Macroeconomic Conditions and Marital Dissolution

Judith K. Hellerstein and Melinda Sandler Morrill*

March 2011

Preliminary and Incomplete Draft

Please do not cite or circulate

Consistent with anecdotal accounts from the recent "Great Recession", new research using vital statistics data has concluded that aggregate divorce rates fall in economic downturns. In this paper we use individual-level retrospective marriage histories reported by women in three panels of the Survey of Income and Program Participation to explore this finding further by examining whether marital dissolution is differentially sensitive to business cycles across subgroups of the population. We focus primarily on separation rather than divorce, although our qualitative results are consistent across both definitions of marital dissolution. As in previous work using vital statistics, we utilize state-level variation in unemployment rates to proxy for local macroeconomic conditions. We find that separation rates decline as the unemployment rate rises—that is, that marital separations are pro-cyclical. This result is robust to alternative specifications and to adding a host of individual-level demographic characteristics, including controls for marriage duration and economic conditions in the year of marriage.

There has been widespread interest in the consequences of this latest economic recession in the United States on marital stability. In fact, researchers going at least as far back as the 1920s have speculated that divorce rates might decline in times of economic recession. Given this long history, it is surprising that there are only a few formal empirical studies on whether

---

* Hellerstein: University of Maryland, Department of Economics and MPRC, and NBER, hellerst@econ.umd.edu; Morrill: North Carolina State University, Department of Economics, melinda_morrill@ncsu.edu. We are grateful for the research assistance of Ben Zou and Evan Rogers. We thank seminar participants at the 2010 AEA meetings, Elon University, and the University of Chicago Population Research Center for useful comments. This research was funded by NIH grant number 1R03AG037161-01A1.

such a link exists. Three very recent papers use variation in state-level unemployment rates and aggregate state-level divorce rate data from the Vital Statistics and conclude that divorce is pro-cyclical (Amato and Beattie, 2011, Hellerstein and Morrill, 2010, and Schaller, 2010). In this paper, we conduct an empirical examination of the impact of macroeconomic conditions on marital dissolution using individual-level retrospective marital histories of women in the 1996, 2001, and 2004 panels of Survey of Income and Program Participation (SIPP). Our empirical specifications are chosen to match those of the previous research using aggregate vital statistics data, but we exploit the richness of the individual-level data to explore the robustness of the result to the inclusion of family-level demographic characteristics and consider the results disaggregated by various demographic groups.

Unlike prior research using vital statistics data, but consistent with much of the previous work on marital dissolution that uses individual-level data from the SIPP and other data sets, we focus mostly on separation rather than divorce, although our qualitative results are robust across the two definitions of marital dissolution. Also consistent with much of the previous work with individual-level data, we report results for a sample that is restricted to newer marriages (fewer than 10 years in duration) that are more proximate to the interview data (within 10 years of the interview date). We do this in order to minimize recall bias, to focus most on marriages that are most at risk of divorce, and to allow us to consider economic conditions at the time of marriage as a potential confounder to our results.

I. The Relationship Between Macroeconomic Conditions and Divorce

In addition to the small number of studies that examine the impact of macroeconomic conditions on divorce, there is also evidence focusing on the effects of individual-level or family-

level employment shocks on marital stability.[1] Although there is no consensus on the magnitude of the effect, if any, of an adverse individual-level economic shock on marital dissolution, there is no evidence to our knowledge suggesting that an individual-level adverse employment shock (such as job loss) *reduces* the risk of marital dissolution. But if high unemployment is simply the aggregation of many job losses, we would anticipate a counter-cyclical or a-cyclical divorce rate, especially when the unemployment rate is used as the proxy for the state of the local economy. The fact that the recent evidence using state-level data finds that divorce rates in the aggregate are pro-cyclical, either the mechanisms for how high unemployment rates affect marital stability are different than those from individual employment shocks, or else there are large inconsistencies in the way the patterns of marital dissolution manifest in state-level versus individual-level data as used for these analyses.[2] In this paper we use individual-level data and construct our sample in ways similar to that of other individual-level studies of marital dissolution, but we use empirical specifications that mimic those of the results using state-level

---

[1] Weiss and Willis (1997) use data from the National Longitudinal Study of the High School Class of 1972 and show that a rise in the husband's earnings is stabilizing to marriage while a rise in the wife's earnings is destabilizing. Charles and Stephens (2004) use a similar framework and, using the Panel Study of Income Dynamics, report that divorce rates rise in response to a husband being laid off from a job, but not as a result of job loss due to disability or plant closing. In contrast, Singleton (2009) finds using the Survey of Income Program and Participation that disability of a husband increases the probability of divorce, particularly in the case of young men.

[2] There are three studies of which we are aware that do not conclude that divorce rates are procyclical. Two of these, Fischer and Liefbroer (2006), which is an analysis of the Netherlands, and South (1985), which is an older study in the United States, both use only time-series data. The applicability of these two studies is limited, since using a single time-series likely confounds secular changes in both divorce rates and macroeconomic conditions. The third paper, Arkes and Shen (2010), uses individual-level data from the 1979 NLSY and state-level variation in local economic conditions over time. The NLSY is a much smaller dataset than the SIPP and represents information from one cohort over a limited number of business cycles. Arkes and Shen find no evidence that divorce is pro-cyclical.

data. In that sense our results can help distinguish between these two possible explanations for why the sets of previous studies differ.

