

Lucky in Life, Unlucky in Love?

The Effect of Random Income Shocks on Marriage and Divorce

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Abstract

Economists have long been interested in the extent to which economic resources affect decisions to marry and divorce. For married couples, an increase in resources can either provide a stabilization effect or, alternatively, can enable divorce by allowing the couple to overcome costs associated with divorce. Similarly, while economic theory predicts that an increase in income makes an unmarried person more attractive to potential marriage partners, it may also make single life more attractive. However, answering these questions empirically has been difficult due to a lack of exogenous income shocks. We overcome this problem by exploiting the randomness of the Florida Lottery and comparing recipients of large prizes to those of small prizes. Results indicate that while positive income shocks of \$25,000 to \$50,000 do not cause statistically significant or economically meaningful changes in divorce rates, single women are less likely to marry as a result of the additional income.

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1. Introduction

Economists and other social scientists have devoted significant effort at determining the relationship between economic resources and marital decisions. Interest began with work by Gary Becker (1981) on how income affects an individual's incentives to marry or divorce. More recently, researchers and policymakers have tried to determine whether income supports or tax credits for low-income households cause individuals to divorce or fail to marry, which many policymakers would regard as an unintended consequence.

There are several reasons why positive income shocks could affect marital decisions. For married couples, more generous cash transfers may have a stabilization effect and relax financial constraints and arguments that lead to divorce. Indeed, the income shocks received by individuals in this study—\$25,000 to \$50,000—are sufficiently large to pay off the majority of the unsecured debt (\$49,000) owed by the those who had earlier filed for bankruptcy (Hankins et al, 2009).

On the other hand, increased resources may enable unhappy couples to incur the costs associated with divorce.¹ Schramm (2006) estimates that legal fees incurred during divorce average \$7,000 while the additional housing cost averages just over \$4,000 per year.² The short-term costs associated with divorce may be especially important to the extent that couples are liquidity-constrained or behave as such due to risk-aversion.

¹ This theory has been popularized in the press. In an article entitled “Buy Low, Divorce High” published in the *New York Times* on August 12, 2007, one divorcee and beneficiary of the appreciation in the housing market is quoted as stating “Money is freedom... We made enough money to be able to get divorced and support two households.”

² Both the legal and housing cost estimates are for married couples with children; we were unable to document any other estimates of the average legal and housing costs associated with divorce. The estimate from Schramm (2006) on housing costs comes from Census reports on average housing costs reported for unmarried individuals. Consequently, it may understate the additional cost in the first year since moving to less expensive housing takes time and since the estimate ignores the actual moving costs.

Indeed, evidence consistent with widespread liquidity-constraints is reported by Laibson et al. (2001), who reports that at least 63 percent of U.S. households pay interest on credit card debt every month. In addition, other studies have shown how individuals do not smooth consumption as predicted by the permanent income hypothesis (Shapiro, 2005; Stephens, 2003). Finally, even the seemingly long-term costs of divorce such as the increased cost of supporting two households are more temporary than one might expect; Kreider (2006) reports that 50 percent of individuals who divorce remarry within 5 years, and more likely cohabit.

The theoretical effect of positive income shocks on marriage rates is also ambiguous. While simple economic models of marriage predict that an increase in resources will make single individuals more attractive as marriage partners, it also makes single life more attractive (Burstein, 2007; Moffitt, 1992). In addition, more resources may facilitate marriage due to sociocultural ideals for weddings or married life that require greater assets (Edin, 2000).

Determining the extent to which marriage and divorce are normal goods is difficult due to a lack of exogenous pure income shocks. Perhaps the most closely related research is that which examines the impact of men's or women's earnings on labor force participation (e.g., Hoffman and Duncan, 1995; Weiss and Willis, 1997). However, by design these estimates pick up the effect of income as well as reduced returns to specialization. Furthermore, as Johnson and Skinner (1986) point out, it is hard to determine if, for example, women work more hours in response to a higher expected probability of divorce or if women are more likely to divorce because they earn higher incomes. Similarly, it is difficult to believe that men in typical data sets who later receive

positive income shocks did so randomly rather than because of personal qualities such as loyalty or interpersonal skills. This is problematic given that these characteristics could themselves yield stronger marriages but are not observed by the econometrician. Finally, while perhaps the most promising variation in income came from the randomization of income guarantees in the Negative Income Tax experiments, methodological problems and the complexity of the experiments have made it difficult to determine what aspect of the experiments, if any, affected marital decision-making (e.g., Groenveld et al, 1980; Cain and Wissoker, 1990).

There is also a literature that examines the impact of income-changing life events on marital decisions. Bitler et al. (2004) and Hu (2003) found that reducing welfare benefits increases the likelihood of divorce, though given the nature of the policy it is impossible to distinguish the effect of the negative income shock from that of the increased work requirement. In addition, researchers have examined how job displacement and disability impact marital stability. However, in examining those effects Charles and Stephens (2004) argue that the information conveyed by the type of job displacement itself affects the likelihood of divorce. This highlights the difficulty in determining the effect of income *per se* on marital stability in the absence of truly exogenous shocks to income.

In order to distinguish the effect of pure income shocks on marriage and divorce from other confounding factors, we exploit the random variation in the magnitude of cash prizes won in state lotteries. In exploiting exogenous variation in income due to lottery winnings, our identification strategy is similar to that used by Imbens et al. (2001) and Lindahl (2005) to address the effect of income shocks on labor supply and consumption

and on health and mortality, respectively. To implement our research design, we link data on lottery winners from Miami-Dade and Palm Beach counties to marriage and divorce records. The crucial identifying assumption is that conditional on winning more than \$600 (the threshold at which the names of the winners are recorded) for the first time, the amount won is random. Tests support this identifying assumption: winners of \$25,000 to \$50,000 come from similar neighborhoods as those who win less than \$1,000, and perhaps more importantly, winners of large sums were no more or less likely to marry or divorce *before* winning the lottery than were (future) winners of small sums.

The primary advantage of this approach is that it allows us to identify the effect of income shocks on marital decisions without assuming that income shocks not predicted by observable characteristics are random. However, this approach does have limitations. First, while survey evidence suggests that approximately half of the adults in the US has played the state lottery in the previous year, there is an open question regarding the extent to which the divorce response of lottery players is representative of the response of the general public or of low-income individuals who may be affected by increased income supports. Second, it is possible that individuals may respond differently to the large cash transfers observed in our data than they would to smaller cash transfers over a longer period of time. Finally, we cannot address whether income shocks greater than \$50,000 would affect marital decisions, though we note that the size of this prize is nearly one year's income for the average household (\$45,300) and twice the per-capita income expected of single individuals (\$18,500) in our sample. Despite these limitations, we think that our approach will be informative regarding the effect of economic resources on marriage and divorce.

