

# **Lucky in Life, Unlucky in Love?**

## **The Effect of Random Income Shocks on Divorce**

March 31, 2008

Scott Hankins  
University of Kentucky  
[scott.hankins@gmail.com](mailto:scott.hankins@gmail.com)

Mark Hoekstra  
University of Pittsburgh  
[markhoek@pitt.edu](mailto:markhoek@pitt.edu)

Preliminary: Please do not cite

### **Abstract**

Economists have long been interested in determining whether increases in income cause either a stabilizing effect on a couple's marriage or a destabilizing "independence effect". However, estimating the effect of income on marital stability is difficult due to a lack of exogenous pure income shocks. To overcome that problem, we compare the divorce rates of winners of large cash prizes through the Florida Lottery to those of winners of small cash prizes. By linking lottery winners from Miami-Dade and Palm Beach counties to public record divorce filings from 1985 to 2007, we show that there is little evidence that positive income shocks of \$25,000 to \$50,000 cause statistically significant or economically meaningful changes in divorce rates in the 3 years after the income shock despite relatively small standard errors.

Acknowledgements: We would like to thank the Florida Lottery for providing us with the data on lottery winners. All errors are our own.

## 1. Introduction

The relationship between income and divorce has long been of interest to economists and other social scientists for several reasons. First, beginning with work by Gary Becker and others (1977), there has been considerable interest in how income affects a spouse's incentives to divorce. Second, researchers and policymakers have wondered whether increasing income for low-income households via income supports or tax credits causes some couples to divorce, which would be regarded by many policymakers as an unintended consequence.

The extent to which higher cash transfers affect divorce has been the subject of considerable controversy. While Groenveld, Tuma, and Hannan (1980) found that the Seattle and Denver income maintenance experiments increased the incidence of divorce for Whites and Blacks, that result has been vigorously contested by Cain and Wissoker (1990a, 1990b). Indeed, even those studying the labor supply effects of the experiments—the expressed purpose for which the experiments were performed—have concluded that the main contribution of the experiments was to inform how to avoid the methodological mistakes that resulted in attrition being correlated with the treatment rather than determining the labor supply effects (Ashenfelter and Plant, 1990). This casts considerable doubt on whether a consensus will ever be achieved with respect to the effect of the Negative Income Tax Experiments on divorce rates.

A related literature has examined the effect of welfare changes on marital stability (e.g., Hu, 2003; Bitler et al, 2004) and finds that reducing welfare benefits increases the likelihood of divorce, though by design the estimates pick up both the effect of the negative income shock and the effect of increased work requirements. In addition, there has also been some related research focused on the impact of other income-changing life

events on marital stability. However, since events such as job displacement and disability can plausibly affect marital stability in other ways, it is difficult to distinguish the effect of the income shock from the effect of other factors. For example, Charles and Stephens (2004) argue that the information conveyed by different types of job displacement itself affects the likelihood of divorce. Indeed, the primary reason for the difficulty in determining the effect of income on marital stability is that there are very few truly exogenous shocks to income.

In order to distinguish the effect of pure income shocks on marital stability from other confounding factors, we focus on the positive income shocks that accrue to lottery winners. We do so by linking data with personal identifying information on Miami-Dade and Palm Beach county residents who won the lottery between 1988 and 2004 to public county 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), the amount won is random. Tests support this identifying assumption: winners of large sums of money come from similar neighborhoods as those who win small sums and, perhaps more importantly, winners of large sums were no more or less likely to file for divorce *before* winning the lottery than were (future) winners of small sums.

Along with the strengths of our identification strategy come two limitations. First, while survey evidence suggests that approximately half of the adults in the US play state lotteries, 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, say, the response of a low-income group of individuals who may be affected by increased income supports. Second, it is possible that married couples 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. Still, we think that our approach will be informative regarding the extent to which receiving unearned cash income affects a couple's likelihood of divorce.