Although one can imagine many ways in which macroeconomic conditions affect families, we present four groups of potential mechanisms that we believe are the most likely avenues through which the unemployment rate influences a couple's risk of marital dissolution. The first mechanism by which the business cycle might matter is via market imperfections in borrowing. The process of dissolving a marriage is a costly endeavor. Not only must a couple pay the direct cost of legal fees, but maintaining separate households may be prohibitively expensive during economic downturns. Moreover, in the recent "Great Recession", much attention has been paid to the devaluation of large, illiquid assets, such as houses, which may be more difficult to divest of in a housing bust. While pure wealth effects (or liquidity constraints) would suggest that the most financially insecure couples would need to postpone divorcing in a recession, the devaluation of large illiquid assets mechanism should only affect those most likely to own assets, such as homes.[3]

A second channel through which economic conditions might influence a couple's choice to divorce is through the strength of a woman's economic options outside of marriage. If a couple has chosen to specialize, so that the woman has left the labor market or decreased her labor market attachment, the couple might choose to wait to divorce until the woman has secured a job and her own economic viability. During a period of high unemployment it may be more difficult for a woman who was not previously working to find a job, and hence the couple would be forced to postpone separating. In this case we would anticipate seeing that couples where the woman was less attached to the labor market would be more sensitive to the business cycle. It might also be the case that a woman believes her potential alimony payments (or even

[3] In the popular press, Leland (2008) and Johnson (2008) present anecdotal evidence suggesting that a weak housing market forces some couples to postpone or forgo divorcing.

child support) would be lower if they were calculated at a time when the husband's future earnings potential looked less optimistic.

Weiss and Willis (1997) argue that a husband's job loss provides the wife with new information about the "quality" of her husband, i.e., his future earnings potential. In a Becker-style model of divorce, she lowers her expectation of future utility within the marriage upon her husband's job loss and thus may choose to divorce. Consistent with this story, it may be the case that when a man loses his job during a period of high unemployment, his job loss is less informative as a signal of his quality and future earnings potential compared to when a man loses his job in a period of low unemployment, where few others are losing their jobs. Therefore, when a man loses his job during an economic downturn, the woman would not revise her expectations about the future as much, and the couple would not divorce. Alternatively, if economic booms lead to increased labor market participation of women, women may get better signals of the benefits to them of two important options outside of marriage: their earnings capacity and their potential to find a new spouse (perhaps in the workplace--as in McKinnish, 2004).[4]

Finally, it may be that marriages that form during a boom are more (or less) stable, and that the relationship between the business cycle and divorce rate is just a lagged reflection of changes in the composition of marriages, and so what appears to be the causal effects of the business cycle on marital dissolution is actually a spurious effect. A similarly spurious relationship could be generated if fertility is sensitive to the business cycle, and if having young children in the house changes the probability of separation a few years later.

---

[4] South and Lloyd (1995) similarly document that more appealing spousal alternatives in a local marriage market are associated with higher divorce rates.

II. Data

To create the sample for this study, we utilize the Marital History Topical Module of the Survey of Income and Program Participation (SIPP). The topical module was conducted in Wave 2 of the surveys every year from 1986-2004.[5] For our initial analysis described below, we use data from survey years 1996, 2001, and 2004. Future work may incorporate more survey years prior to 1996. The marriage data is retrospective. In the current survey year, the respondent is asked about her most recent, first, and second marriages. Thus, we do not have complete histories for those with four or more marriages. For example, we do not have any data on the third marriage for those with four or more marriages. Respondents in the SIPP are both male and female, so we could theoretically have used the marital histories provided by both men and women to construct our sample, but we have chosen to construct a sample using only female respondents. When examining the retrospective reports of marriage histories from male respondents, we found that they did not accord well with aggregate data, something we attribute to greater recall issues for men.[6]

In order to create our main regression sample, we restrict to our attention to marriages that are either still intact or that ended in separation (whether or not followed by divorce). We excluded any marriage that ended in widowhood.[7] We then expand the sample so that for each

---

[5] In earlier years of the SIPP, the Marital History Topical Module was also collected but in later waves.

[6] Martin (2006) also documents that the female respondent retrospective marital histories in the 1996 and 2001 SIPP match closely with other commonly used data sets. He limits his sample to exclude men, citing the fact that men report fewer marital dissolutions than women, particularly at very long (more than fifteen years) and short (less than three years) durations.

