

The Impact of Unilateral Divorce in Mexico: Bargaining Power and Labor Supply

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Over 2008 and 2016, 27 of 32 Mexican states introduced unilateral no-fault divorce. Using variation in the timing and adoption of the unilateral divorce legislation, we study how the reform affected labor supply for married men and women. The results suggest that women increased their labor supply at both the extensive and intensive margins. Men also worked more, but only at the intensive margin. Prior work has attributed these changes in labor supply to the divorce law's impact on women's bargaining power. We test this hypothesis empirically using a structural model of intra-household resource allocation. We find that women experienced a small decline in bargaining power as a result of the reform.

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1 Introduction

From 2008 to 2016, 27 of 32 Mexican states adopted legislation that legalized unilateral no-fault divorce. This legislation allowed married individuals to seek a divorce without the consent of their spouse or the need to prove cause (e.g., infidelity). In states that have adopted the reforms, divorce rates have steadily increased.¹ This newly created ability to unilaterally divorce one's spouse has benefits, such as escaping an abusive relationship (Stevenson and Wolfers, 2006), but also comes with costs, such as a higher risk of financial insecurity (Weitzman and Dixon, 1980; Weitzman, 1985). The consequences of unilateral divorce laws, however, extend beyond divorcing couples; Unilateral divorce laws are likely to influence the interactions of both couples who remain married after the reforms, as well as newly formed marriages. More liberalized divorce laws may initiate a renegotiation of intra-household bargaining power based on each spouse's divorce outside option, where the spouse who values exiting the marriage most stands to gain. This, in turn, may change economic behavior within the household.

In this paper, we study how married couples behave after the passage of the unilateral reforms. We begin by analyzing the impact of unilateral divorce on labor supply using multiple waves of the National Household Income and Expenditures Survey (ENIGH). To identify changes in labor supply, we exploit variation in the timing and location of the divorce laws with a difference-in-differences design. Using this approach, we find that the liberalization of divorce laws increased female labor supply by 6.30 percentage points. Women also raised their intensive labor supply, working an additional seven hours per week. These changes are robust to several alternative specifications and corroborate similar findings in Stevenson (2008) and Bargain et al. (2012).² We also examine how women accommodate their increased time in the labor force and find evidence that women are substituting away from household production and into market work. Men also show an increase in labor supply on the intensive margin, though the magnitude of these changes is smaller than that of women.

The above labor supply analysis says little about the underlying mechanisms that produce this change in behavior. One potential explanation is that unilateral divorce laws change bargaining power within the marriage. However, since bargaining power is not observable, reduced-form methods are unable to quantify this effect. To

¹Figure A1 plots divorce rates over time. For a more formal analysis of the impact of unilateral divorce on divorce rates in Mexico, see Hoehn-Velasco and Penglase (2018).

²However, changes in labor supply only hold when we look at married couples with children, which is consistent with Genadek et al. (2007) who also finds distinct responses in mothers and childless women.

address this issue, we study how the introduction of unilateral divorce affects married women's bargaining power using a structural model of intra-household decision-making. We use the collective household framework (Chiappori, 1988, 1992; Apps and Rees, 1988) and infer bargaining power from a model of intra-household resource allocation. The goal of the model is to identify resource shares, defined as the share of the total household budget controlled by each spouse. To accomplish this, we follow Dunbar et al. (2013) and identify resource shares using Engel curves for private assignable goods, that is, a good that consumed exclusively by either men or women. We identify resource shares by comparing the slopes of the Engel curves for men's and women's assignable clothing.³

We estimate the model using consumption and expenditure data from the ENIGH survey. We focus on nuclear households that consist of one married couple and up to three children. Within the framework of the structural model, we compare the resource shares of married couples across treated and untreated states, before and after the reforms. We find a small decrease in women's bargaining power originating from the introduction of unilateral divorce. This result is only marginally significant and not robust to alternative specifications. We attribute this lack of robustness to several factors. First, women work more when they experience an exogenous decline in bargaining power (e.g., due to unilateral divorce laws), but this higher labor supply may result in greater female bargaining power. Our estimation is not able to disentangle these competing effects. Instead, the results provide some empirical support for this explanation as working women control more of the household budget. Second, marital property laws partially determine the relationship between divorce laws and bargaining power. Depending on the unobservable marital property regime, either spouse could benefit from more liberalized divorce laws as the marital outside option is in part determined how property would be divided in a potential divorce. The net effect of differing property laws across marriages may result in the average effect being close to zero.

This paper makes several contributions to the literature. First, we add to the extensive literature on the employment effects of unilateral divorce laws (Parkman, 1992; Gray, 1998; Bremmer and Kesselring, 2004; Genadek et al., 2007; Stevenson, 2008; Bargain et al., 2012; Hassani-Nezhad and Sjögren, 2014). The results of these studies, which focus primarily on United States and Europe, may not be generalizable to a developing-country context such as Mexico. In Mexico, there are weaker social safety nets and women's marital exit options are often considerably worse. We contribute to this literature by extending the analysis of unilateral divorce and labor supply to Latin

³This methodology and similar approaches have been employed in a variety of contexts (Calvi, 2017; Calvi et al., 2017; Penglase, 2018; Tommasi, 2018; Sokullu and Valente, 2018; Brown et al., 2018).

America, specifically Mexico.⁴ Second, we complement our reduced-form results by structurally estimating the household bargaining effects of no-fault divorce. Most existing work has attributed changes in labor supply to changes in bargaining power, without empirically testing this hypothesis. We use exogenous variation in divorce laws within a structural model to identify the causal effect of these laws on women's bargaining power. Our approach is similar to Chiappori et al. (2002) and Voena (2015). We discuss how we differ from these studies in Section 2.

The remainder of this study is organized as follows. In Section 2 we summarize the existing literature. Section 3 discusses the introduction of unilateral divorce in the Mexican context. In Section 4 we summarize the ENIGH survey. In Section 5, we discuss the empirical strategy and results from our reduced-form analysis of the relationship between divorce laws and labor supply. In Section 6 we structurally analyze the relationship between divorce laws and bargaining power to better understand our reduced-form results. We rationalize our different results in Section 7. Section 8 concludes.

2 Literature Review

This study pertains to two different strands of research. First, our study contributes to work considering the effect of unilateral divorce laws on labor supply and other household behaviors. Second, we add to recent research on understanding how public policy influences women's standing within the household.

Unilateral divorce laws have become more widespread in recent years. These laws have been shown to increase divorce rates in a variety of different contexts including the United States (Friedberg, 1998; Wolfers, 2006), several countries in Europe (González and Viitanen, 2009; Kneip and Bauer, 2009), and more recently in Mexico (Hoehn-Velasco and Penglase, 2018). How do divorce laws affect couples who remain married? Given that divorce is now a credible threat, the spouse who values exiting the marriage the most is likely to benefit from the new divorce regime. This shift in bargaining power within the marriage is likely to have a corresponding effect on household behavior. A large literature has analyzed this hypothesis along several different dimensions, including labor supply, savings decisions, and investments in children. Our study relates primarily to work on the relationship between unilateral divorce laws and labor supply.

⁴In general, research on divorce in developing countries is quite limited, with recent exceptions being Lagoutte et al. (2014) and Lambert et al. (2017).

A variety of studies (Peters, 1986; Parkman, 1992; Genadek et al., 2007; Stevenson, 2008; Bargain et al., 2012) in several different contexts find that the introduction of unilateral divorce laws increased women's labor supply. These results are often attributed to women wanting to insure themselves against divorce. Gray (1998) studies the consequences of unilateral divorce laws in the United States, and somewhat counterintuitively, attributes changes in women's labor supply to *increased* women's bargaining power. Gray (1998) reaches this conclusion using variation in state-level marital property laws to show that women increased their labor supply and reduced household production in states with property regimes favoring women. In contrast, Chiappori et al. (2002) interpret higher labor supply as a decrease in bargaining power due to the decline in leisure, though they do not incorporate household production in their analysis.