Results indicate that while large cash transfers do not induce married couples to divorce, they do induce singles—particularly women—to remain unmarried. Specifically, we find that the divorce rate of married recipients of \$25,000 to \$50,000 in the three years following the income shock is between one-half and one percentage point lower than that of recipients of \$1,000, which is small both in absolute terms and relative to the baseline 3-year divorce rate of 9.5 percent. Estimates also allow us to rule out large absolute positive effects of income shocks on divorce rates: even the upper bound of the 95 percent confidence interval implies that fewer than 1 in 50 married couples will divorce due to the positive income shock of \$25,000 to \$50,000.

However, we also find that single women are nearly 10 percentage points (40 percent) less likely to marry in the 5 years following the positive income shock. This suggests that while receiving \$25,000 to \$50,000 may not induce individuals to exit marriages, it may at least partially remove the incentive for single women to marry.

2. Data and Identification Strategy

To identify the effect of income shocks on marriage and divorce, we exploit the variation in income that is caused by the size of lottery prizes in Florida. Specifically, we obtained data on winners from two games: Florida Lotto and Fantasy 5. Florida Lotto allows players to choose 6 numbers or have the computer select a number for them, while Fantasy 5 is similar except that there are only 5 numbers. Both games are pari-mutuel games in which the amount won is determined by how many numbers the winner matched, the total amount spent on that drawing, and how many players won. For example, while very few Florida Lotto players matched 6 of 6 numbers and won the

average prize of \$6 million, players who matched 5 of 6 numbers won an average of \$4,200 though the prizes from some drawings were much larger.

Similarly, in Fantasy 5 players who matched 5 of 5 numbers prior to 2001 won an average of \$20,000, though again the actual amount varied widely depending on how many players won relative to how many played. After 2001, players who matched 5 of 5 numbers won an average of \$120,000 while players who matched 4 of 5 numbers *when no one matched 5 numbers* won an average of \$900. Finally, while it is possible for individuals to play up to 10 times on each card, an analysis of Fantasy 5 winners revealed that no winners had played the same 5 numbers multiple times on the same card. As a result, although some people are more likely to enter our data than others (i.e., those who play more frequently or who play multiple times on a card), conditional on winning \$600 the amount won is unaffected by the number of plays paid for on a given card. Rather, the identification strategy that we employ largely relies on the assumption that conditional on matching 5 of 6 numbers (Florida Lotto) or 5 of 5 numbers (Fantasy 5) for the first time, one's underlying propensity to marry or divorce is uncorrelated with how many winners there were relative to the number of players. As discussed later, an important advantage of this research design is that it is testable.

The data for the analysis of divorce include every lottery winner in Miami-Dade and Palm Beach counties from 1988 through 2004, during which there were 73,714 individuals who won up to \$50,000,³ while the data for the marriage analysis include only Miami-Dade County winners.⁴ These winners represent everyone who won at least \$600

³ We only examine winners of amounts up to \$50,000 because there were relatively few winners of more than \$50,000.

⁴ The data set for the analysis of marriage is smaller because we could not access electronic marriage records for Palm Beach County.

by playing either Florida Lotto or Fantasy 5,⁵ the minimum amount for which records were kept. For each lottery winner, we observe the individual's name and home zip code, the amount won (adjusted for inflation), the date of the drawing, and the lottery game played. Finally, we note that while we do not observe the marital status of lottery players at the time of winning, this will not be a problem so long as the magnitude of the cash prize is determined randomly. That is, there should be no more unmarried recipients of large cash prizes than there are of small cash prizes.⁶ However, as discussed later, the fact that not all lottery winners are married or single does change the interpretation of the marriage and divorce rates observed as well as the estimated impacts of winning \$25,000 to \$50,000.

Data on marriage and divorce come from the public records in Miami-Dade and Palm Beach counties in Florida, which is an equitable distribution state with respect to the division of marital assets.⁷ These data were linked to the lottery winner data on the basis of first and last name and county of residence. However, before doing so, efforts were made to reduce the number of false positive matches made due to common names. Toward that end, we excluded all names that appeared more than once in the 2007 county phone records. In addition, if lottery records indicated that an individual with a unique name from a given county won more than once, we then use only the first time that

⁵ The Florida Lottery has other games that we did not use because of insufficient variation in the magnitude of the cash prizes won.

⁶ To the extent that income shocks affect marriage or divorce decisions in the short term, this may not be true in the longer term. For example, if positive cash shocks induce married couples to divorce, we may well expect higher marriage rates (per lottery player) for that group in the longer term as individuals remarry. However, since we only examine divorce rates up to 3 years afterward and find no effect, we are less concerned that our marriage estimates would be biased.

⁷ This means that in the absence of other considerations such as children, etc., a prize received by one spouse should be split equally. Consistent with this law, we find little differences in the effects based on whether the recipient was male or female, which we inferred from the winner's name using empirical probability distributions provided by David Figlio.

individual won.⁸ Importantly, this also means that our identifying assumption is that conditional on winning more than \$600 *for the first time*, the amount won is random. We emphasize this because although whether an individual *ever* wins a large prize clearly depends on frequency of play, the magnitude of the *first* prize won does not.

As shown in Tables A1 and A2 in the appendix, eliminating individuals with common names leaves 32,798 lottery winners for the divorce analysis and 24,797 winners for the marriage analysis. The neighborhood (zip code) median family income averaged \$45,300 for the individuals in the divorce data set, which is approximately the same as the median family income of \$44,752 for all Miami-Dade and Palm Beach county residents. The winners came from neighborhoods that reported being 42 percent of Hispanic origin and 19 percent black. These lottery winners were then linked to divorce (marriage) records filed in their respective county in the 3 (5) years prior to and the 3 (5) years after winning.⁹ This was performed via an automated search of each winner's first and last name on the Miami-Dade County and Palm Beach County Clerk of the Court websites.¹⁰

The results are shown in Table 1. Of the 32,798 winners, 1,696 (5.45%) were linked to a divorce case within 3 years after winning the lottery. For the marriage analysis, 12.85 percent of recipients were linked to a marriage license in the 5 years after winning. Furthermore, as shown in Table 1, the proportion of divorces appears to be

⁸ Results are unchanged when these individuals are excluded from the analysis.

⁹ Importantly, the indicator used for marriage was the marriage license itself, which is typically obtained no more than one week prior to the wedding itself.

¹⁰ In the cases where an individual was linked to more than one marriage or divorce in the three years after winning (which is true for 7.3% of the individuals matched to at least one divorce after winning the lottery), the "average" divorce date was used since it was unclear if the individual divorced more than once or if multiple people with the same name divorced. For example, if one divorce case was filed on January 1, 2000 and the other was filed on January 1, 2002, that individual was assigned a divorce case filed on January 1, 2001. In addition, similar results were obtained when we used the 1st divorce case filed after winning instead of averaging the divorce dates.

approximately constant across winning amounts while the proportion of marriages appears to decline as the size of the income shock increases.