[7] Note that we would not observe a marriage if the woman had died before the survey year, so in effect this only excludes marriages where the man predeceased his wife.

marriage we have one observation for every marriage by calendar year.[8] Consistent with much previous work using retrospective marital histories (e.g., Sweeney and Phillips, 2004), we then impose versions of both right and left censoring on our marriage-year observations. First, we impose right censoring so that we keep only marriage-year observations where the couple has been in the marriage for up to ten years. Most divorces happen in the first ten full years of marriage, so this restriction focuses our attention on the most "at risk" marriages. Then, we left-censor the data to restrict the sample to marriage-year observations where the respondents are contributing retrospective information about whether or not their marriage ended in separation for years that are no more than 10 years prior to the survey date. Thus, respondents are recalling information about whether or not their marriage ended in separation for years no earlier than 1986. In practice, these two restrictions together mean that women respondents in the 1996 (2001, 2004) SIPP panel report information about their marriages that began no earlier than 1976 (1981, 1984), and contribute marriage-year observations on those marriages for years only as far back as 1986 (1991, 1994). Restricting the retrospective history in this way helps mitigate potential recall bias for marriages that ended long before the survey year, which is especially important to us given that we are trying to pin down the timing between the existing economic conditions in the year a marriage ends. In addition, as we explain further below, our proxy for local economic conditions is the state-by-year unemployment rate in the woman's state of residence, a series which began in 1976. We note, however, that while these sample restrictions accord with other studies that use retrospective marital histories, they definitely do

[8] Future versions will change the definition from calendar year to year of marriage. We will then use the monthly unemployment rates to calculate the unemployment rate over the past 12 months rather than the current calendar year. This should improve the precision of our estimates. We anticipate that it will also correct the low separation rate for those who have been married less than one year, since those couples have not been "exposed" to the risk of divorce for a full year.

not provide us with a sample of marriages in each year that mimic the national universe of married women in that year.

In order to match the information in the SIPP to state-level data on unemployment rates in a given year, for each woman in the sample, we must calculate her state of residence in each year of marriage by using information in the Migration History Topical Module, also conducted in Wave 2. We observe a woman's current home state, the year she moved into the state, her previous home state, and the year she moved into her previous home. We drop from the sample those marriage-year observations with missing state information or inconsistencies between different migration variables, approximately 6 percent of the sample.

To approximate local economic conditions, as in Hellerstein and Morrill (2010), we utilize the local area unemployment statistics (LAUS) series produced by the Bureau of Labor Statistics, which provides state-by-year measures of the unemployment rate from 1976 onwards.[9] We chose to focus on the unemployment rate as the measure of macroeconomic conditions for two main reasons. First, the state-level unemployment rate series uses a consistent and well-documented methodology.[10] Second, the unemployment rate represents an aggregation of individuals who have lost their jobs. Because previous literature on individual households suggests that job loss at the household level raises divorce, it is especially salient to consider an aggregate measure of these household job losses. We merge the relevant state-specific yearly unemployment rate to each marriage-year observation in our sample.

---

[9] This data series is available at: http://www.bls.gov/lau/rdscnp16.htm [accessed November 8, 2009].

[10] Note that data on unemployment rates is available for years prior to 1976, but is not collected in as a consistent and reliable way. For example, prior to 1970, state-level unemployment rates were constructed by each state individually without a standardized methodology across states. They were simply compiled by the Federal Government in various reports (personal communication with BLS employee Brian Hannon, February, 2009).

Table 1 provides a summary of our main regression sample. As shown in Part A of Table 1, the data consists of 32,461 marriages, with 15.06 percent ending in separation prior to censoring (i.e., before the tenth year of marriage or the time of the survey). Eighty-six percent of the women in the sample are white and 27 percent have at least a college degree. The average age of the women at marriage was 27.59 years, and nearly three-quarters of marriages in the sample were first marriages. As shown in Part B of Table 1, when these data are expanded to a panel of marriage-year observations we have 181,116 marriage-year observations. A couple's risk of separating in a given year is 2.70 percent.[11] In Table 1B we also report the separation rate for different subsets of the total sample as distinguished by educational attainment, race, duration of marriage, marriage order, and age at marriage.[12]

---

[11] To put this number in context, data from the Vital Statistics of the United States from 1986-1995 reports an average of 20.69 divorces per 1,000 married women annually (National Center for Health Statistics, 2006). Note that this number should be slightly higher than for our sample, since the divorce rate continued to decline from 1996 through 2003. However, recall that we are only considering marriages of durations ten years or less, so our sample of marriages will be less stable than average. In our sample, 2.70 percent separate in a given year, implying 27 separations per 1,000 married women. As shown below, when we consider divorce rather than separation as the outcome, we find that 1.97 percent divorce in a given year, implying a slightly lower 19.7 divorces per 1000 married woman. We therefore conclude that our fraction of marriages dissolving in a given year is roughly consistent with what we would expect from the Vital Statistics data series.

[12] Of course there are other potentially important demographic characteristics that may be related to the risk of martial dissolution, and more importantly, may lead to heterogeneous responses of marital dissolution to economic shocks. These include the work history and fertility of the couple in the marriage. After extensive checking, we do not feel confident that the retrospective nature of the SIPP data allows us to construct precise enough measures of either of these (potentially endogenous) characteristics to conduct analysis with these data.