We contribute to this literature in two ways. First, our study addresses the conflicting evidence on the relationship between divorce laws, labor supply, and bargaining power by directly estimating changes in market work, household work, leisure, and bargaining power. Second, add to this literature by analyzing the effects of unilateral divorce on labor supply in an emerging economy. The wellbeing of women in a Mexico is an important policy issue and divorce laws appear to have different effects by gender. Existing work on the introduction of unilateral divorce in Mexico has focused on the effect on divorce rates and domestic violence (Lew and Beleche, 2008; Garcia-Ramos, 2017; Hoehn-Velasco and Penglase, 2018).

Our study also relates to recent work on the relationship between household bargaining power and divorce laws. Similar to our study, Chiappori et al. (2002) structurally estimate the relationship between divorce laws, bargaining power, and labor supply. The authors extend the collective labor supply model (Chiappori, 1988, 1992; Apps and Rees, 1988) to include distribution factors, such as divorce laws and the sex ratio.⁵ Voena (2015) extends Chiappori et al. (2002) to a dynamic setting and incorporates asset accumulation and marriage into a life-cycle structural model. Like these studies, we examine the effects of unilateral divorce on both labor supply and bargaining power within the marriage. We differ in two respects; First, instead of using a labor supply model, we infer bargaining power from a collective model of resource allocation (Browning et al., 2013; Dunbar et al., 2013). Because we focus on a developing country, female labor supply in market work is uncommon, and wage data is unavailable for most of the sample. By contrast, we observe detailed consumption data. We add to the growing number of studies that have structurally estimated women's

⁵Distribution factors are variables that affect bargaining power within the household, but not preferences for goods.

bargaining power in the developing world using this framework.⁶ Our second difference is that we can conduct a more causal analysis. Our estimation allows for the inclusion of year and state-fixed effects in identifying the relationship between divorce laws and women's bargaining power, and thus our approach resembles a difference-in-difference identification strategy within a structural model. Voena (2015) is also able to incorporate this type of variation to identify the key model parameters using an indirect inference approach. A weakness of our paper relative to these existing studies is that we are unable to account for the property regime of the marriage, which may impact our results. We discuss this in more detail in Section 7.

More generally, our study adds to work on the influence of public policy on women's standing within the household. A large body of work has examined the role of cash transfers, inheritance laws, family leave, and many other programs designed to improve women's well-being. We focus on divorce laws, which include laws that facilitate divorce proceedings (our paper) as well as laws that deal with child custody, alimony, and property rights. Past work has examined theoretically how divorce laws should affect intra-household dynamics. Becker (1993) applies the Coase theorem to the decision to divorce and determines that divorce rates should remain unchanged, but couples should reallocate goods. More recently, Chiappori et al. (2015) demonstrates that the Coase-Becker theorem only holds under strong assumptions over whether utility is transferable within the marriage. Examples of empirical research in this area include Peters (1986), Gray (1998), Chiappori et al. (2002), Rangel (2006), Voena (2015), among many others.

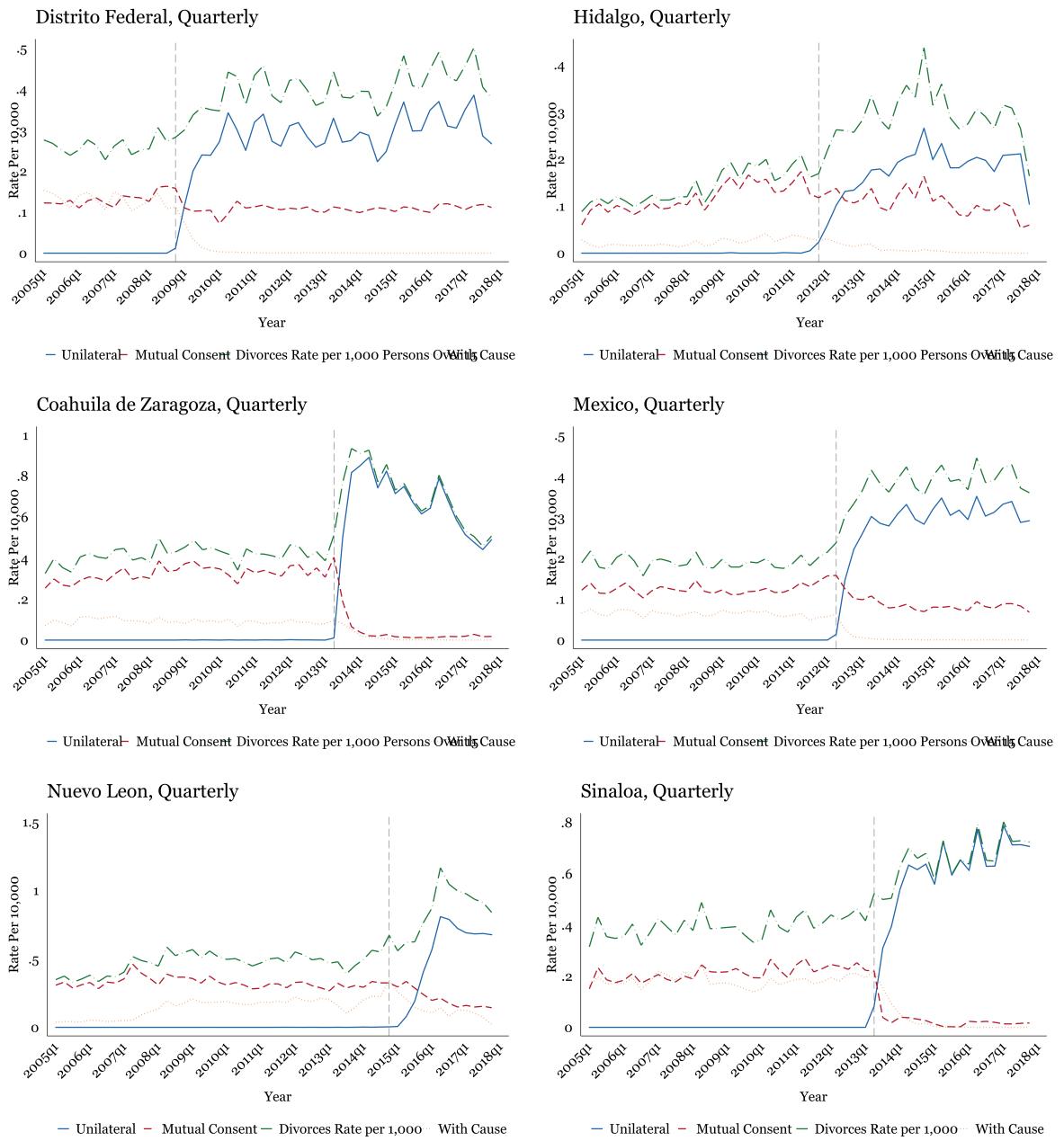
3 The Mexican Context

For most of its history, obtaining a divorce in Mexico has been an arduous process. To be granted a divorce, either the divorcing spouse had to prove cause or both spouses needed to consent to terminate the marriage. Legal reforms in the 1990s and early 2000s relaxed some of the hurdles faced by divorcing couples, but the process was still time-consuming. More drastic changes began in 2008 when Mexico City implemented no-fault unilateral divorce. This legislation allowed one spouse to dissolve the marriage without the consent of their spouse. Hidalgo adopted similar legislation in 2011, and as of 2016, 27 of Mexico's 32 states (including Mexico City) have done the same. Figure II illustrates the geographic distribution of divorce laws. The majority of the Mexican states passed the legislation between 2013 and 2016.

⁶ See, for example, Bargain et al. (2014); Calvi (2017); Calvi et al. (2017); Tommasi (2018).