While it is possible that some type I¹¹ and type II errors were made in linking the lottery winners to divorce and marriage filings, neither type of error will invalidate the research design due to the randomness of amount won. That is, we should be no more or less likely to match winners of large jackpots to divorce or marriage records than we are to match winners of small jackpots, except for the causal effect of the income shock on marital decisions. Consequently, any difference in the marriage or divorce rates of small winners and large winners is properly interpreted as the causal effect of receiving a large cash prize.

One way to check our matching algorithm is to compare the divorce rates implied by our data to those from the Census. To do so, it is important to note that not all of the income shock recipients are married. While we know of no measure capturing the proportion of lottery players or winners who are married, data from a 1998 nationally representative survey of more than 2,400 adults reported by Clotfelter et al. (1999) show that lottery participation rates are approximately equal across divorced, married and unmarried individuals.¹² Consequently, a back-of-the-envelope calculation based on that result and the demographic characteristics of residents of Miami-Dade and Palm Beach counties suggest that approximately 54 percent of the individuals in our data were

¹¹ The degree of Type I error likely depends on the prevalence of misspelled names and nicknames in the data sets. In a check of 200 random names from divorces filed in the county and 200 names of unique lottery winners, we found 7 potential nicknames in the lottery data and 17 potential nicknames in the divorce data. These names include names such as Jill, Charlie, Danny, Willy, Betty, Fred, and Steve. While these names would only be a problem if the individual used one name (e.g., Jill) when filing for divorce and another (e.g., Jillian) when claiming lottery winnings, a conservative estimate is that we should match $183/200 * 193/200 = 88.3\%$ of individuals who divorce or marry. We found no obvious misspellings among the 400 names, which is not unexpected given the official nature of both data sets.

¹² Specifically, they found that the participation rates among married, single, and divorced individuals were 49.7%, 52.8%, and 56.7%, respectively.

married at the time they won the lottery.¹³ Consequently, the annual divorce rate as a proportion of married individuals who received less than \$1,000 is $(1.82/0.54) 3.37$ percent per year. By comparison, 2.35% of married Floridians divorced in 2000 according to Census statistics.

Finally, an important advantage of our strategy is that we can test the identifying assumption that the amount won is uncorrelated with the underlying propensity to marry or divorce, conditional on winning at least \$600 for the first time. First, we show that the amount won is not explained by the winners' neighborhood characteristics. Second, we show that marriage and divorce rates *prior to* winning the lottery are unaffected by the amount (later) won.

3. Methodology

Given the straightforward nature of this research design, we begin by examining whether the average marriage and divorce rates are different for large winners (those who win \$25,000 – \$50,000) than for small winners (those who win between \$600 and \$1,000).¹⁴ For divorce rates, we focus primarily on the rate in the three years after the couple receives the income shock since we would expect that any effect on divorce rates would be evident relatively quickly. For marriage rates, we examine a longer time frame of 5 years to allow recipients time for increased dating, etc., after winning the cash prize.

¹³ According to the 2000 Census data for Miami-Dade and Palm Beach counties, 54.27 percent of residents over the age of 18 were married. Assuming equal participation rates by marital group as roughly found by Clotfelter et al (1999), this means that one could expect that 54.27% of lottery winners would be married.

¹⁴ While we would ideally be able to examine the effect of winning even larger amounts than \$25,000 - \$50,000, we note that this amount is large relative to the average household income of \$44,752. Consequently, it seems reasonable that if higher income causes a net “independence” effect due to relaxed liquidity constraints or the ability to afford two households for a period of time, we would be able to observe that effect in our sample.

Our primary test of whether income shocks cause individuals to marry or divorce is to estimate the following equation using ordinary least squares regression, though similar marginal effect estimates result from using a probit:¹⁵

$$(1) \text{ Outcome}_i = \beta_0 + \beta_1 (\$1k\text{-}\$10k \text{ Winner})_i + \beta_2 (\$10k\text{-}\$25k \text{ Winner})_i \\ + \beta_3 (\$25k\text{-}\$50k \text{ Winner})_i + \beta_4 (\text{Fantasy } 5)_i + \Phi_{\text{year}} + \theta_{\text{zip code}} + \varepsilon_i$$

Where Outcome_i is an indicator variable equal to 1 if lottery player i divorced (married) within a given number of years after winning the lottery, $(\$25k\text{-}\$50k \text{ Winner})$ is an indicator variable equal to 1 if the individual won between \$25,000 and \$50,000, $(\text{Fantasy } 5)$ is an indicator variable equal to 1 if the individual won by playing Fantasy 5 (where Florida Lotto is the excluded game), and θ is a vector of zip code fixed effects. The primary coefficients of interest are β_2 and β_3 , the sign of which indicates whether receiving large positive income shocks induces individuals to be more or less likely to marry or divorce.

4. Results

4.1 Tests of the Identification Strategy

To demonstrate that the size of the income shock received is uncorrelated with other determinants of marriage and divorce, we offer two tests. First, in results available upon request, we regress the cash prize on 13 neighborhood demographic characteristics measuring income, gender, marital status, and educational attainment (as well as interactions) and find that only one coefficient is statistically significant at the 5 percent

¹⁵ Probit estimates are available upon request. Although probit or logit can be preferable to ordinary least squares when most values are near zero or one, there are also disadvantages that one might expect to be especially worrisome in this context. For example, omitted variables can cause bias in probit or logit estimations even if they are orthogonal to the treatment variable. In addition, even classical measurement error in the dependent variable can result in inconsistent estimates (Hausman, 2001; Hausman et al, 1998).

level.¹⁶ More importantly, all of the variables collectively explain only 0.1 percent of the variation in lottery winnings for individuals in Miami-Dade and Palm Beach counties.

Second, we match lottery winners to marriage and divorce records filed in the years *before* the individual won the lottery. In the absence of correlation between amount won and underlying propensity to marry or divorce, we would expect no difference between the marriage and divorce rates of individuals who would *later* win a large cash prize compared to those of individuals who would *later* win a small cash prize. The estimated impacts of winning \$10,000 to \$25,000 and \$25,000 to \$50,000 relative to winning less than \$1,000 are reported in Table A3 in the appendix. As expected, the amount won does not affect the probability of filing for divorce or getting married, consistent with the identifying assumption.

4.2 The Effect of Positive Income Shocks on Divorce

We now turn to the effect of income shocks on divorce. We begin by examining whether flows into divorce for small winners (those who won less than \$1,000) are different from large winners (those who won between \$25,000 and \$50,000) before and after winning. Results are shown in Figure 1a, which shows that there is little difference between the divorce rates of these two groups before or after the income shocks. This result is corroborated by Figure 1b, which shows residual divorce rates after removing year and game fixed effects.