III. Methods and Results from Individual-Level Data

We seek first to model whether the pattern of pro-cyclical divorce, found in Amato and Beattie (2011), Hellerstein and Morrill (2010) and Schaller (2010) using state-level aggregate data on divorce rates by year from official vital statistics, can be found in individual-level, retrospective survey data. In contrast to the vital statistics data, however, which measure divorce rates as of the year of the granting of divorce, in the individual data from the SIPP we use as an outcome whether a woman's marriage ended in separation in a particular year. This follows much of the previous work on determinants of marital dissolution that use individual level data. In addition, given our question of interest, separation is likely a more salient measure of marital dissolution that may be responsive to business cycles since the time between separation and divorce can be lengthy.[13] We present a sensitivity test using divorce as the outcome of interest and results look strikingly similar.[14] We run a linear probability regression of an individual couple's probability of separating in a given year on state, year, and SIPP panel fixed effects, the state-specific unemployment rate in year t, and a host of marriage-specific and individual-specific covariates. The regression takes the form:

$$\Pr(Dissolution_{st}=1) = \gamma_s + \mu_t + \eta_p + \alpha * urate_{st} + \beta * X_{ist} + \varepsilon_{ist},$$

[13] According to a Census Bureau Report, Kreider and Fields (2001), in 1996 the average duration between first separation and first divorce for couples who eventually divorced was 0.8 years, [accessed at http://www.census.gov/prod/2002pubs/p70-80.pdf, October 2010].

[14] Note that future versions of this paper will explore using a slightly different calculation of time, which may increase the precision of estimates and reduce the concern over timing. Currently we measure marriages over calendar years, so a couple's marriage duration is zero in the year in which married, one in the following year, etc. The unemployment rate used is that in the current calendar year. In future versions we intend to measure time as beginning in the month and year of marriage, so a couple's duration of marriage is zero for the first twelve months of the marriage. Then we will use the state-specific monthly unemployment rates to calculate the average unemployment rate over the twelve month period of interest.

Where *Dissolution* is a dummy variable for whether a separation (or divorce in some specifications) occurred for individual *i*'s marriage in state *s* in year *t*, γ_s is a dummy variable for state *s*, μ_t is a dummy variable for year *t*, η_p is a dummy variable if the observation comes from SIPP panel *p*, *urate* is the unemployment rate in state *s* in year *t*, *X* is a vector of time-varying family demographic characteristics, and ε is an error term. Note that *i* indexes a marriage, not an individual, as multiple marriages are included in the data, consistent with the aggregate vital statistics data. We cluster the standard errors by state of residence in year *t*.

Table 2 presents the baseline results from this model using the sample of marriage-years from the pooled SIPP data.[15] The first column includes only state, year, and panel fixed effects in addition to the state-level unemployment rate. The estimated coefficient on the unemployment rate is -0.010 with a standard error of 0.042—that is, a pro-cyclical effect. Column (2) of Table 2 adds a series of dummy variables for the parity of the marriage (first marriage is omitted), the woman's age at the time of marriage (age 25-34 is omitted), race (white is omitted), and education (less than a college degree is omitted). The estimated coefficient on the state-level unemployment rate is statistically significant and nearly identical to that in Column (1).

Table 2, Column (3) is our preferred specification.[16] Here, in addition to the covariates in the previous column, we include in the model marriage duration as of time *t*, broken into

[15] Table 2 presents estimates from a linear probability model. Results from probit and logit models yield very similar results.

[16] Hellerstein and Morrill (2010), examining state-level divorce rates from 1976-1998 also include state-by-year linear time trends. Here, including state-by-year linear time trends led to the same qualitative results we report below, but the effects were smaller and less precise than when they were excluded. We believe this is due to the fact that we simply do not have enough variation in unemployment rates across states and years here given the sample sizes to detect effects, but we will explore this more fully in a later version of the paper.

bins, with durations of 8-10 years being the omitted category. The estimated coefficient on the unemployment rate is again very similar to that of Column (1) and implies that 1 percentage point rise in the local unemployment rate is associated with a 0.099 percentage point drop in the probability of separation. This represents a roughly 3.7 percent increase in the risk of separation off of a mean separation rate of 2.70 percent in a given year.[17]

The coefficients on the other variables in the model are consistent with prior findings on the risk factors for marital instability. We find that higher order marriages are less stable relative to first marriages, while women who marry at older ages have more stable marriages. Women marrying before age 20 have almost a 2 percentage point higher risk of separating in a given year relative to those who marry at ages between 25 and 34. Relative to white women, marriages of black women are also 2 percentage points more likely to end in separation in a given year, and we see that women with a college degree are 1.1 percentage points less likely to separate in a given year.[18] Finally, we see that, consistent with prior literature, short duration marriages are the most fragile. As currently specified, marriages in their 0th year have not been exposed to the risk of divorce for a full year, so we expect that these are much less likely to end in divorce by construction.

---

[17] We note that the magnitude of this effect is considerably larger than the estimated relationship found in Hellerstein and Morrill (2010) using aggregate divorce rates, which was an approximately 1 percent increase in the divorce rate due to a 1 percentage point increase in the unemployment rate. The larger effect reported here relative to the aggregate data is not surprising given that we are restricting the sample to later time periods (Hellerstein and Morrill document that the effect is slightly larger in later years) and to separations by the tenth year of marriage, which are more frequent. Note that in Column (4) of Table 2 we use divorce as the outcome instead of separation. The point estimate on unemployment, while imprecise, still suggests a larger effect. Below we test whether shorter duration marriages are more sensitive to the business cycle.

[18] Note that college degree is measured at the time of the survey. Although it seems unlikely, it may be the case that women obtain more education either just prior to or subsequent to divorcing, which we cannot accurately capture in our data.