Past work has demonstrated that the introduction of unilateral divorce in Mexico dramatically increased divorce rates (Hoehn-Velasco and Penglase, 2018). To illustrate this point, we present country-level trends in divorce rates in Panel A of Figure A1. We see that following the change in 2008, divorce rates began to rise with the majority of the increase due to unilateral divorces. We also observe a steady decline in divorce with cause and mutual consent divorce. Overall, the immediate impact of the legislation is muted by the fact that only one state passed the reform in 2008 and the rest after 2011.

Figure I: Divorce Rate by Type in Select States



NOTES: The divorce rate is reported per 1,000 persons over age 15.

SOURCE: INEGI divorce statistics.

The effect of the legislation on divorce rates is more apparent in a disaggregated form for individual states. Figure I shows the state-by-state impact of the reform, where the dashed vertical line indicates the introduction of unilateral divorce. Each subfigure demonstrates both the substantial increase in unilateral divorces, as well as the decline of for-cause divorce filings. Moreover, depending on the state, mutual consent divorces also declined. In Mexico City, consenting divorces were relatively stagnant, but in Sinaloa and Coahuila de Zaragoza, mutual consent divorces dropped to almost zero.

4 Data

We use individual- and household-level data from the National Household Income and Expenditures Survey (ENIGH) over the years 2008, 2010, 2012, 2014, and 2016. The Instituto Nacional de Estadistica, Geografia Informatica (INEGI) collected this information, and the data contains a nationally representative sample of Mexican households. The ENIGH is a repeated cross-section with sample sizes ranging from 8,861 households in 2012 to 69,169 households in 2016. The survey includes detailed information on income, consumption, and time use.

Figure II: Divorce Reform by State



NOTES: The divorce rate is reported per 1,000 persons over age 15.

SOURCE: INEGI divorce statistics.

Table 1 presents the summary statistics for the main estimation sample. We restrict our attention to married couples with less than four children for the main results, but include other household compositions in several of our robustness checks. We divide the results by whether or not the individual resided in a state that had adopted the unilateral reform. Around one-quarter of our sample lives in a treated state during

a treated period. Based on the summary statistics, individuals affected by the reform earn less, have fewer children, and appear slightly more likely to be working than individuals not affected by the legislation.

The primary outcomes of interest are shown in Table 1, and include labor supply, hours worked, and time use. These measures vary substantially between men and women in the sample. Women work on average 17 hours per week, with 47 percent of the sample working in the past month. Men have much higher labor supply, with 95 percent of the sample working. Men also work more than double the number of hours, around 50 hours per week. Women, by contrast, spend almost 40 hours per week doing household work while men spend about 10 hours doing household work. Men and women are most similar in leisure time with men spending around 13 hours on leisure and women spending around 15 hours.

Table 1: Summary Statistics

PANEL A: WOMEN 18-60

	No Reform		Unilateral Reform		Difference
	Mean	Std. Dev.	Mean	Std. Dev.	b
Age	37.125	8.21	37.149	8.11	-0.02
Income (K)	12.388	23.50	12.778	19.90	-0.39
# Children	1.879	0.75	1.880	0.75	-0.00
1(Literate)	0.965	0.18	0.977	0.15	-0.01***
1(Working)	0.479	0.50	0.537	0.50	-0.06***
Work Hours	17.479	22.56	19.529	23.13	-2.05***
Household Work Hours	41.285	26.99	39.814	27.16	1.47**
Leisure Hours	14.214	11.91	12.778	11.79	1.44***
Total Hours	72.389	31.27	72.063	31.32	0.33
1(Urban)	0.305	0.46	0.350	0.48	-0.04***
N	28,973		3,455		32,428

PANEL B: MEN 18-60

	No Reform		Unilateral Reform		Difference
	Mean	Std. Dev.	Mean	Std. Dev.	b
Age	49.884	9.01	49.453	9.59	0.43
Income (K)	30.169	58.01	31.876	46.32	-1.71
# Children	0.000	0.00	0.000	0.00	0.00
1(Literate)	0.956	0.20	0.961	0.19	-0.01
1(Working)	0.887	0.32	0.913	0.28	-0.03**
Work Hours	45.000	22.74	46.021	21.84	-1.02
Household Work Hours	8.111	11.96	7.485	11.02	0.63
Leisure Hours	15.923	15.23	14.798	14.82	1.12*
Total Hours	68.865	25.92	68.259	25.09	0.61
1(Urban)	0.251	0.43	0.279	0.45	-0.03*
N	9,789		1,167		10,956

NOTES: The sample includes individuals married couples with 1-3 children in the household. Income is quarterly nominal income and is reported in pesos. SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

We also report the controls used throughout the analysis. We rely mainly on the number of children, age, and the urban-rural status of the household. For the sample, households have 1.7 children on average and the spouses are between 35 and 40 years old. The youngest subsample is women in reform states who are 34 years old on average.

To measure the changes in the divorce legislation, we collect the date of the reforms from state-level civil and family laws in Mexican states. Table A1 shows the year of the legislation, as well as where in the state's legal code the unilateral reform is located. Some states designate divorce proceedings in civil codes, and others record divorce legislation in family codes. For states that do not show evidence of having a unilateral divorce, the years are blank. We confirm the accuracy of the legislation dates using the Instituto Nacional de Estadística y Geografía (INEGI) microdata covering divorces in Mexico from 2005-2016. If a state recorded more than ten unilateral divorces in that quarter-year we define that state as passing the reform.⁷ If there are discrepancies between the legislation and the data, we defer to the data and consider that state as having passed unilateral divorce legislation.

5 Unilateral Divorce and Labor Supply

5.1 Empirical Strategy

To study the effect of unilateral divorce laws on household behavior, we exploit state-level variation in the timing and adoption of no-fault divorce legislation. We implement a difference-in-differences regression model for individual i in state s during year t as:

$$Y_{ist} = \alpha + \beta(Uni_s \times Post_t) + X'_{ist} + \phi_s t + \gamma_s + \tau_t + \epsilon_{ist} \quad (1)$$

where Y_{ist} is our outcome of interest, which includes measures of labor supply and time use. Uni_s indicates state-level adoption of unilateral divorce. $Post_t$ denotes whether the state has adopted the divorce reform as of the first quarter of year t . $\phi_s t$ are state-level time trends. γ_s and τ_t are the state and year fixed effects, respectively. X_{ist} is a vector of individual controls. Controls for men and women include age, age-squared, indicators for education, urban-rural status, and the number of children.⁸

⁷We chose ten since there may be measurement error in the survey.

⁸The number of children may also be affected by the introduction unilateral divorce laws making it somewhat problematic to include as a control variable.

In several specifications, we diverge from OLS to estimate either a Probit or a Tobit model. First, for estimations where our outcome is a binary variables we rely on a Probit model and report average marginal effects. Second, because much of our analysis utilizes hours worked and over 50 percent of women do not participate in market work, these women have their hours worked censored from below at zero. To account for this censoring, we employ a Tobit Model (Tobin, 1958) in Equation (1).⁹ The estimating equations appear as:

$$\begin{aligned} Y_{ist} &= \max\{0, Y_{ist}^*\} \\ Y_{ist}^* &= \alpha + \tilde{\beta} (Uni_s \times Post_t) + \mathbf{X}'_{ist} + \phi_s t + \gamma_s + \tau_t + \epsilon_{ist} \end{aligned} \tag{2}$$

where Y_{ist} is observed hours worked (in the market or household production) or leisure, and Y^* is the latent variable. The model is estimated via maximum likelihood where $\epsilon_{ist} \sim N(0, \sigma^2)$.