To formally test for differences in the divorce rates of the two groups in the 3 years after winning, we estimate equation (1) from above. Results are shown in Table 2, which shows that the raw difference between winning \$25,000 to \$50,000 and winning

¹⁶ The significant variable was the proportion of women from the county, the coefficient of which implies that a 5 percentage point increase in the proportion of women is associated with a prize that is \$325 larger. We note that this is small relative to the amounts examined in this paper.

less than \$1,000 is -0.38 percentage points, which is relative to a baseline divorce rate of 5.1 percent. Including controls for game, year, and player zip code changes the estimate only slightly to 0.11 percentage points. Neither estimate is statistically significant.

Because not all lottery players were married at the time of the income shock, the estimates must be reweighted in order to interpret the estimates as divorce rates relative to the married population. According to data from a nationally representative survey reported by Clotfelter et al. (1999) and Miami-Dade and Palm Beach county demographics, we estimate that 54 percent of lottery winners were married at the time they won. Consequently, the 5.1 percent baseline divorce rate in the lottery winner population over the three years after winning corresponds to a $(5.12/0.54)$ 9.48 percent actual divorce rate among married individuals. Similarly, the -0.38 percentage point difference implies a statistically insignificant 0.70 percentage point drop in the divorce rate due to winning \$25,000 - \$50,000. Importantly, while the estimates are not statistically different from zero, they are reasonably precise. The upper bound of the 95% confidence interval suggests that no more than 1 in 50 married couples will be induced to divorce as a result of receiving a large income shock.¹⁷ This implies that to the extent life events or policy changes affect divorce, it is unlikely due to a pure positive income shock.

To ensure that the results are not driven by the admittedly arbitrary cutoffs made in defining large and small income shocks, divorce rates for the full range of income shocks are shown in Figure 2. Consistent with the estimates in Table 2, there appears to be no

¹⁷ The reweighted point estimate is -0.0070, while the reweighted standard error is $0.0068/0.54 = 0.0126$. Consequently, the upper bound for the 95% confidence interval is $-0.0070 + 1.96*0.0126 = 0.0177$. In absolute terms, this implies that fewer than 1 in 50 married couples will divorce as a result of receiving the income shock, while in relative terms it implies that there will be no more than a 19% $(0.0177/0.0948)$ increase in the divorce rate among married lottery players.

relationship between the magnitude of the income shock and the likelihood of subsequently filing for divorce. In results available upon request, we also find no difference between winners coming from minority- or majority-Hispanic zip codes, above or below median income zip codes, or between male and female winners.¹⁸ Finally, using probit to estimate the model rather than OLS yielded similar estimates.¹⁹

4.3 The Effect of Positive Income Shocks on Marriage

We now turn to the question of whether large positive income shocks affect an individual's likelihood of getting married. Flows into marriage are shown in Figure 2a and indicate that consistent with the identifying assumption, there is little difference in the marriage rates prior to the income shock. Figure 2b, which shows residual marriage rates after partialing out year and game fixed effects, also provides no evidence that flows into marriage were different prior to the income shock.

After the \$25,000 to \$50,000 income shock, both Figures 2a and 2b reveal a small if not definitive reduction in marriage rates in the 5 years afterward. Results from more formal tests of the effect of winning \$25,000 to \$50,000 on marriage rates within 3 and 5 years are shown in Table 2. The raw difference in 5-year marriage rates is -1.36 percentage points, while the difference after controlling for game and year fixed effects is -2.16 percentage points, which is statistically significant at the 10 percent level. Both are relative to a baseline marriage rate among lottery players of 14.17 percent.

¹⁸ Gender was inferred on the basis of first names using empirical probability distributions provided by David Figlio.

¹⁹ For example, results from a probit estimation that include game and year fixed effects imply that winning \$25,000 to \$50,000 causes divorce rates over the next 3 years to increase by a statistically insignificant 0.11 percentage points, compared to 0.07 percentage points from the OLS regression. Similarly, the effect on marriage in the 5 years after winning is -1.64 percentage points compared to an OLS estimate of -2.16 percentage points, both of which are significant at the 10% level.

As with divorce, before interpreting these estimates one must remember that approximately only 46% of winners were unmarried. Consequently, the estimates suggest that $(14.17/0.46)$ 30.8 percent of single individuals married in the 5 years after winning the lottery. Similarly, the absolute reduction in marriage rates implied by the estimate in Specification 2 of Table 2 is $-2.16/0.46 = -4.7$ percentage points, or 15 percent. This implies that approximately 1 in 20 single individuals are induced *not* to marry as a result of receiving a large positive income shock. This relationship can also be seen in Figure 4, which shows a modest negative relationship between the size of the income shock and marriage rates.

To further investigate this result, we examine whether women respond differently than men.²⁰ To do so, we used empirical distributions on the gender of first names from David Figlio to categorize each winner as either male or female and were able to do so for 20,136 of the 24,797 individuals in the marriage data set. The results are shown graphically in Figure 5, while the regression estimates are shown in Table 3. Both indicate that while positive income shocks do not affect men's marriage rates, women who receive \$25,000 to \$50,000 are significantly less likely to marry than women who receive less than \$1,000. For example, point estimates in Specification 2 of Table 3 indicate that women who receive the positive income shock are 4.4 percentage points less likely to marry in the next five years than their counterparts who received less than \$1,000. This is a large effect given that only 10.6 percent of all female lottery players married in the following 5 years. Furthermore, once one accounts for the fact that not all of the cash prize recipients are single, the estimates in Table 4 imply that the five year

²⁰ We also investigate differences by income and race as proxied by the demographics of each winner's zip code and found no differences.

marriage rate among single women falls by nearly 10 percentage points (or 40 percent) as a result of the income shock. This is consistent with the interpretation that large positive income shocks remove some of the incentive to marry, though it is also possible that the additional income makes single life more attractive in other ways.

4.4 Migration Out of the County of Residence

The identification strategy utilized in this paper will break down if large income shocks cause individuals to move to another county before marrying or divorcing.²¹ We expect this to be unlikely for several reasons. First, residents of Miami-Dade and Palm Beach counties appear to have strong roots: the Census reports that over 80 percent of residents in these counties lived in the same county 5 years earlier, a number which would likely be higher if not for substantial migration into the area over this time period. Second, both Miami-Dade and Palm Beach counties are very large and offer a diverse set of areas in which one could relocate without leaving the county. Geographically, Miami-Dade and Palm Beach counties cover 1,946 and 1,974 square miles, respectively, making each of them over six times the size of New York City and over one-third as large as the state of Connecticut. Both are also large in terms of population; Miami-Dade County was home to 2.3 million people in 2000 while 1.1 million people resided in Palm Beach County. Furthermore, there is substantial within-county variation in neighborhoods in both counties. For example, the median family income in the poorest zip code in Miami-Dade County was \$18,000 while the median family income in the wealthiest zip code

²¹ We should point out that the potential for bias is smaller here than it might otherwise be due to how the sample was constructed. Specifically, because all individuals are assumed to not divorce (marry) unless matched to a divorce (marriage) record, the results are unaffected if large income shocks cause differential attrition only among individuals who will not later divorce (marry).

was \$200,000. Collectively, these factors minimize the likelihood that a wealth shock will cause individuals to move out of the county.