Finally, the last column of Table 2 uses a sample where divorce is the outcome of interest. The estimated coefficient here is -0.069 and is only marginally statistically significant, but interestingly it is of similar magnitude in percentage terms to that found using separations as the outcome. This estimate implies that a 1 percentage point rise in the unemployment rate is associated with a fall in the probability of divorcing of 0.069 percent, or approximately 3.5 percent of the sample mean. The estimated coefficients on the various coefficients in the model are quite similar when using divorce rather than separation as the outcome, with the notable exception of the estimated coefficient on the indicator for the woman being black, which is five times smaller when the outcome is divorce. This is likely not surprising to the extent that there is evidence that blacks are more likely to end a marriage in a permanent separation rather than a divorce, or to delay divorce much longer than whites.[19]

One potential mechanism through which the unemployment rate might affect the divorce rate is a change in the composition of who is marrying. If marriages that occur during a period of economic boom are inherently going to be less (or more) stable, then the estimated coefficient on the current unemployment rate could be a lagged reflection of the economic conditions at marriage. To test this directly, in Table 3 we report results where we include in the model controls for economic conditions at the time of marriage. Table 3, Column (1) reproduces the preferred specification from Table 2, Column (3). In Column (2) we add a control for the state-specific unemployment rate in the year and state of marriage. The estimated coefficient on this variable is small and statistically significant, and importantly, the estimated coefficient on the contemporaneous state-level unemployment rate in the current year does not change at all. In the final column of Table 3 we include both the state-specific unemployment rate in the year

[19] See, e.g. Teachman, et al. (1999) and Raley and Bumpass (2003),

of marriage and marriage year fixed effects. We still find no change in the estimated impact of contemporaneous unemployment on separation.

In Table 4 we explore the heterogeneity in the sensitivity of the probability of separation to the unemployment rate. As discussed in Section II, although we cannot directly test the mechanisms through which high unemployment rates might stabilize marriages, we can learn something by considering what types of couples are most or least affected.

Column (1) of Table 4 reproduces the preferred specification reported in Table 2, Column (3). The second column of Table 4 includes an interaction for whether the woman had at least a college degree. The estimated coefficient on the unemployment rate is therefore estimating the relationship between the unemployment rate and probability of separating for women who have less education than a college degree. This coefficient is -0.121, about 20 percent larger than the average effect in Column 1. The estimated coefficient is highly statistically significant and demonstrates clearly a strong pro-cyclical pattern to marital separation. The point estimate on the interaction between the unemployment rate and the indicator for a college degree is large and positive (0.086), and is marginally statistically significant (standard error of 0.045). Taken at face value, this suggests that marital dissolution for college educated women is far less sensitive to the business cycle. Indeed, the overall impact of a one percentage point increase in the unemployment rate on the separation probability for college educated women is estimated to be only a 0.036 percentage point decrease in the unemployment rate (-0.121+0.086), which is both small in magnitude and is not itself statistically significantly different from zero (it has an estimated standard error of 0.044). The fact that separation is more sensitive pro-cyclically to the business cycle for less educated women and their spouses is consistent with the possibility that, because these couples are likely to be more liquidity constrained, they may choose to postpone incurring the costs of separation during economic downturns. However, given that labor market outcomes of less-educated

individuals are more sensitive in general to business cycle fluctuations,[20] this finding is also consistent with other underlying mechanisms by which economic fluctuations affect marital dissolution pro-cyclically.

The third column of Table 4 explores heterogeneity in the relationship of the unemployment rate and separation rate by race. The point estimate of the effect of the unemployment rate for whites is -0.112 which is a bit larger than in the full sample, and is statistically significant. Although we do estimate a qualitatively large positive coefficient of 0.064 on the interaction between the unemployment rate and an indicator for the woman being black, it is imprecisely estimated. Thus we cannot definitively conclude that there is a differential effect between blacks and whites. Blacks comprise fewer than 10 percent of our sample, so perhaps it is not surprising that we cannot detect a separate effect for these women, although we do estimate precisely and robustly their higher overall separation rate.

Table 4, Column (4) presents estimated coefficients from a model where we interact the unemployment rate with an indicator for whether the marriage is very recent, happening less than two years before the year of the observation, *t*. The estimated coefficient on the main effect of the unemployment rate is -0.124, which is statistically significant and larger in absolute value than in Column 1. The estimated coefficient on the interaction term for the unemployment rate and durations less than two years is 0.130, which is opposite the sign of the main effect but almost of the same magnitude and just on the edge of statistical significance at conventional levels (the p-value is 0.051). This then suggests that the shortest duration marriages are not affected by the business cycle.[21]

---

[20] See, e.g. Hoynes (2000).

[21] Note that in results not shown, when we disaggregate marriage durations of greater than two years more finely, we find a very small and statistically insignificant difference in the estimated relationship

When we disaggregate the sample by the parity of the marriage, we find point estimates implying that higher order marriages may be more sensitive to the business cycle. However, when we disaggregate the data in this way, neither the baseline coefficient nor the coefficient on the interaction of the unemployment rate with an indicator for second or higher order marriages are statistically significant, as shown in Table 4, Column (5), and so this result is at best just suggestive. Finally, the Column (6) of Table 4 we explore how the woman's age at marriage is related to the cyclicality of the probability of separation. Here we include an interaction term between the unemployment rate and an indicator for the woman being age 16-19 in the year she was married. The estimated coefficient on the unemployment rate is still negative (-0.085) and statistically significant (standard error of 0.037). And although the point estimate on the interaction term (-0.103) is not statistically significant (p-value is 0.105), it is large and negative. This provides some suggestive evidence that women who are relatively young when they marry tend to be in marriages that are most sensitive to the business cycle.[22] By expanding the sample and refining the dating of time since marriage in future versions of this paper, we will potentially be able to estimate these responses more precisely. In addition, we may potentially detect differential effects at finer disaggregations of marriage duration, marriage order, and age at marriage.