5.2 Labor Force Participation Results

Table 2 shows the difference-in-differences results from Equation 1 for men and women in nuclear families with one to three children. From the reported coefficients in Panel A, women are more likely to be working in the post-reform period. Further, the majority of their additional labor supply appears to be in the form of part-time work. Following the reform, in Column (1) women are 6.30 percentage points more likely to be working. In Columns (2) and (3), women are 7.4 percentage points more likely to be working in a part-time position after the reform. There is no statistically significant change in full-time work for women.

This increase in extensive margin labor force participation corroborates similar findings in Bargain et al. (2012), where women increase their labor force participation in response to divorce liberalizations in Ireland. Stevenson (2008) also finds similar increases in labor supply during the United States' unilateral divorce reform. In both contexts, women respond to the exogenous rise in marital dissolution risk by increasing labor force participation. The magnitude of the effect is closer to the estimates in Bargain et al. (2012), who find a 5-7 percentage point increase in labor supply. Stevenson (2008) finds only a one percentage point increase in female employment. The comparison of magnitudes is imperfect as our sample is distinct from related work. We focus on married women in nuclear households with one to three children, while

⁹Ignoring this censoring would result in inconsistent estimates, and dropping these women would result in selection bias. Nonetheless, we estimate several alternative specifications that ignore this problem to match the literature.

Stevenson (2008) and Bargain et al. (2012) consider married and unmarried women.

Table 2: Unilateral Divorce Reform and Labor Supply (1-3 Children)

PANEL A: EXTENSIVE MARGIN						
Outcome:	WOMEN			MEN		
	1(Work) (1)	1(Part-time) (2)	1(Full-time) (3)	1(Work) (4)	1(Part-time) (5)	1(Full-time) (6)
Uni x Post	0.063** (0.030)	0.074*** (0.019)	-0.012 (0.026)	0.007 (0.015)	-0.051*** (0.016)	0.049** (0.018)
N	32,428	32,428	32,428	32,023	32,023	32,023
Mean Dep	0.48	0.28	0.22	0.96	0.09	0.88
Controls	X	X	X	X	X	X
State x Trend	X	X	X	X	X	X

PANEL B: TOTAL TIME USE						
Weekly Hours Spent:	WOMEN			MEN		
	Hours Worked (1)	Household Hours (2)	Leisure Hours (3)	Hours Worked (4)	Household Hours (5)	Leisure Hours (6)
Uni x Post	6.854*** (2.151)	1.058 (1.600)	-1.070 (2.130)	2.027** (0.966)	0.360 (1.829)	-1.791 (1.280)
N	32,428	32,257	32,068	32,023	31,871	31,773
Mean Dep	17.70	14.06	41.13	50.74	12.91	10.51
Controls	X	X	X	X	X	X
State x Trend	X	X	X	X	X	X

PANEL C: SHARE OF TIME USE						
Share of Time:	WOMEN			MEN		
	Working (1)	Household (2)	Leisure (3)	Working (4)	Household (5)	Leisure (6)
Uni x Post	0.078*** (0.030)	-0.048*** (0.016)	0.018 (0.016)	0.014 (0.027)	-0.021 (0.013)	0.009 (0.020)
N	31,905	31,581	31,760	31,861	31,615	31,714
Mean Dep	0.23	0.56	0.21	0.70	0.13	0.17
Controls	X	X	X	X	X	X
State x Trend	X	X	X	X	X	X

NOTES: Difference-in-differences estimation. OLS coefficients are reported for continuous variables, with the exclusion of hours worked for women. We estimate female hours worked with a Tobit to account for censoring. Binary outcomes are estimated with a Probit and the reported coefficients are the estimated average marginal effects. Controls for men and women include age, age-squared, indicators for education, urban-rural status, and the number of children. Part-time work is an indicator that equals one if the individual reports working less than 35 hours per week. Full-time work is an indicator for 35 hours or more hours of work per week. The share of time on each activity is defined as the reported hours on each activity divided by the total number of hours reported by the individual. Robust standard errors are clustered at the state level and reported in parentheses. ***, **, * mean statistical significance at 1, 5 and 10 percent levels.

SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

Next, we consider whether women spend substantially more hours in the labor force during the post-reform period. We find that women are not only increasing their extensive labor supply but also their intensive margin labor supply. In Panel B Column

(1), women work on average, seven more hours per week.¹⁰ We then test whether women are changing their time allocation over leisure activities and household work. Women who now spend more time in the labor force may have less time to contribute to previously necessary activities such as household chores. Columns (2) and (3) report the results from an OLS estimation. Neither coefficient reveals a statistically significant effect following the reform. Women do not appear to be replacing their household or leisure hours with market work.

Next, in Table 2, we address the fact that reported hours spent on work, leisure, and household activities might suffer from poor reporting by individuals; Individuals may over-report or under-report their total number of total hours during a given week due to self-reporting limitations. To address this, we normalize the time use of individuals into shares of the total reported hours. Panel C presents the results. Here the denominator is the total hours reported per week, which is the sum of market work, household work, and leisure time. Column (1) corroborates findings from Panels A and B. Post-reform women increase their share of time spent on market work. When looking at the total stock of time, Column (2) shows that women are shifting their time away from household activities and spending more time working outside the household.

We additionally consider how the reform affects men in Table 2. Panels A and B show that men follow a similar pattern to women and increase their labor supply through their hours worked. The results are slightly nuanced, however, as men move from part-time to full-time employment whereas women are entering the labor force in the form of part-time work. We also do not see a change in the extensive margin labor force participation for men. This lack of an effect is likely due to the fact that 95 percent of married men were already working in the pre-reform period, which does not leave room for extensive labor supply to increase substantially. In Panel C, men do not appear to shift the composition of their weekly hours.

5.3 Robustness

Overall, the difference-in-differences estimation shows that men and women are spending more time in the labor force, and for women, less time on non-market household activities. The theme of the results is consistent across all specifications; men

¹⁰To test whether the specification choice of the Tobit is producing the increase in hours worked, we also estimate the effect with OLS (ignoring the censoring), and then also restricting the sample to women who work. In both cases the results are roughly half of the magnitude of the Tobit results, but still statistically significant. As the OLS model no longer accounts for censoring, the decline in the estimated impact is expected. These results are available upon request.

and women invest more time in work outside of the household. To examine the robustness of these findings, we report several adjustments to the base sample in Table 3. Throughout these checks, we focus on our primary outcomes of interest: hours worked in the past week and labor force participation in the past month.

Table 3 shows women in Panel A and men in Panel B. In Columns (1) and (2) we confine the sample to states that eventually pass the reform during the sample period (before 2016). The motivation behind this restriction is that states that did not adopt unilateral divorce laws may be different in unobservable ways that could bias the results. As a result, individuals in these states may not belong in the control group. Encouragingly, the restricted results are consistent with the baseline from Table 2. Women are more likely to be working (5.7 percentage points) and are working more hours (7 hours per week). Men are working an additional two hours per week, but similar to the baseline, do not change their extensive labor supply.

In Columns (3) to (8) we examine additional subsamples of interest. Columns (3) and (4) limit the sample ages to 18-50. This 18-50 group may be more sensitive to the change in legislation than ages 51-60, especially since these women may be more likely to have young children at home. The results are similar to the baseline. Then, to directly test whether women who have children under age five are affected differently than the base sample, Columns (5) and (6) restrict the sample to only women with children under age five. In fact, women with young children appear to have a higher response (in magnitude) to the reform at both the extensive and intensive margins, but the estimates are less precise. This result is surprising as mothers of young children are the least likely to participate in the labor force; only 41% of the women with young children work as opposed to 48% in the full sample.

We test whether urban or rural individuals behave differently than the full sample. The motivation behind this subsample is that women in rural areas may have fewer formal labor market opportunities. In Columns (7) and (8), the urban-only sample is more sensitive than the rural sample. The effect disappears for urban women but remains for rural women in Columns (9) and (10). For men, the subsample behaves similarly. There is no change for men across the urban sample, but in the rural sample, men are increasing their labor supply and their intensive margin hours worked. We then drop the top and bottom five percent income tails in Columns (7) and (8), to test whether the high or low income individuals are driving the results. The results appear similar in magnitude to the baseline.