We can offer one test of whether differential migration out of the county is likely to be a problem for our analysis. Specifically, we link individuals who won the lottery between March of 2003 and March of 2007 to phone records accessed in March of 2008.²² Results are reported in Table 5, which show that the difference in the proportions of small and big winners showing up in the county phone records one to five years later is small and statistically insignificant. While this is an imperfect test due to the fact that some households no longer have landlines, some individuals who do are not listed in the phone book, and winning the lottery could enable some families to afford a landline, it does provide some comfort that differential migration from the county is unlikely to bias the results.²³

5. Conclusions

While economists have long been interested in the relationship between economic resources and marital decisions, determining the extent to which economic resources affect marriage and divorce has been difficult due to a lack of exogenous income shocks. To overcome that problem, we exploit income shocks that occur as a result of winning the lottery and compare the marriage and divorce rates of individuals who won between \$25,000 and \$50,000 to those who won just over \$600. We find no evidence that pure income shocks cause statistically significant or economically meaningful changes in

²² Note that these individuals were not used in the main analysis. We are unable to use this test on the main sample of lottery winners because we do not have access to historical phone records.

²³ These factors are likely the reason why the number of individuals linked to phone records after winning is lower than one would otherwise expect. This is reflected by the fact only 53 percent of winners of less than \$1,000 are found in the phone records in the 6 months after winning.

divorce rates. Moreover, even the upper bound of the 95 percent confidence interval implies that fewer than 1 in 50 married couples will be induced to divorce as a result of receiving an income shock that is approximately twice as large as per-capita income.

However, we do find evidence that positive income shocks reduce marriage rates in the following five years. Women are most affected; point estimates suggest that nearly 1 in 10 single women will be induced not to marry as a result of the income shock, a 40 percent decline. Consequently, while the results presented in this study indicate that additional resources do not induce individuals to exit their existing marriages, they do suggest that additional income may induce single women to remain unmarried.

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Table 1: Lottery Winners Linked to Marriage and Divorce Records after Winning

Amount Won	Within 3 Years of Winning			Within 5 Years of Winning		
	Did Not Divorce	Divorced	Percent Divorced	Did Not Marry	Married	Percent Married
<\$1,000	2,538	130	5.12	1799	255	14.17
\$1,000 - \$5,000	16,517	908	5.50	11545	1517	13.14
\$5,000 - \$10,000	7,720	435	5.63	5114	622	12.16
\$10,000 - \$15,000	1,008	47	4.66	728	81	11.13
\$15,000 - \$25,000	1,583	91	5.75	1348	170	12.61
\$25,000 - \$35,000	1,164	62	5.33	962	129	13.41
\$35,000 - \$50,000	572	23	4.02	478	49	10.25
Total	31,102	1,696	5.45	21,974	2,823	12.85

Table 2: The Effect of Receiving Up to \$50,000 on Marriage and Divorce (relative to receiving less than \$1,000)

Specification	(1)		(2)		(3)	
Panel 1: The Effect of Random Income Shocks on Divorce Rates						
	\$10,000 - \$25,000	\$25,000 - \$50,000	\$10,000 - \$25,000	\$25,000 - \$50,000	\$10,000 - \$25,000	\$25,000 - \$50,000
Within 3 Years	0.0029 (0.0060)	-0.0038 (0.0068)	0.0027 (0.0064)	0.0007 (0.0074)	0.0030 (0.0064)	0.0011 (0.0074)
Observations	32,798		32,798		32,798	
Panel 2: The Effect of Random Income Shocks on Marriage Rates						
	\$10,000 - \$25,000	\$25,000 - \$50,000	\$10,000 - \$25,000	\$25,000 - \$50,000	\$10,000 - \$25,000	\$25,000 - \$50,000
Within 3 Years	-0.0079 (0.0080)	-0.0086 (0.0088)	-0.0095 (0.0086)	-0.0127 (0.0097)	-0.0158 (0.0096)	-0.0136 (0.0106)
Within 5 Years	-0.0158 (0.0096)	-0.0136 (0.0106)	-0.0187* (0.0104)	-0.0216* (0.0117)	-0.0176* (0.0104)	-0.0211* (0.0117)
Observations	24,797		24,797		24,797	
Includes Game and Year Fixed Effects?	No		Yes		Yes	
Includes Neighborhood Fixed Effects?	No		No		Yes	

Estimates are in percentage points and are relative to receiving less than \$1,000. Standard errors are in parentheses. Estimates are relative to a 3-year divorce rate of 5.12% and 3-year and 5-year marriage rates of 8.19% and 14.17%, respectively.

Table 3: The Effect of Receiving \$25,000 to \$50,000 on 5-Year Marriage Rates for Men and Women

Specification	1	2
Effect on Women	-0.0382** (0.0173)	-0.0443** (0.0181)
Effect on Men	-0.0027 (0.0167)	-0.0090 (0.0176)
Observations	20,136	20,136
Includes Game and Year Fixed Effects?	No	Yes

Notes: Standard errors are in parentheses. Estimates are relative to winning less than \$1,000 and compare to 5-year marriage rates of 10.6% for women and 15.0% for men in that group. Asterisks *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4: The Proportion of Lottery Winners Who Are Linked to County Phone Records One to Five Years Later

	Winners of Less than \$1,000 (1)	Winners of More than \$25,000 (2)	Difference (3) = (2) - (1)
1 to 3 Years Later	0.530 (0.013)	0.573 (0.046)	0.043 (0.048)
3 to 5 Years Later	0.539 (0.012)	0.559 (0.037)	0.021 (0.038)

Standard errors are in parentheses.

None of the differences are statistically different at conventional levels.

