitted)								
hhsize3			-0.174	(0.317)	-0.224	(0.318)	-0.026	(0.346)
hhsize4			-1.936	(0.419)***	-2.004	(0.422)***	-1.756	(0.443)***
hhsize5			-0.898	(0.416)**	-0.989	(0.422)**	-0.712	(0.446)
earning					534.477	(0.053)***	531.215	(0.054)***
fin_inc					534.256	(0.287)***	531.009	(0.284)***
est_inc					534.479	(0.055)***	531.217	(0.055)***
other_inc					534.468	(0.050)***	531.205	(0.050)***
tot_inc					-534.470	(0.052)***	-531.208	(0.052)***
Constant	-5.743	(0.139)***	-5.051	(0.491)***	-5.051	(0.494)***	-6.351	(0.559)***
# Observations	19,127		19,127		19,127		18,397	
# Households	4,967		4,967		4,967		4,922	
Log Likelihood	-405.71		-377.90		-374.71		-341.24	

* p<.10 ** p<.05 *** p<.01

Table 5
Random Effects Logit Estimation of the Probability of Divorce

	(1)		(2)	
	Coeff	s.e	coeff	s.e
debt_1	5.9E-04	0.001	-0.027	0.028
debt_2	-0.085	0.136	0.023	0.022
debt_3	0.000	0.015	-0.002	0.028
debt_4	-0.001	0.009	0.007	0.021
debt_5	-159.2	206×10^6	-304.9	206×10^6
debt_6	-135.5	148×10^6	-779.2	108×10^7
age34 (omitted)				
age35_44	0.809	0.445*	0.655	0.452
age45_54	0.422	0.492	0.258	0.503
age55	-0.465	0.532	-0.826	0.570
Lths (omitted)				
hs	0.306	0.321	0.214	0.339
coll	-1.217	0.509**	-1.218	0.520**
hhsize2 (omitted)				
hhsize3	-0.181	0.319	0.008	0.347
hhsize4	-1.954	0.423***	-1.717	0.444***
hhsize5	-0.877	0.423**	-0.603	0.447
earning	13.333	0.054***	58.990	0.054***
fin_inc	13.150	0.286***	58.815	0.286***
est_inc	13.348	0.054***	59.006	0.055***
other_inc	13.337	0.050***	58.993	0.050***
tot_inc	-13.340	0.052***	-58.997	0.053***
Constant	-6.040	0.552***	-5.977	0.564***
# Observations	14,319		13,769	
# Households	4,178		4,075	
Log Likelihood	-358.03		-326.36	

* p<.10 ** p<.05 *** p<.01
Notes: (1) debt variables are measured as the amount of outstanding debt. (2) debt variables are measured as debt-to-income ratios.