In the Appendix, we conduct several additional robustness checks in Table A2. We report results for single women and men in Columns (1) and (2). For single women, the

magnitude of the effects is similar to the baseline sample of married women with children. These results corroborate similar findings in Stevenson (2008), where unilateral reform in the United States affects both married and unmarried women. Unmarried women appear to be exhibiting precautionary labor force participation in response to the reform. We next estimate the model using a sample of all married individuals in Columns (3) and (4) (i.e., not just those in nuclear households). For these women, the magnitudes of the effect of unilateral divorce on the probability of working and hours worked is similar to what we find in our main results in Table 2 as well. For men, we see no effects among either sample. In Columns (5) and (6) we test for changes among married couples with no children. Here, we find that these couples experience no change in labor supply following the reform. This finding is consistent with Genadek et al. (2007). In Columns (7) and (8) we expand the sample to include all men and women. Using this sample, we find that women increased their labor supply at both the intensive and extensive margins, and we see no effect on men.

Finally, in addition to the sample adjustments, the final columns of Table A2 adds controls for municipal-level marriage rates and divorce rates. These supplemental controls help to address sample differences between high and low divorce areas. Differences in divorce rates would be especially concerning if higher divorce rates following the reform led the control and treatment groups to vary substantially. The results in Columns (11) and (12) show a weaker effect on the extensive-margin labor supply, but a stronger response for women's hours worked.

Table 3: Unilateral Divorce Reform and Robustness Checks

PANEL A: WOMEN												
Outcome:	TREATMENT		AGES 18-50		CHILD 0-5		URBAN		RURAL		DROP 5% TAILS	
	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked
Uni x Post	0.057*	6.600***	0.068**	7.658***	0.090*	9.733*	0.107	10.895	0.050*	5.436**	0.063*	6.518**
	(0.030)	(2.193)	(0.026)	(1.841)	(0.052)	(5.120)	(0.078)	(7.895)	(0.028)	(2.563)	(0.034)	(2.612)
N	30,053	30,053	30,105	30,105	14,508	14,508	10,055	10,055	22,373	22,373	29,651	29,651
Mean Dep	0.49	17.78	0.49	17.82	0.43	15.30	0.43	13.96	0.51	19.38	0.48	17.46
Controls	X	X	X	X	X	X	X	X	X	X	X	X
State x Trend	X	X	X	X	X	X	X	X	X	X	X	X

PANEL B: MEN												
Outcome:	TREATMENT		AGES 18-50		CHILD 0-5		URBAN		RURAL		DROP 5% TAILS	
	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked
Uni x Post	0.008	2.051**	0.006	1.896*	0.015	4.214**	-0.044	1.840	0.024*	2.158**	0.008	2.183**
	(0.015)	(0.967)	(0.017)	(0.971)	(0.020)	(1.548)	(0.027)	(3.021)	(0.012)	(0.851)	(0.015)	(0.843)
N	29,687	29,687	27,843	27,843	14,496	14,496	9,865	9,865	22,158	22,158	29,282	29,282
Mean Dep	0.96	50.80	0.97	51.36	0.96	51.14	0.96	50.37	0.96	50.91	0.96	50.88
Controls	X	X	X	X	X	X	X	X	X	X	X	X
State x Trend	X	X	X	X	X	X	X	X	X	X	X	X

NOTES: Difference-in-differences estimation. OLS coefficients are reported for continuous variables, with the exclusion of hours worked for women. We estimate female hours worked with a Tobit to account for censoring. Binary outcomes are estimated with a Probit and the reported coefficients are the estimated average marginal effects. Controls for men and women include age, age-squared, indicators for education, urban-rural status, and the number of children. Robust standard errors are clustered at the state level and reported in parentheses. ***, **, * mean statistical significance at 1, 5 and 10 percent levels. Columns (1)-(2) restrict the sample to the treatment states only. Columns (3)-(4) present only individuals between 18 and 50. Columns (5)-(6) present individuals with children under five. Columns (7)-(10) show the rural-only/urban-only samples. Columns (11)-(12) display the results without the 5% income tails.

SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

6 Unilateral Divorce and Bargaining Power: A Structural Analysis

In this section, we analyze the causal relationship between the introduction of unilateral divorce laws on women's bargaining power within the household. As bargaining power is not observable, we develop a structural model of intrahousehold decision making to recover this parameter. We follow [Dunbar et al. \(2013\)](#) to identify the share of household resources controlled by women, which we will use to infer bargaining power. Section 6.1 presents a standard collective household model. We discuss how the model parameters are identified in Section 6.2. The estimation and results are provided in Sections 6.3 and 6.4, respectively.

6.1 Model

The model closely follows [Browning et al. \(2013\)](#) and [Dunbar et al. \(2013\)](#) (DLP). The main alteration is that we emphasize the role of unilateral divorce in the household decision making process.

We model *nuclear* households, defined as households that consist of a married man (m) and woman (f) with up to three children (c). The adults are decision makers within the household and they bargain over how to allocate the household budget.¹¹ Bargaining power within the household is a function of each spouse's outside option, and is therefore in part determined by their state's divorce laws. The goal of the model is to uncover how bargaining power changes as a result of these laws. To accomplish this, we identify how consumption goods are allocated within the household to determine which spouse "controls" more of the budget. This measure will serve as a proxy for bargaining power.¹²

Consistent with the [Browning et al. \(2013\)](#) formulation of the collective model, the household purchases a k -vector of goods z at market prices p . Individuals consume a k -vector of *private good equivalents* x of the household-level quantities, which are given by $z = Ax$. The k -by- k matrix A accounts for the sharing of goods within the household, and transforms what the household purchases into what individuals actually consume using Barten scales ([Barten, 1964](#)).

¹¹Children do not participate in the bargaining process. Instead, children can be thought of as a public good from which both the mother and father derive utility.

¹²[Browning et al. \(2013\)](#) show that resource shares have a monotonic relationship with the Pareto weights, which determines each household member's bargaining power.

The man and woman each have their own utility function $U_j(x_j)$, $j \in \{m, f\}$. We write the household's problem as follows:

$$\begin{aligned} & \max_{x_m, x_f} \tilde{U}_h[U_m(x_m), U_f(x_f), p/y] \\ & \text{such that} \\ & y = z' p \text{ and } z = A[x_m + x_f] \end{aligned} \tag{3}$$

where \tilde{U}_s exists by Pareto efficiency.

Solving this program results in bundles of private good equivalents. Pricing these goods at within household shadow prices $A' p$ allows us we can calculate resource shares η_m , defined as the share of the total household budget controlled by the man. It follows that $\eta_f = 1 - \eta_m$ of the household budget is controlled by the woman. As η_m increases, the husband has greater bargaining power, and therefore has more control of the budget.

Because the household is Pareto efficient, we can alternatively use duality theory to redefine the household's problem as a two stage process: In the first stage, resources are optimally allocated between the husband and wife. That is, the wife is allocated $\eta_m y$ and the husband $(1 - \eta_m)y$. In the second stage, each individual maximizes their own utility subject to their within household budget constraint which is determined by their share of household resources η_j and the shadow price vector $A' p$.¹³

Resource shares are a function of observable household characteristics (suppressed for now) and also what are known in the literature as *distribution factors*. These are variables that affect each spouses relative bargaining power, but do not directly affect preferences for goods. Examples include the relative wages or age differences between spouses. In our context, we will classify unilateral divorce laws *Uni* as distribution factors. These laws will affect household decision making only through changes in the bargaining power of the spouses.