Figure 1a: Flows into Divorce before and after Receiving Small and Large Cash Prizes

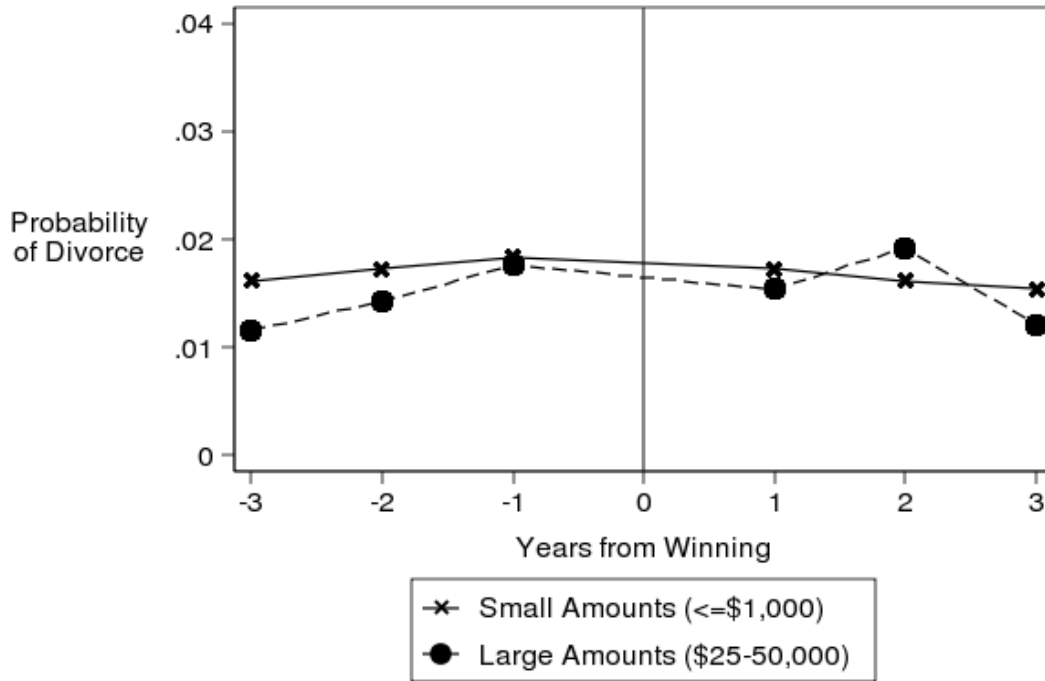


Figure 1b: Flows into Divorce before and after Receiving Small and Large Cash Prizes (after Removing Year and Game Fixed Effects)

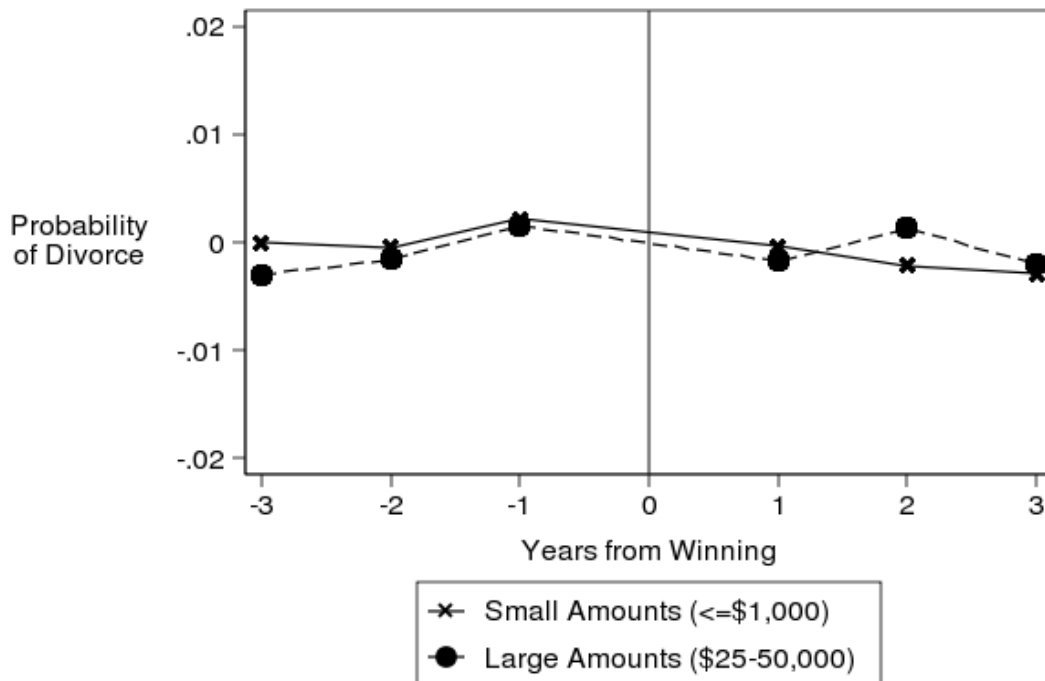


Figure 2: Divorce Rates in the 3 Years after Winning the Lottery

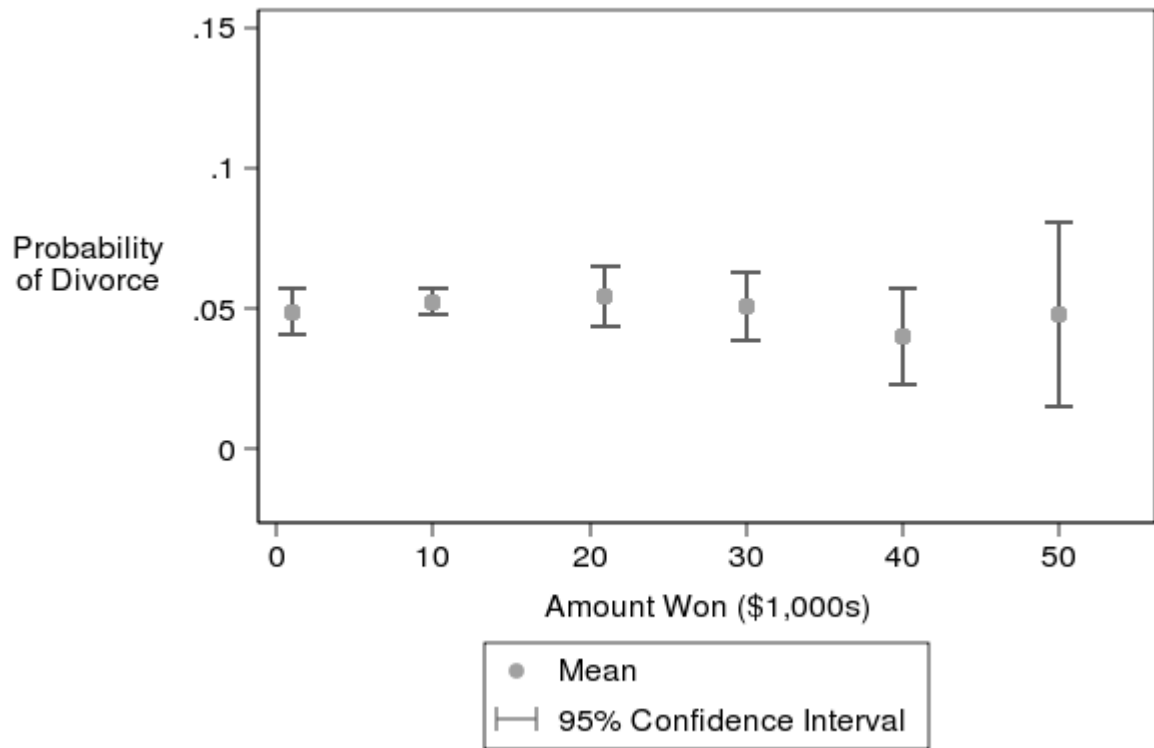


Figure 3a: Flows into Marriage before and after Receiving Small and Large Cash Prizes