We find that large cash transfers do not affect a couple's likelihood of divorce in a statistically significant or economically meaningful way despite the fact that the cash prizes of up to \$50,000 are large relative to the \$45,300 neighborhood family income for the individuals in the sample. Specifically, we find that the divorce rate for married recipients of \$25,000 - \$50,000 cash prizes in the three years following the income shock is between one-half and one percentage point lower than that for recipients of \$1,000, which is small both in absolute terms and relative to the baseline 3-year divorce rate of 9.1%. Examining the full range of cash amounts received also yields little evidence of an effect of unearned cash income on divorce.

## **2. Data and Identification Strategy**

Lottery winner data were obtained from the Florida Lottery. The data include every lottery winner from 1988 through 2004 in Miami-Dade and Palm Beach counties<sup>1</sup>, during which there were 128,613 winners. These winners represent all individuals who won at least \$600 in the Florida lottery over that time period, 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 specific lottery game played.

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<sup>1</sup> The lottery data contains zip codes but not counties. The county was determined by matching zip codes to counties based on <http://www.usnaviguide.com/index.htm>.

Before linking these records to public records on divorce from Miami-Dade and Palm Beach counties, efforts were made to reduce the number of false positive matches made due to common names. Toward that end, the lottery winner data were first limited to the 64,355 lottery winners with unique names, since it is difficult to know if names appearing more than once indicate that someone won the lottery multiple times or that the name is simply very common.<sup>2</sup> Second, we excluded all names that appeared more than once in the 2007 county phone records for similar reasons.

As shown in Table 1, eliminating individuals with common names leaves 47,735 lottery winners. In addition, given there were relatively few winners of \$50,000 or more, the main analysis uses only the 46,899 winners of less than \$50,000. Table 1 shows that the names dropped were evenly distributed across the winning amount and thus likely represented the commonness of the name rather than something correlated with the propensity to divorce. For example, 8.82% of all winners in the sample won between \$600 and \$1,000, which is remarkably similar to the 7.94% of the final sample of individuals with unique names who won an amount in that same bucket. The neighborhood (zip code) characteristics of these individuals are similar to what one would expect for lottery players: neighborhood median family income averaged \$45,300 for the individuals in the data set, which is approximately the same as the median family income of \$44,752 for Miami-Dade and Palm Beach county residents. The winners came from neighborhoods that reported being 42% of Hispanic origin and 19% black.

These lottery winners were then linked to divorce cases filed in their respective county in the 3 years prior to and the 3 years after winning. This was performed via an

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<sup>2</sup> Similarly, for these individuals it is difficult to categorize their outcomes as either the result of a small income shock or that of a large income shock since some individuals experience both.

automated search of each winner's first and last name on the Miami-Dade County and Palm Beach County Clerk of the Court website.<sup>3</sup>

The results are shown in Table 2. Of the 47,735 winners, 2,309 (5.08%) were linked to a divorce case within 3 years after winning the lottery. Furthermore, as shown in Table 2, the proportion of divorces appears approximately constant across winning amounts, indicating that there does not appear to be a striking relationship between positive income shocks and divorce.

While it is possible that some type I and type II errors were made in linking the lottery winners to divorce filings, because the lottery winning amount is random conditional on winning, that would not invalidate the research design. That is, we should be no more or less likely to match winners of large jackpots to divorce cases than we are to match winners of small jackpots, except for the causal effect of the income shock on marital instability. For example, in expectation there are no more unmarried recipients of large jackpots than unmarried recipients of small jackpots, which implies that any difference in divorce rates between the small winners and the 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, survey data reported by

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<sup>3</sup>In the cases where an individual was linked to more than one divorce case 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 1<sup>st</sup> divorce case filed after winning instead of averaging the divorce dates.

Clotfelter et al (1999) show that lottery participation rates are approximately equal across divorced, married and unmarried individuals.<sup>4</sup> 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 54.27% of the individuals in our data were married at the time they won the lottery.<sup>5</sup> Consequently, the annual divorce rate as a proportion of married couples who received less than \$1,000 is  $(1.69/0.5427)$  3.11% per year. By comparison, 2.35% of married Floridian couples divorced in 2000 according to Census statistics. Given the potential differences in the populations examined and the coarseness of the comparison, the relative similarity of the two divorce rates provides some comfort that our matching algorithm is a reasonable one.