To identify resource shares, we rely on private assignable goods. A good is private if it is not shared. Examples of private assignable goods include food and clothing. A good is assignable if the econometrician can determine who in the household consumed the good. In our context, we can not determine food consumption for each individual household member, but we can assign clothing to men, women, and children. Food is therefore not assignable, whereas clothing is.

¹³Pareto efficiency is a testable assumption. It has not been rejected in a variety of different settings: [Browning and Chiappori \(1998\)](#); [Bobonis \(2009\)](#); [Attanasio and Lechene \(2014\)](#); [Calvi \(2017\)](#); [Brown et al. \(2018\)](#). However, there are notable exceptions where Pareto efficiency is rejected. See, for example, [Udry \(1996\)](#).

Following DLP, we derive household-level demand functions for the private assignable goods. The key advantage of focusing on these goods is that the demand functions will only depend on the preferences and resource shares of a single household member.

DLP derive the following household-level budget share functions for the private assignable good k . Identification does not require price variation, so we use an Engel curve framework (budget share functions holding prices fixed):

$$\begin{aligned} W_m(y, Uni) &= \eta_m(y, Uni) \omega_m(\eta_m(y, Uni))y \\ W_f(y, Uni) &= (1 - \eta_m(y, Uni)) \omega_f((1 - \eta_m(y, Uni))y) \end{aligned} \quad (4)$$

where W_j is the budget share for good for men's or women's clothing, and ω is the individual-level demand function. The parameter of interest is η_j which serves as our measure of bargaining power. The challenge in identifying η_j is that for each Engel curve there are two unknowns functions: ω_j and η_j . That is, there are two reasons the household can spend little on women's clothing; (1) women may not like clothing, or (2) women may control a small share of the household budget. In what follows, we discuss how η_j can be identified by placing semi-parametric restrictions on clothing preferences.

6.2 Identification

We follow the DLP methodology of identifying resource shares using Engel curves for private assignable goods. We use assignable clothing for men and women. DLP impose two key identification assumptions. First, resource shares are assumed to be independent of household expenditure.¹⁴ Second, DLP restrict preferences to be similar in a limited way across people. We discuss the validity of these assumption as we move through identification.¹⁵

We assume individual preferences follow a PIGLOG indirect utility function which takes the following form: $V(p, y) = e^{b(p)}[\ln y - a(p)]$.¹⁶ By Roy's identify, we derive budget share equations that are linear in log expenditure. Holding prices fixed, this results in the following Engel curves: $w(y)_j = \alpha_j + \beta_j \ln y$. Substituting this equation into Equation (4) results in a system of household-level Engel curves. We suppress

¹⁴Menon et al. (2012) show the assumption to be quite reasonable. Moreover, this assumption only has to hold at low levels of expenditure.

¹⁵Bargain et al. (2018) have tested several aspects of the collective model. The results provide empirical support for using clothing expenditures to infer how total resources are allocated.

¹⁶More general functional forms are allowed, but for expositional reasons we focus on the simpler case. Moreover, this is the functional form we use in the empirical section.

observable heterogeneity for now for notational clarity:

$$\begin{aligned} W_m &= \eta_m [\alpha_m + \beta_m \ln(\eta_m) + \beta \ln y] \\ W_f &= (1 - \eta_m)[\alpha_f + \beta_f \ln(1 - \eta_m) + \beta \ln y] \end{aligned} \tag{5}$$

where α_j and β_j are clothing preference parameters.

As required by DLP, we impose the "Similar Across People" (SAP) restriction. This restricts the slope preference parameter for clothing β_j to not vary across people, that is, $\beta_m = \beta_f = \beta$. Intuitively, this assumption requires that for the man and woman, their marginal propensity to consume clothing is the same. This is an empirically testable assumption which we investigate in the robustness section. Recent work by [Dunbar et al. \(2017\)](#) and [Calvi \(2017\)](#) provide empirical support for this assumption.

Resource shares are identified by inverting these Engel curves and implicitly solving for η_m . In practice, the model is identified using an OLS-type regression of the household-level budget share W_j on log expenditure $\ln y$. This identifies the slope of the Engel curve $c_j = \eta_j \beta$. Then since resource shares sum to one, we have that $\sum_j c_j = \sum \eta_j \beta = \beta \sum_j \eta_j = \beta$. Solving for resource shares, we have $\eta_j = c_j / \beta$. While we impose that Engel curves are linear in log expenditure, more general functional forms are permissible for identification.

How are we inferring bargaining power from how clothing expenditures are allocated? The identification strategy can be understood as follows: If household expenditure increases, this change will affect household-level expenditure on both men's and women's clothing. If we see that men's clothing budget shares increased by more than the increase in women's clothing budget shares, we infer from that that the man in the household *controlled* more of that additional household expenditure. Placing this intuition within a structural model with utility maximization is what identifies resource shares, and ultimately bargaining power.

It is important to note that the relative magnitude of clothing budget shares does not determine the relative magnitude of resource shares. It is entirely possible for women to consume more clotting, but still control a smaller share of the budget. The distinction between budget shares W_j and resource shares η_j is because preferences for clothing are allowed to be different.

6.3 Estimation

As discussed earlier, we use five waves for the National Household Income and Expenditures Survey (ENIGH) spanning the years 2008 to 2016. The key data requirements necessary for the structural model are household-level expenditure on a private assignable good (clothing) for both men and women. The ENIGH also includes detailed demographic information about the household. In the estimation, we separate households by those with children and those without, because household behavior may be systematically different across these household compositions. We therefore provide summary statistics for these two samples in Table A3. In estimating the structural model, we account for observable heterogeneity in education, age, employment, and whether the household is located in an urban or rural area.

We select a subsample of *nuclear* households, where a nuclear consists of a married couple with zero to three children. We therefore exclude a significant percentage of households that have multiple adult men or women. The reason for this exclusion is that it facilitates our interpretation of female bargaining power; since we only observe women's clothing, but not individual-level clothing, we can only identify total women's resource shares. Having multiple women in the household would complicate our interpretation of "women's" bargaining power. We drop households in the top or bottom percentile of total household expenditure in each wave to eliminate outliers, as well as households with men or women over age 60.¹⁷ Lastly, we exclude households with missing values for any of our covariates.

We first add an error term to the Engel curves given in Equation (8).

$$\begin{aligned} W_m &= \eta_m [\alpha_m + \beta_m \ln(\eta_m) + \beta \ln y] + \epsilon_m \\ W_f &= (1 - \eta_m)[\alpha_f + \beta_f \ln(1 - \eta_m) + \beta \ln y] + \epsilon_f \end{aligned} \tag{6}$$

Since expenditure is likely endogenous due to measurement error or unobservable preference heterogeneity (see, for example, Lewbel (1996)) we use income as an exogenous instrument. The model is estimated via Hansen (1982)'s Generalized Method of Moments.¹⁸ Let q_j be an $L \times 1$ vector of instruments. Then $E(\epsilon_j q_j) = 0$ for

¹⁷One reason to focus on households in this age range is because our model is static. The behavior of couples may change at retirement, and for simplicity, we avoid developing a dynamic model that accounts for these changes.

¹⁸Past work that has employed the DLP method has estimated the model using nonlinear Seemingly Unrelated Regression (for example, DLP; Calvi (2017); Penglase (2018)). While that approach is more efficient, it does not account for endogeneity in total expenditure. Moreover, we find several important differences in certain parameter estimates that lead us to use GMM instead.

all j, l . The moments can be written as follows:

$$\begin{aligned} E[(W_m - \eta_m [\alpha_m + \beta_m \ln(\eta_m) + \beta \ln y]) q_{ml}] &= 0 \\ E[(W_f - (1 - \eta_m)[\alpha_f + \beta_f \ln(1 - \eta_m) + \beta \ln y]) q_{wl}] &= 0 \end{aligned} \quad (7)$$

For instruments, we interact our vector of household demographic characteristics X_j , log income, and log expenditure with X_j .