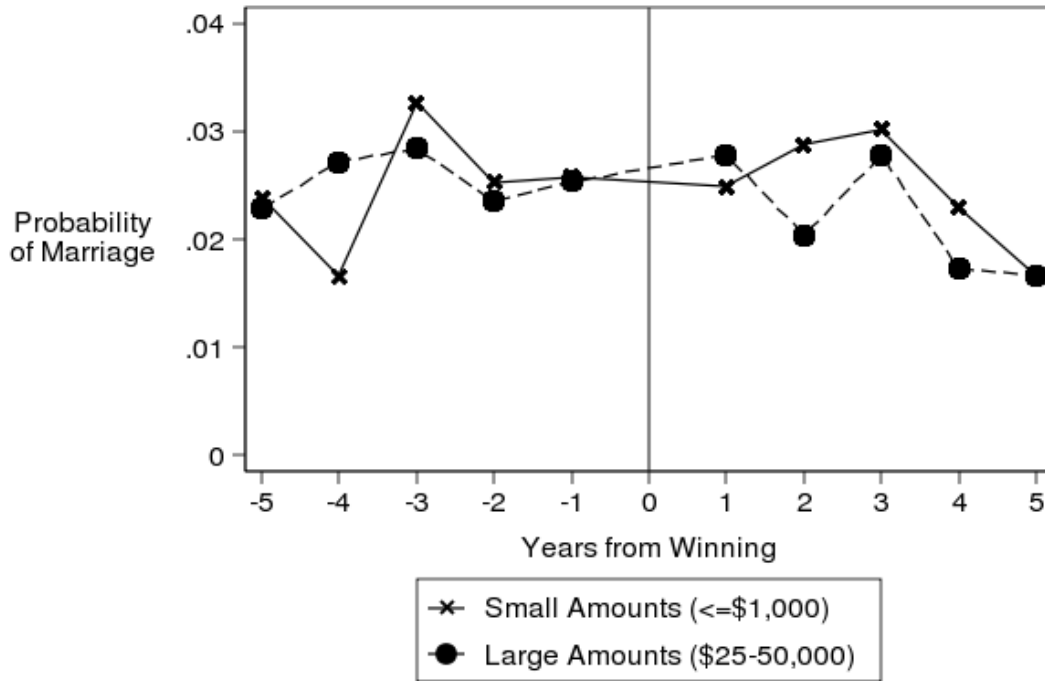


Figure 3b: Flows into Marriage before and after Receiving Small and Large Cash Prizes (after Removing Game and Year Fixed Effects)