In comparing winners of relatively large jackpots to winners of small jackpots, our identification strategy is similar to that used by Imbens, Rubin, and Sacerdote (2001) to address the labor supply and consumption effects of winning the lottery. However, rather than relying on survey data to determine outcomes, we rely on administrative public records. The other primary difference in this application is that we utilize data from winners of several different lottery games and consequently control for the game played, though this makes little difference in the results.

Finally, one advantage of our strategy is that we can test the identifying assumption that the amount won is random and is uncorrelated with the underlying propensity to divorce, conditional on winning at least \$600. First, in results available

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<sup>4</sup> Specifically, they found that the participation rates among married, single, and divorced individuals were 49.7%, 52.8%, and 56.7%, respectively.

<sup>5</sup> According to the 2000 Census data for Miami-Dade and Palm Beach counties, approximately 54.27% 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.

upon request, we show that the amount won is not explained by the winners' neighborhood characteristics. Second, we show that divorce rates *prior to* winning the lottery are unaffected by the amount (later) won.

### 3. Methodology

Given the straightforward nature of this research design, perhaps the most obvious approach is a simple comparison of mean divorce rates between the large winners (those who win \$25,000 – \$50,000) and small winners (e.g., those who win between \$600 and \$1,000). We focus primarily on the divorce rate in the three years after the couple receives the income shock, though we also examine the impact over the first year and the first two years after receiving the cash prize. We examine this relatively short time horizon for two reasons. First, we are primarily interested in examining the extent to which receiving unearned income causes an “independence effect”, which should arise relatively quickly after receiving the cash prize. The second reason is more pragmatic and relates to the fact that because we do not directly observe if a lottery winner is married at the time of winning (though we can say that given the random nature of the lottery, similar proportions of small and large winners are married), examining divorce rates more than a few years after receiving the income shock makes the interpretation of the result much more difficult. For example, while the proportion of winners of large amounts who are married should be the same as the proportion of small winners who are married at the time of the lottery drawing, this need not be the case several years afterward if cash transfers affect the likelihood of marriage and thus the subsequent likelihood of filing for divorce.

In addition to the simple but powerful comparison of means test, we also perform another test to determine if income shocks cause couples to divorce in which we regress divorce on various polynomials of amount won. Specifically, we estimate the following:

$$(1) \text{Divorce}_i = \beta_0 + \gamma(f(\text{Lottery Jackpot Won}_i)) + \theta X_i + \varepsilon_i$$

Where  $\text{Divorce}_i$  is an indicator variable equal to 1 if lottery player  $i$  divorced within 3 years after winning the lottery,  $f(\bullet)$  is a polynomial of the amount won, and  $X_i$  is a vector of lottery game, year, and zip code fixed effects. We tested the null hypothesis that winning large amounts had no effect on divorce relative to winning \$600, the smallest amount observed to be won by those in our data.

## 4. Results

### 4.1 Tests of the Identification Strategy

To demonstrate that the income shock received is random and thus uncorrelated with other determinants of divorce, we offer two tests. In results available upon request, when regressing the cash prize amount on 13 neighborhood demographic characteristics, we find that only 2 are statistically significant at the 5% level and that all of the variables collectively explain only 0.2% of the variation in lottery winnings.

Second, we match lottery winners to divorces filed in the three years *prior* to the date the individual won the lottery. The intuition behind this test is that if the amount won in the lottery, conditional on winning more than \$600, really is uncorrelated with an individual's underlying propensity to divorce, there should be no difference between the 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 resulting divorce rates are shown in Figure A1 in the appendix for the range of lottery winnings, where local

average divorce rates are shown as open circles and the predicted probability of divorce is graphed from estimating a 5<sup>th</sup> order polynomial. As shown there and in estimates available from the authors upon request, the amount won does not affect the probability that the party filed for divorce in the 3 years *prior* to winning the lottery, consistent with the identifying assumption that amount won is random.