Divorce Laws and Bargaining Power. We introduce observable heterogeneity by allowing each parameter to be a function of household characteristics. This includes demographic characteristics such as the age and education of each household member, but also state and year fixed effects. Moreover, we allow resource shares to depend on the divorce law regime in the household's state of residence. For $j \in \{m, f\}$:

$$\begin{aligned} \eta_j &= \delta^{\eta_j} X_i + \gamma_t^{\eta_j} + \psi_s^{\eta_j} + \phi Uni_s \times Post_t \\ \alpha_j &= \delta^{\alpha_j} X_i + \gamma_t^{\alpha_j} + \psi_s^{\alpha_j} \\ \beta &= \delta^\beta X_i + \gamma_t^\beta \end{aligned} \quad (8)$$

where X_i is a vector of household demographic characteristics, γ_t are year fixed effects, ψ_s are a vector of state fixed effects, and $Uni_s \times Post_t$ is an indicator for whether state s in year t allows unilateral divorce. We assume the divorce regime only affects the household demand for assignable clothing through its affect on resource shares, that is, Uni is a distribution factor and therefore does not enter either preference parameter α_j or β . Divorce laws have previously been used in the literature as a distribution factor (Chiappori et al., 2002). Lastly, note that β does not vary across person types j as required by the DLP identification method.

With the panel structure of the data, we are then estimating a difference-in-difference specification within the structural model of intra-household resource allocation. The spirit of this identification strategy is to combine the best features of reduced-form and structural techniques, as discussed in Lewbel (2018). In effect we estimate a structural system of Engel curves to identify resource shares which are linear in household characteristics. Then within the resource share function, we use a difference-in-difference model with the structural parameter as the outcome of interest.

6.4 Results

Table 4 presents the effect of the introduction of unilateral divorce on women's resource shares. This parameter originates from Equation (8) which is estimated within

Table 4: Effect of Unilateral Divorce on Women's Bargaining Power

	FULL SAMPLE			TREATED STATE SAMPLE		
	HHs with 1-3 Children (1)	HHs with 0 Children (2)	HHs with 1-3 Children (3)	HHs with 1-3 Children (4)	HHs with 0 Children (5)	HHs with 0 Children (6)
Uni × Post	-0.013* (0.007)	-0.013* (0.007)	-0.016 (0.010)	-0.010 (0.008)	-0.012 (0.008)	-0.018 (0.011)
Sample Size	26,459	26,459	4,849	22,461	22,461	4,127
Region Fixed Effects	X		X	X		X
State Fixed Effects		X			X	
Year Fixed Effects	X	X	X	X	X	X

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The full sample includes all households with 1 married couple, and 1 to 3 children. The treated state sample drops households that reside in states that have at no point adopted unilateral divorce laws. Robust standard errors in parentheses. Controls include the age and education of the husband and wife, the number of children, average child age, proportion of female children, and whether the household resides in an urban area. SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

System (7). We estimate the model separately for couples with and without children.¹⁹ Columns (1) to (3) include the entire sample, whereas Columns (4) to (6) include households that reside in states that have ever been treated. Columns (2) and (5) include state fixed effects in the resource share function.²⁰ Because of the smaller sample sizes we are unable to include state-fixed effects in the resource share parameter for the childless households. The parameter of interest is $Uni \times Post$ which can be interpreted the difference-in-difference estimate of the implementation of unilateral divorce on women's bargaining power within the household.

The results suggest a small decline in women's bargaining power in married couples with 1 to 3 children, though this effect is only marginally significant. The preferred results, given in Column (2), suggest that unilateral divorce decreased women's control of the household budget by 1.2 percentage points. Once we limit the sample to states that were ever treated, we see no effect. Moreover, there was no change in bargaining power as a result of unilateral divorce in the childless households. We attribute this small effect to three reasons. First, our estimation may not be able to

¹⁹We do not pool the samples because we view couples with children as fundamentally different than those without children. By combining the samples, we're restricting both clothing preferences and resource shares to behave in a similar way across household compositions, which we feel is an overly strong assumption.

²⁰State fixed effects are always included in the clothing preference parameter α^j .

disentangle the relationship between unilateral divorce, labor supply and bargaining power. Unilateral divorce may cause women's bargaining power to decline, but if this in turn causes women to work more, that may offset the decline in bargaining power. Second, the marital property regime (community or separate) varies across marriages and is likely highly correlated with which spouse benefits from the reforms. Because we do not know the property regime, we are unable to account for it. Lastly, we see a sharp increase in divorce rates. This suggests that couples may not be renegotiating the household allocation, but rather simply divorcing. We discuss these reasons in more detail in Section 7.

Several of the demographic characteristics are interesting on their own. The results for household with children are presented in Table A4 in the Appendix. Across both samples, female employment is strongly associated with higher female bargaining power. Using the full-sample estimates with state-fixed effects, we see that women who work control 4.4 percentage points more than women who do not. Interestingly, our full-sample estimates suggest that women benefit from their own education and from more educated husbands. We interpret men's education as proxying for higher socioeconomic status, which may have gender norms that are more favorable to women. Table A5 displays similar results for childless couples.

Lastly, we present summary statistics of the predicted resource shares in Table 5. The empirical distributions of the resource share estimates are provided in Figure A2 in the Appendix. Bargaining power is largely equal across household compositions with women controlling a slightly smaller share of the household budget at 49.1 percent in married couples with one to three children. Recall that these measures have a one-to-one relationship with the Pareto weights. Results are similar for couples without children. These figures are slightly higher than previous estimates in the Mexican context which find women control slightly less than half of the budget (Tommasi, 2018). However, these results use data from the late 1990s and early 2000s, and we believe it's likely women's empowerment has improved in recent years.

The above results suggest the introduction of unilateral divorce had a small, near-negligible effect on women's bargaining power within the household. In the next section, we reconcile these results with our labor supply results and also discuss potential reasons for the lack of a large effect of these laws on women's bargaining power within the household.

Table 5: Predicted Resource Shares

			Mean	Median	Std. Dev.	Min.	Max.	Obs.
Married Couples with One to Three Children	Women	0.491	0.494	0.096	0.017	0.808	26,459	
	Men	0.509	0.506	0.096	0.192	0.983		
Married Couples with No Children	Women	0.480	0.500	0.093	0.170	0.713	4,849	
	Men	0.520	0.500	0.093	0.287	0.830		

NOTES: Descriptive statistics for the predicted resource shares across the estimation sample.

SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

7 Discussion

Our results in Section 5 suggest that the introduction of unilateral divorce laws resulted in married women with children increasing the labor supply. How do these results reconcile with what we find in our structural analyses? In this section, we first discuss the relationship between our labor supply and women's bargaining power results. We then discuss how property rights within the marriage may interact with divorce laws, and how this relationship could confound our analysis.

7.1 Labor Supply and Women's Bargaining Power

One complication that arises in the interpretation of our results is that working, in and of itself, increases female bargaining power. That is, women may work more because of a decline in bargaining power, but the higher wage income relative to their husbands may offset some of this decline. A natural solution to this problem is to model labor supply in addition to consumption allocations as a way of inferring women's bargaining power. We would study both how consumption goods and leisure is allocated to estimate changes in bargaining power as a result of the divorce laws. Lise and Seitz (2011) conduct an analysis along these lines. However, there are several complications that prevent us from taking this route. First, Lise and Seitz (2011) focus only on childless married couples who both are employed in market work. This population is not common in Mexico as women often work, but not in the formal sector with observable wages. Moreover, modeling household production would involve strong assumptions about household production functions. Incorporating household

production into a model of intrahousehold consumer demand is beyond the scope of this paper. While not entirely satisfying, we refrain from complicating our model, and instead choose a simpler formulation that may fail to entirely capture our desired outcomes of interest.