---

between the unemployment rate and separation rate for marriage durations of 2-5 years versus 6-10 years (coefficient is -0.023 with a standard error of 0.051).

[22] In results not shown, when separate interaction terms are included for the unemployment rate with age at marriage of 20-24 and age at marriage of 35 and older, both estimated coefficients are small and negative and neither is close to statistically significant.

IV. Discussion and Conclusions

Recent work using aggregate divorce rates from the Vital Statistics data series to model how the prevalence of divorce varies over the business cycle finds a pro-cyclical relationship (Amato and Beattie, 2011, Hellerstein and Morrill, 2010, and Schaller, 2010). In contrast, using individual-level data from the PSID, Charles and Stephens (1994) suggest that when a man loses his job the couple faces an increased risk of divorce.

In this paper we document a strong and robust pro-cyclical pattern of marital separation using retrospective marital histories from individual-level data in the SIPP. This result is consistent with the results from the aggregate divorce statistics data, and therefore we find no evidence that there is something different about using aggregate divorce statistics rather than individual-level data.[23] Rather, our findings suggest that the mechanisms by which individual-level job loss affects families are different than how macroeconomic conditions influence marital stability.

Our main results indicate that a one percentage point rise in the unemployment rate is associated with a 0.10 percentage point decline in a couple's probability of separating in a given year, a roughly 3.5 percent drop. The estimates are robust to including additional covariates such as marriage duration, woman's education level, race, age at marriage, and marriage order. In addition, the results are robust to the inclusion of controls for economic conditions at the time of marriage, and thus are not being spuriously driven by lagged differences in the quality of marriages across the business cycle. When using divorce as an alternative outcome to

[23] We note again that Arkes and Shen (2010) do use individual-level data from the NLSY and do not find evidence of pro-cylical patterns of divorce. They do not examine separations. They use data from only one birth cohort and different model specifications, so it is not clear how their results compare with the results we find here.

separation, the magnitude of the relationship between dissolution and macroeconomic conditions is nearly identical, although less precisely estimated.

When disaggregating the impact across demographic groups, we find suggestive evidence that the pro-cyclical relationship between the unemployment rate and probability of separation is driven largely by women with less than a college education. We also find suggestive evidence that the separation rate is not influenced by the business cycle for marriages that are less than two years of duration and that women who were young (age 16 to 19) at the time of marriage are in marriages that are most sensitive to the business cycle. Our results are unable to detect heterogeneous effects by race or marriage order. In future versions we plan to incorporate more years of data and to model marriage-years rather than calendar years in order to achieve more precision and potentially detect heterogeneous effects for more disaggregated demographic groups.

References

Amato, Paul R., and Brett Beattie, (2011), "Does the unemployment rate affect the divorce rate? An analysis of state data 1960-2005," *Social Science Research*, forthcoming.

Amato, Paul R., and Stacy J. Rogers, (1997), "A Longitudinal Study of Marital Problems and Subsequent Divorce," *Journal of Marriage and the Family,* Vol. 59, No. 3, August 1997, pp. 612-624.

American Academy of Matrimonial Lawyers, (2008), "Divorces Drop in Economics Downturn Say Nation's Top Divorce Lawyers," *Press Release, AAML,* November 17, 2008.

Arkes, Jeremy, and Yu-Chu Shen, (2010), "For better or worse, but how about a recession?" *NBER Working Paper* 16525, November 2010.

Becker, Gary S., (1981), *A Treatise on the Family.* Cambridge, MA: Harvard University Press.

Ben-Porath, Yoram, (1973), "Short-term Fluctuations in Fertility and Economic Activity in Israel," *Demography,* Vol. 10, No. 2, pp. 185-204.

Brien, Michael J., Lillard, Lee A., and Steven Stern, (2006), "Cohabitation, Marriage, and Divorce in a Model of Match Quality," *International Economic Review,* Vol. 47, No. 2, May 2006.

Charles, Kerwin Kofi, and Melvin Stephens, Jr., (2004), "Job Displacement, Disability, and Divorce." *Journal of Labor Economics,* vol. 22, no.2, 489 – 522.

Cherlin, Andrew J., (2009), "Married With Bankruptcy," *New York Times,* May 29, 2009.

Cherlin, Andrew J., (1981), *Marriage, Divorce, Remarriage.* Cambridge, MA: Harvard University Press.

Elder, G. H., Jr. (1999). Children of the Great Depression: Social change in life experience. Boulder, CO: Westview Press.

Fischer, Tamar, and Aart C. Liefbroer, (2006), "For Richer, for Poorer: The Impact of Macroeconomic Conditions on the Union Dissolution Rates in the Netherlands 1972-1996." *European Sociological Review,* Vol. 22, No. 5, December 2006, 519-532.