#### **4.2 The Effect of Positive Income Shocks on Divorce**

Perhaps the simplest way to determine the extent to which income shocks affect divorce rates is to compare the divorce rates of the small and large winners using a difference in means test. These comparisons are shown in Table 3, and the point estimates indicate that receiving \$25,000 - \$50,000 causes between a -0.28 and a -0.50 percentage point reduction in divorce relative to winning approximately \$1,000, an effect that is not statistically significant.

As discussed earlier, in interpreting these estimates, one must consider the fact that based on survey data of lottery players reported by Clotfelter et al and Miami-Dade and Palm Beach county demographics, approximately 54.27% of the individuals who received positive income shocks in our data were married at the time. Consequently, the 4.93% baseline divorce rate in the lottery winner population over the three years after winning corresponds to a  $(4.93/0.5427)$  9.1% actual divorce rate among married individuals. Similarly, the 0.28 percentage point difference implies a statistically insignificant 0.52 percentage point drop in the divorce rate due to winning \$25,000 - \$50,000. The upper bound of the 95% confidence interval is a 1.76 percentage point increase in the divorce rate of married couples relative to the baseline rate of 9.1%, which implies that no more than 1 in 55 married couples will be induced to divorce as a result of

receiving a large income shock. Consequently, the confidence intervals of these estimates rule out increases in divorce of the magnitude reported by Groenveld et al (1980) that were on the order of 3 to 7 percentage points or 26 to 76 percent.

Additional results that make full use of the distribution of amounts won observed in the data are displayed graphically in Figure 1, which shows the probability of divorce within 3 years after winning various amounts through the lottery. As shown there, the probability of divorce does not appear to increase in a meaningful way with amount won. More formally, Table 4 reports the effect of winning various lottery amounts (relative to \$600) based on the polynomial specification outlined in equation (1). As shown, none of the estimates are statistically significant at conventional levels.

The final evidence that we show regarding the effect of income shocks on divorce is a graph showing flows into divorce for small winners (those who won less than \$1,000) and large winners (those who won between \$25,000 and \$50,000). That comparison is shown in Figure 2 and indicates that there is little difference in the divorce rates of these two groups both before and after the income shocks. Collectively, these results indicate that there is little, if any, effect of receiving a \$25,000 - \$50,000 income shock on a couple's likelihood of divorce.

## **5. Conclusions**

While economists have long been interested in the relationship between income and divorce, determining the extent to which pure income shocks affect marital stability has been difficult due to the lack of exogenous pure income shocks. To overcome that problem, we exploit income shocks that occur as a result of winning the lottery and compare the divorce rates of individuals who won between \$25,000 and \$50,000 to those

who won just over \$600. We find no evidence of a statistically significant or economically meaningful change in divorce rates as a result of winning despite relatively small standard errors. Consequently, while the results presented in this study do not rule out the possibility that larger income shocks than those observed here could cause a net “independence” or “stabilization” effect among married couples or that the divorce decisions of lottery players may be different from another population of interest, we do think that this paper provides relevant evidence that reasonably large income shocks do not significantly affect the likelihood that couples will divorce.

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Table 1: Constructing the Sample of Unique Lottery Winners in Miami-Dade and Palm Beach Counties