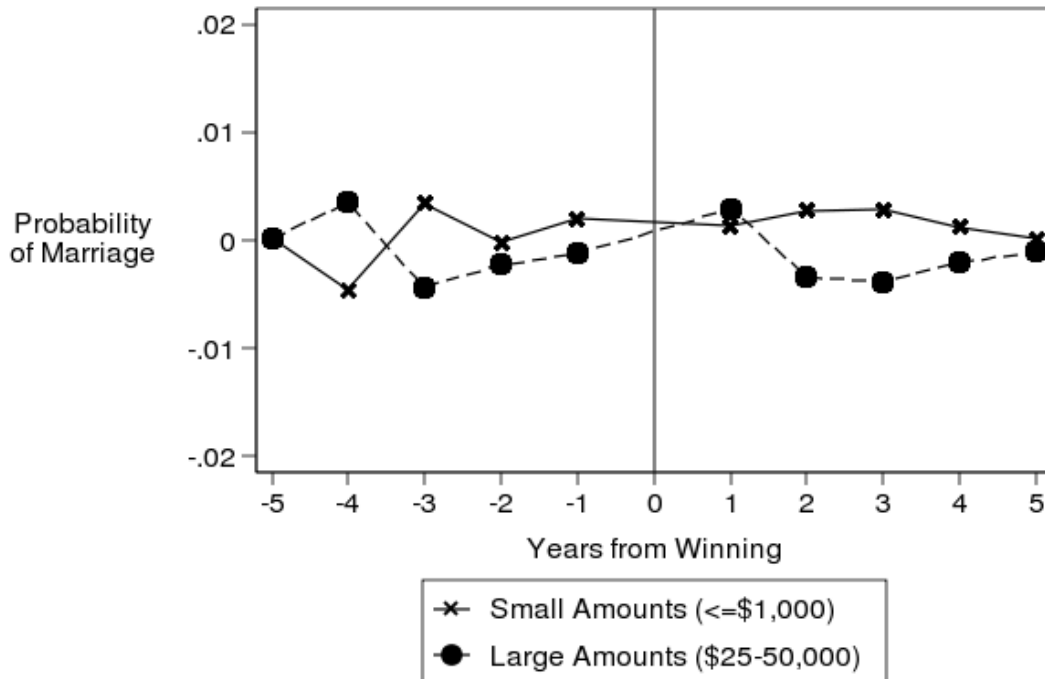


Figure 4: Marriage Rates in the 5 Years after Winning the Lottery

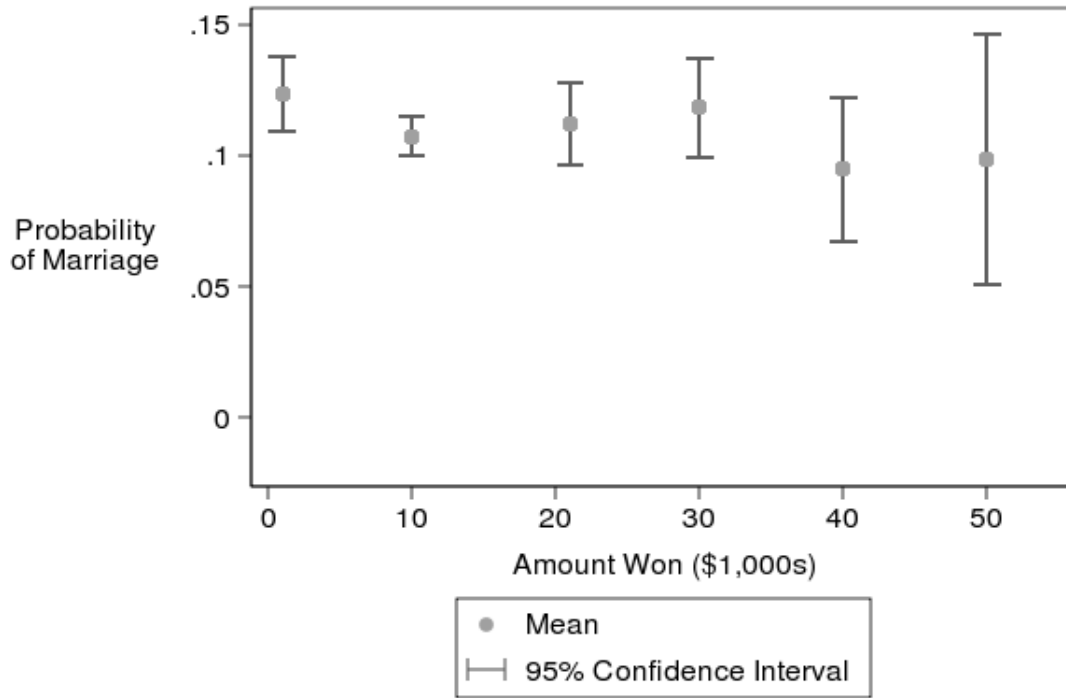
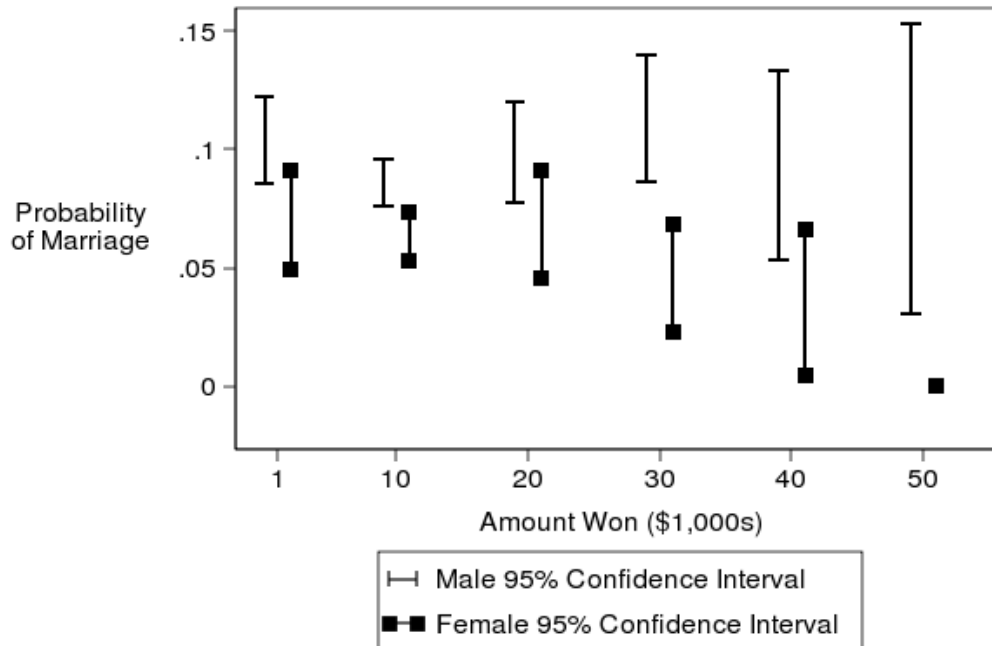


Figure 5: Marriage Rates for Men and Women in the 5 Years after Winning the Lottery



Appendix

Table A1: Constructing the Sample of Unique Lottery Winners in Miami-Dade and Palm Beach Counties Used for Divorce Analysis

Amount Won	<u>All Winners</u>		<u>First Time Winners</u>		<u>Unique in Phonebook</u>	
	Number	Percent	Number	Percent	Number	Percent
<\$1,000	7,713	10.46	3,817	8.14	2,668	8.13
\$1,000 - \$5,000	39,151	53.11	24,740	52.75	17,425	53.13
\$5,000 - \$10,000	16,447	22.31	11,701	24.95	8,155	24.86
\$10,000 - \$15,000	2,130	2.89	1,576	3.36	1,055	3.22
\$15,000 - \$25,000	3,888	5.27	2,398	5.11	1,674	5.10
\$25,000 - \$35,000	2,938	3.99	1,788	3.81	1,226	3.74
\$35,000 - \$50,000	1,447	1.96	881	1.88	595	1.81
Total	73,714	100.00	46,901	100.00	32,798	100.00

Table A2: Constructing the Sample of Unique Lottery Winners in Miami-Dade County Used for Marriage Analysis

Amount Won	<u>All Winners</u>		<u>First Time Winners</u>		<u>Unique in Phonebook</u>	
	Number	Percent	Number	Percent	Number	Percent
<\$1,000	4,559	9.33	3,134	8.35	2,054	8.28
\$1,000 - \$5,000	25,813	52.84	19,695	52.45	13,062	52.68
\$5,000 - \$10,000	10,535	21.57	8,662	23.07	5,736	23.13
\$10,000 - \$15,000	1,560	3.19	1,287	3.43	809	3.26
\$15,000 - \$25,000	3,024	6.19	2,290	6.10	1,518	6.12
\$25,000 - \$35,000	2,282	4.67	1,684	4.49	1,091	4.40
\$35,000 - \$50,000	1,074	2.20	795	2.12	527	2.13
Total	48,847	100.00	37,547	100.00	24,797	100.00

Table A3: Falsification Test: The Impact of (Later) Winning the Lottery on Marriage and Divorce Rates Prior to Winning

Specification	(1)		(2)		(3)	
Panel 1: The Effect of Future Random Income Shocks on Divorce Rates						
	\$10,000 - \$25,000	\$25,000 - \$50,000	\$10,000 - \$25,000	\$25,000 - \$50,000	\$10,000 - \$25,000	\$25,000 - \$50,000
Within 3 Years	-0.0015 (0.0057)	-0.0080 (0.0064)	0.0007 (0.0061)	-0.0051 (0.0070)	0.0005 (0.0061)	-0.0051 (0.0070)
Observations	32,798		32,798		32,798	
Panel 2: The Effect of Future Random Income Shocks on Marriage Rates						
	\$10,000 - \$25,000	\$25,000 - \$50,000	\$10,000 - \$25,000	\$25,000 - \$50,000	\$10,000 - \$25,000	\$25,000 - \$50,000
Within 3 Years	0.0052 (0.0080)	-0.0071 (0.0088)	0.0002 (0.0087)	-0.0152 (0.0098)	0.0009 (0.0087)	-0.0145 (0.0098)
Within 5 Years	0.0121 (0.0098)	0.0026 (0.0107)	0.0099 (0.0105)	-0.0048 (0.0119)	0.0112 (0.0106)	-0.0036 (0.0119)
Observations	24,797		24,797		24,797	
Includes Game and Year Fixed Effects?	No		Yes		Yes	
Includes Neighborhood Fixed Effects?	No		No		Yes	

Estimates are in percentage points and are relative to receiving less than \$1,000. Standard errors are in parentheses. Estimates are relative to a 3-year divorce rate of 5.12% and 3-year and 5-year marriage rates of 8.19% and 14.17%, respectively.