Glick, Paul C., and Sung-Ling Lin, (1986), "Recent Changes in Divorce and Remarriage," *Journal of Marriage and the Family,* Vol. 48, (November 1986), pp. 737=747.

Hellerstein, Judith K., and Melinda S. Morrill, (2010), "Booms, Busts, and Divorce," *Working Paper,* North Carolina State University, January 2010.

Hoynes, Hilary, (2000), "The Employment and Earnings of Less Skilled Workers Over the Business Cycle," *Finding Jobs: Work and Welfare Reform*, eds. Rebecca Blank and David Card, Russell Sage Foundation: New York, pp. 23-71.

Jalovaara, Marika, (2003), "The Joint Effects of Marriage Partners' Socioeconomic Positions on the Risk of Divorce," Demography, Vol. 40, No. 1, (February 2003), pp. 67-81.

Johnson, Alex, (2008), "Wanting to Divorce, But Unable to Afford It." *MSNBC.com,* November 23, 2008 [accessed December 22, 2008].

Kreider, Rose M. and Jason M. Fields, (2001), "Number, Timing, and Duration of Marriages and Divorces: Fall 1996." Current Population Reports, P70-80. U.S. Census Bureau, Washington, DC

Leland, John, (2008), "Breaking Up Is Harder to Do After Housing Fall," *New York Times*, December 29, 2008.

Martin, Steven P., (2006), "Trends in Marital Dissolution by Women's Education in the United States," *Demographic Research,* Vol. 15(20), pp. 537-560.

National Center for Health Statistics, (2006), "Vital Statistics of the US: Part A: Population," *Historical Statistics of the United States*, Millennial Edition, Volume 1, Cambridge UP, pp. 1688-1689.

Ogburn, William F. and Dorothy S. Thomas, (1922), "The Influence of the Business Cycle on Certain Social Conditions," *Journal of the American Statistical Association,* 18: 324-340.

Raley, R. Kelly, and Larry Bumpass, (2003) "The topography of the divorce plateau: Levels and trends in union stability in the United States after 1980," *Demographic Research*, 8: pp. 245-260.

Ruggles, Steven, (1997), "The Rise of Divorce and Separation in the United States, 1880-1990," *Demography*, Vol. 34- No. 4, (Nov. 1997), pp. 455-466.

Ruhm, Christopher J. , (2000), "Are Recessions Good for Your Health?" The Quarterly Journal of Economics, Vol. 115, No. 2 (May, 2000), pp. 617-650.

Schaller, Jessamyn, (2010), "For Richer, if not for Poorer? Marriage and Divorce over the Business Cycle," Unpublished manuscript, University of California, Davis, December 2010.

Singleton, Perry, (2009), "Insult to Injury: Disability, Earnings, and Divorce," *Working Paper,* August 2009.

South, Scott J., and Kim M. Lloyd, (1995), "Spousal Alternatives and Marital Dissolution," *American Sociological Review,* Vol. 60, (February 1995), pp. 21-35.

South, Scott J., (1985), "Economic Conditions and the Divorce Rate: A Time-series Analysis of the Postwar United States." *Journal of Marriage and the Family,* February 1985, pp. 31-41.

Stevenson, Betsey, and Justin Wolfers, (2007), "Marriage and Divorce: Changes and their Driving Forces." *Journal of Economic Perspectives,* Vol. 21 (2), Spring 2007, 27-52.

Teachman, Jay D., Karen A. Polonko, and John Scanzoni, (1999), "Demography and Families," in *Handbook of Marriage and the Family*, eds. Marvin B. Sussman, Suzanne K. Steinmetz, Gary W. Peterson, New York: Plenum Press.

Tapia Granados, José A (2005),"Increasing mortality during the expansions of the US economy, 1900–1996," International Journal of Epidemiology 2005;34:1194–1202.

Thorton, Arland and Linda Young-DeMarco, (2001), "Four Decades of Trends in Attitudes Toward Family Issues in the United States: The 1960s Through the 1990s." *Journal of Marriage and Family,* Vol. 63, No. 4, pp. 1009-1037.

Weiss, Yoram, and Robert J. Willis, (1997), "Match Quality, New Information, and Marital Dissolution." *Journal of Labor Economics,* 1997, Vol. 15, no. 1, pt. 2, S293 – S329.

White, Lynn K., (1990), "Determinants of Divorce: A Review of Research in the Eighties." *Journal of Marriage and the Family,* Vol. 52, No. 4, 904-912.

Wolfers, Justin, (2009), "Divorce and the Business Cycle," *New York Times,* April 10, 2009.

Xu, Xin, and Robert Kaestner, (2010), "The Business Cycle and Health Behaviors," *NBER Working Paper* 15737, February 2010.

Vinokur, A. D., Price, R. H., & Caplan, R. D., (1996). "Hard times and hurtful partners: How financial strain affects depression and relationship satisfaction of unemployed persons and their spouses." Journal of Personality and Social Psychology, 71, 166–179.