Amount Won	All Winners		Unique Winners		Unique in Phone Book	
	Number	Percent	Number	Percent	Number	Percent
<=\$1,000	11,341	8.82	5,184	8.06	3,790	7.94
\$1,000 - \$2,500	37,176	28.91	20,187	31.37	15,028	31.48
\$2,500 - \$5,000	27,968	21.75	12,939	20.11	9,650	20.22
\$5,000 - \$7,500	32,212	25.05	14,962	23.25	11,018	23.08
\$7,500 - \$10,000	6,619	5.15	4,310	6.70	3,257	6.82
\$10,000 - \$15,000	2,542	1.98	1,390	2.16	1,019	2.13
\$15,000 - \$20,000	1,998	1.55	1,038	1.61	784	1.64
\$20,000 - \$25,000	2,092	1.63	1,030	1.60	763	1.60
\$25,000 - \$30,000	1,682	1.31	789	1.23	582	1.22
\$30,000 - \$35,000	1,308	1.02	670	1.04	478	1.00
\$35,000 - \$40,000	748	0.58	378	0.59	276	0.58
\$40,000 - \$45,000	476	0.37	244	0.38	180	0.38
\$45,000 - \$50,000	240	0.19	106	0.16	74	0.16
\$50,000 - \$75,000	603	0.47	290	0.45	212	0.44
\$75,000 - \$100,000	280	0.22	130	0.20	96	0.20
>\$100,000	1,328	1.03	708	1.10	528	1.11
<b>Total</b>	<b>128,613</b>	<b>100.00</b>	<b>64,355</b>	<b>100.00</b>	<b>47,735</b>	<b>100.00</b>

Table 2: Lottery Winners Linked to a Divorce Case in the Three Years after Winning

Amount Won	Within 1 Year			Within 2 Years			Within 3 Years		
	No Divorce	Divorce	Percent Divorce	No Divorce	Divorce	Percent Divorce	No Divorce	Divorce	Percent Divorce
<\$1,000	3,726	64	1.69	3,663	127	3.35	3,603	187	4.93
\$1,000 - \$2,500	14,790	238	1.58	14,543	485	3.23	14,302	726	4.83
\$2,500 - \$5,000	9,502	148	1.53	9,344	306	3.17	9,209	441	4.57
\$5,000 - \$7,500	10,829	189	1.72	10,616	402	3.65	10,446	572	5.19
\$7,500 - \$10,000	3,200	57	1.75	3,139	118	3.62	3,089	168	5.16
\$10,000 - \$15,000	1,008	11	1.08	994	25	2.45	985	34	3.34
\$15,000 - \$20,000	772	12	1.53	757	27	3.44	748	36	4.59
\$20,000 - \$25,000	752	11	1.44	739	24	3.15	730	33	4.33
\$25,000 - \$30,000	572	10	1.72	559	23	3.95	552	30	5.15
\$30,000 - \$35,000	472	6	1.26	463	15	3.14	459	19	3.97
\$35,000 - \$40,000	271	5	1.81	268	8	2.90	263	13	4.71
\$40,000 - \$45,000	179	1	0.56	175	5	2.78	172	8	4.44
\$45,000 - \$50,000	73	1	1.35	71	3	4.05	70	4	5.41
\$50,000 - \$75,000	210	2	0.94	208	4	1.89	205	7	3.30
\$75,000 - \$100,000	93	3	3.13	93	3	3.13	90	6	6.25
>\$100,000	522	6	1.14	515	13	2.46	503	25	4.73
<b>Total</b>	<b>46,971</b>	<b>764</b>	<b>1.63</b>	<b>46,147</b>	<b>1,588</b>	<b>3.44</b>	<b>45,426</b>	<b>2,309</b>	<b>5.08</b>

Table 3: Comparison of Divorce Rates between Small and Large Winners

Divorce Rate (%)	Amount Won				Amount Won			
	<\$1k (1)	\$25k - \$50k (2)	Difference (%) (2) - (1)	Reject Null Hypothesis of Equality?	<\$1.5k (1)	\$25k - \$50k (2)	Difference (%) (2) - (1)	Reject Null Hypothesis of Equality?
Within 1 Year	1.69	1.45	-0.24 (0.37)	No	1.68	1.45	-0.23 (0.32)	No
Within 2 Years	3.35	3.40	0.05 (0.54)	No	3.39	3.40	0.00 (0.48)	No
Within 3 Years	4.93	4.65	-0.28 (0.63)	No	5.15	4.65	-0.50 (0.57)	No

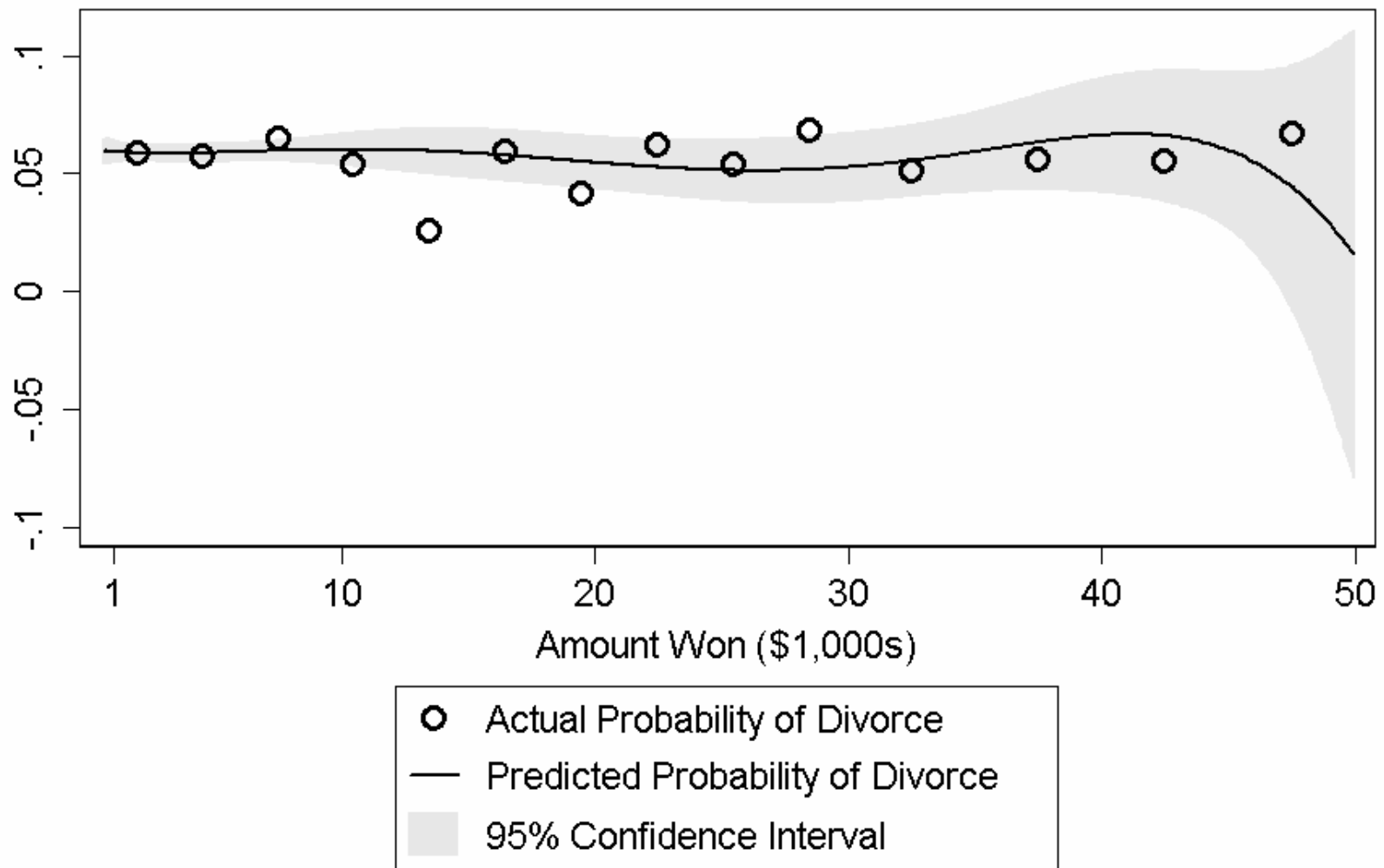


Figure 1: The Probability of Divorce within 3 Years after Winning the Lottery (Fit with a 5<sup>th</sup> order polynomial)

Table 4: The Effect of Lottery Income Shocks on the Probability of Divorce: The Polynomial Approach