Table 1A: Sample Descriptive Statistics -- Marriages

Marriages 1976-2003		
Sample Size		32,461
Percent ending in separation		15.06%
Race:	White	85.85%
	Black	8.56%
	Other	5.69%
Woman's Education Level	College Degree	26.87%
Average Age at Marriage		27.59
Marriage Order	1st	71.31%
	2nd	23.21%
	3rd	4.30%
	4th or higher	1.18%

Table 1B: Sample Descriptive Statistics -- Marriage-Years

	Marriage-Years (Regression Sample) Durations 10 Years or Less & Years 1986+		
		Sample Size	Percent ending in separation
Full Sample		181,116	2.70%
Education	No College Degree	130,765	3.14
	College Degree	50,351	1.55
Race	White	156,713	2.57
	Black	14,729	4.49
	Other Race	9,674	2.07
Duration	Duration 0-1 year	37,813	2.62
	Duration 2-5 years	69,337	3.17
	Duration 6-10 years	73,966	2.30
Marriage Order	1st Marriage	128,793	2.58
	2nd or Higher Marriage	52,323	2.99
Age at Marriage	Age 16-19 at Marriage	21,455	4.38
	Age 20-24 at Marriage	60,300	2.69
	Age 25-34 at Marriage	66,977	2.34
	Age 35+ at Marriage	32,384	2.34

Notes: Sample is pooled cross-sections from the 1996, 2001, and 2004 SIPP Panels, Wave 2.

Table 2: Baseline Individual-Level Results

	Year FE	+ Demo. Controls	+ Duration Controls	Divorce as Outcome
	(1)	(2)	(3)	(4)
Unemployment Rate	-0.100*	-0.104*	-0.099*	-0.069
	(0.042)	(0.042)	(0.041)	(0.036)
2nd Marriage		0.010**	0.011**	0.009**
		(0.001)	(0.001)	(0.001)
3rd Marriage		0.011**	0.011**	0.008**
		(0.002)	(0.002)	(0.002)
4th+ Marriage		0.027**	0.027**	0.018**
		(0.005)	(0.005)	(0.004)
Age 16-19 at Marriage		0.020**	0.021**	0.019**
		(0.002)	(0.002)	(0.002)
Age 20-24 at Marriage		0.006**	0.006**	0.006**
		(0.001)	(0.001)	(0.001)
Age 35+ at Marriage		-0.008**	-0.009**	-0.007**
		(0.001)	(0.001)	(0.001)
Black		0.021**	0.020**	0.004**
		(0.002)	(0.002)	(0.002)
Other Race		-0.003	-0.003	-0.002
		(0.001)	(0.001)	(0.001)
College Degree		-0.011**	-0.011**	-0.006**
		(0.001)	(0.001)	(0.001)
Duration 0-1 Years			-0.006**	-0.007**
			(0.002)	(0.001)
Duration 2-3 Years			0.013**	0.005**
			(0.002)	(0.001)
Duration 4-5 years			0.009**	0.006**
			(0.002)	(0.001)
Duration 6-7 Years			0.004**	0.003*
			(0.001)	(0.001)
N	181,116	181,116	181,116	186,207
Mean Divorce/ Separation Rate	2.70%	2.70%	2.70%	1.97%
Mean URate	5.72	5.72	5.72	5.72

Notes: Coefficients on unemployment rate are presented are in percentage point terms. All specifications include a constant term and state, panel, and year fixed effects. The omitted categories are 1st marriage, age 25-34 at marriage, white, and less education than college degree. Coefficients are from a LPM, the dependent variable is separating (Cols 1-3) or divorcing (Col 4) in the current year. Standard errors are in parentheses, clustered by state of residence. *sig. at 5% level, ** sig. at 1% level.

Table 3: Conditions at the Time of Marriage

	(1)	(2)	(3)
Unemployment Rate	-0.099* (0.041)	-0.099* (0.041)	-0.100* (0.041)
Unemployment Rate in the Year of Marriage		0.014 (0.037)	-0.378 (0.334)
Marriage Year Fixed Effects			X

Notes: Sample and baseline specification is that used in Table 2, Column 3. The sample size is 181,116 marriage-year observations, with a mean separation rate of 2.70%, a mean unemployment rate in the current year of 5.72, and a mean unemployment rate in the year of marriage of 6.52. All coefficients presented are in percentage point terms. All specifications include state, year, and panel fixed effects, a constant term, and dummy variables for duration, marriage order, age at marriage, race, and education. Coefficients are from a LPM, the dependent variable is separating in the current year. Standard errors are in parentheses, clustered by state of residence.

Table 4: Heterogeneity in Sensitivity to Unemployment Rates

	Baseline	X Educ	X Race	X Duration	Marriage Order	Age at Marriage
	(1)	(2)	(3)	(4)	(5)	(6)
Unemployment Rate	-0.099*	-0.121**	-0.112**	-0.124**	-0.081	-0.085*
	(0.041)	(0.045)	(0.041)	(0.046)	(0.045)	(0.037)
Unemployment Rate x						
College Degree		0.086				
		(0.045)				
Black			0.064			
			(0.108)			
Other Race			0.141			
			(0.108)			
Duration 0-1 year				0.130		
				(0.065)		
2^{nd} + Marriage					-0.069	
					(0.059)	
Age 16-19 at Marriage						-0.103
						(0.062)

Notes: See Table 3.