Predicted Probability of Divorce (%)	Within 1 year		Within 2 years		Within 3 years	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Effect of winning \$5,000	0.0615	0.2774	0.2800	0.3961	0.2046	0.4729
Effect of winning \$10,000	-0.0341	0.2367	0.2134	0.3380	0.0663	0.4035
Effect of winning \$15,000	-0.1734	0.2565	-0.0030	0.3662	-0.3242	0.4372
Effect of winning \$20,000	-0.2734	0.2999	-0.1916	0.4282	-0.7232	0.5112
Effect of winning \$25,000	-0.3052	0.3747	-0.2656	0.5350	-0.8898	0.6388
Effect of winning \$30,000	-0.2902	0.4271	-0.2224	0.6099	-0.6905	0.7282
Effect of winning \$35,000	-0.2977	0.4607	-0.1385	0.6578	-0.2031	0.7853
Effect of winning \$40,000	-0.4412	0.6063	-0.1630	0.8657	0.1789	1.0335
Effect of winning \$45,000	-0.8758	0.8176	-0.5121	1.1673	-0.3574	1.3937
Effect of winning \$50,000	-1.7946	2.3807	-1.4635	3.3994	-3.1493	4.0585

Reported estimates are in percentage points. Each column represents a different regression and includes a 5th order polynomial of amount won and include fixed effects for game played, year, and zip code. The reported effect of winning is relative to winning \$600. None of the estimates are statistically significant at conventional levels.

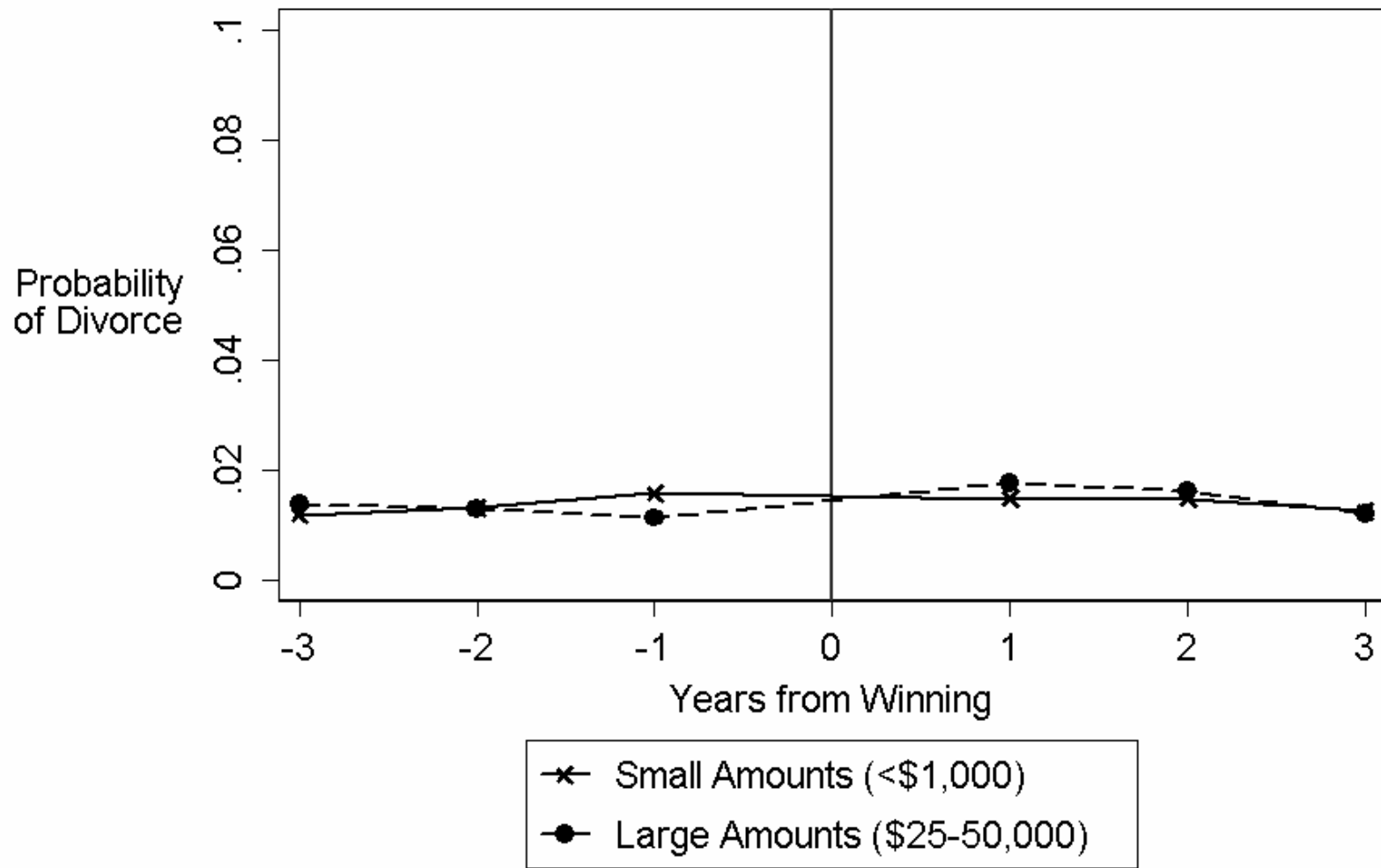


Figure 2: Flows into Divorce before and after Winning for Recipients of Small and Large Cash Prizes

## Appendix

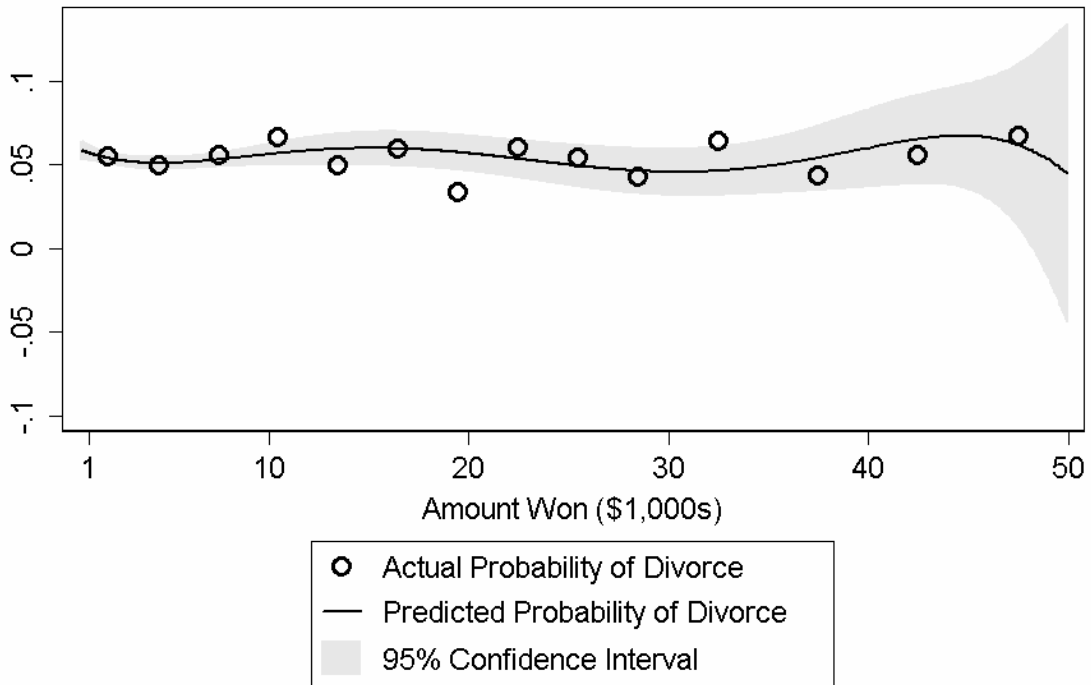


Figure A1: The Probability of Divorce within the 3 Years *prior* to Winning the Lottery (Fit with a 5<sup>th</sup> order polynomial)