Our results do suggest that failing to model labor supply does affect our results. In Table A4, we see that women with children who work control 4.4 percentages points more of the household budget. A positive association between labor supply and bargaining power is unsurprising and consistent with the above discussion. Interestingly, however, we do not see the same relationship with childless women.

7.2 Property Division and Unilateral Divorce Laws

In Mexico, couples choose how property is divided at the time of marriage. The couple can decide to operate under a *communal* property regime, in which case all assets are shared by both spouses (56.9 percent of marriages). Alternatively, the couple could decide on a *separate* property regime, where each spouse individually owns certain assets (26.5 percent of marriages).²¹

The impact of no-fault unilateral divorce laws on women's bargaining power may depend on the divorce property regime. From the perspective of Nash bargaining, spouses who have a better outside option have a higher threat point, and therefore a better bargaining position within the marriage. The introduction of no-fault unilateral divorce interacts with the divorce property regime in such a way that significantly alters each spouses outside option.²²

To illustrate this point, consider two married couples that both consist of an employed husband, and a wife who does not do market work. Suppose the first couple is living under a communal property regime and the second under a separate property regime, but are otherwise identical. Does the introduction of no-fault unilateral divorce affect both couples in the same way? The answer is no. For the married couple living under a communal property regime, the wife benefits from the law change more so than the husband. She can make a credible threat to file for divorce and take a large share of the property for herself. Her bargaining power should therefore increase. For

²¹The remaining marriages are unaware of what they decided.

²²The importance of property rights in understanding the consequences of divorce laws has been studied most notably by Gray (1998) and Voena (2015). Both studies highlight the need to account how marital property is divided should the couple divorce in understanding the impact of no-fault divorce on labor supply, savings, and bargaining power. Stevenson (2008), however, finds evidence that the effect of unilateral divorce on women's labor supply does *not* depend on the property regime.

the married couple with separate assets, the introduction of no-fault divorce will benefit the husband, as he is employed and presumably has a better outside option. His bargaining power should increase.

These competing effects may cancel each other out, resulting in no change *on average* in the estimation sample. Because we do not observe the property rights within the marriage, we are unable to account for this type of heterogeneity. Moreover, there are no state-level laws that govern marital property that would allow us to conduct an analysis similar to Gray (1998), Stevenson (2008), or Voena (2015).

8 Conclusion

This paper analyzes the consequences of unilateral divorce laws in Mexico. We demonstrate that women who resided in states that legalized unilateral divorce increased their labor supply at both the intensive and extensive margins. This result is consistent with the existing literature and suggests that women entered the labor market to help insure themselves against divorce. We then investigate the underlying mechanisms. To do so, we use a structural model of intra-household resource allocation to identify changes in bargaining power as a result of unilateral divorce laws. Our findings indicate a small decline in women's bargaining power on average, though these results are not large or robust to alternative specifications. There are several potential reasons for the lack of a substantial effect that motivate future research. First, the relationship between labor supply decisions and bargaining power is difficult to disentangle within this context and may need to be jointly modeled. Second, property rights are integral in determining which spouse benefits from divorce. Property rights are a vital source of heterogeneity that we are unable to account for in this paper.

Our results highlight the importance of understanding intra-household dynamics when studying the consequences of public policy. Unilateral divorce laws are present in at least nine countries and seem destined to proceed to spread. The introduction of this legislation impacts all aspects of marriage: who gets married, how married couples behave, and which couples get divorced. Moreover, unilateral divorce may have different effects in developing countries where women at times have a lower standing in society, and there are fewer social protections for vulnerable individuals. It is, therefore, necessary to empirically study the welfare effects of these laws as we do in this study.

There are several directions for future work in this context. First, we ignore ex-

tended family households, which are common across Mexico. Understanding the interaction between spouses in these types of households is relevant to the entire collective household literature, and is true here as well. Second, our model is static, and there are undoubtedly dynamic elements to the decision to get divorced, most obviously the possibility of remarriage. Lastly, further research is necessary to incorporate alimony and child custody laws into the analysis.

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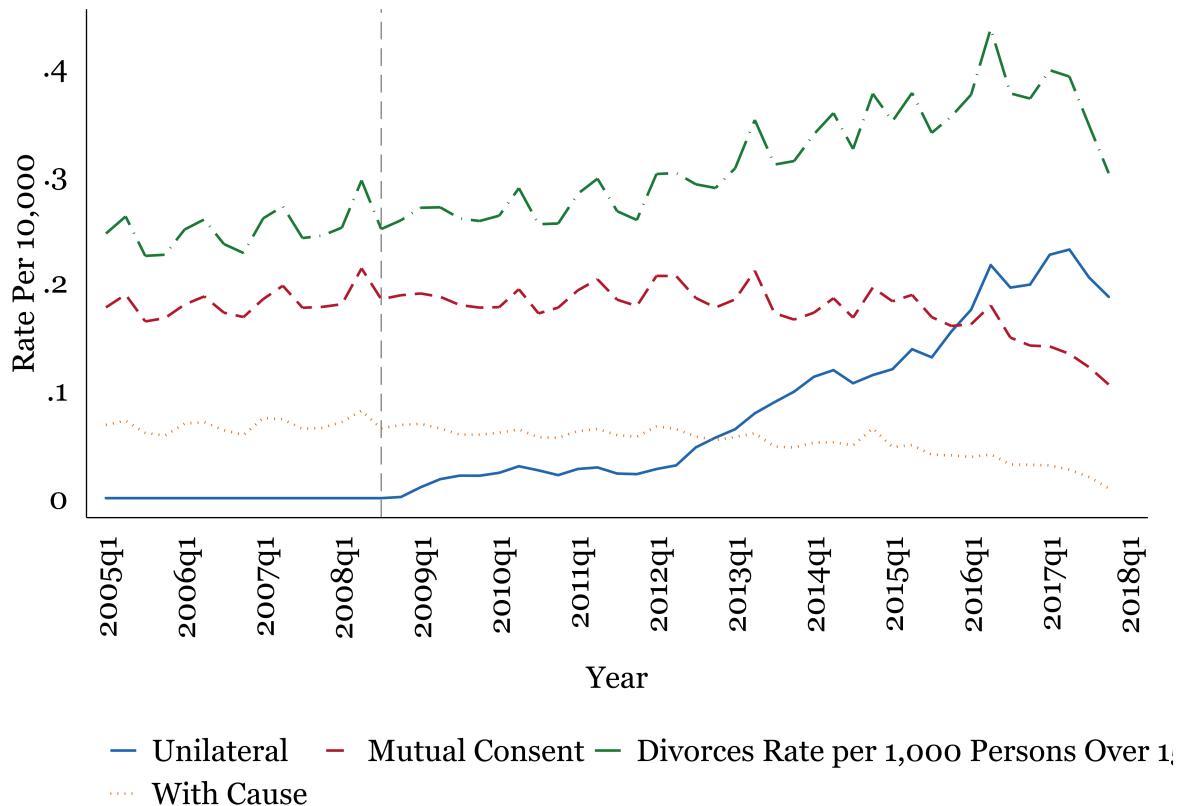
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A Appendix

A.1 Additional Tables

Figure A1: Divorce Rate in Mexico



NOTES: The divorce rate is reported per 1,000 persons over age 15.

SOURCE: INEGI divorce statistics.

Table A1: Unilateral Divorce Legislation Year and State

Region	State	Year	Legal Code	Divorce Articles
Central	Mexico City	2008	Civil	266, 267, 272
	Guanajuato		Civil	328, 323, 329
	Hidalgo	2011	Family	102, 103
	Mexico	2012	Civil	4.89, 4.91, 4.191, 4.102, 4.105
	Morelos	2016	Family	174, 175
	Puebla	2016	Civil	442 - 453
	Queretaro	2015	Civil	246, 249, 252, 253
	Tlaxcala	2016	Civil	123, 125
North	Aguascalientes	2015	Civil	288, 289, 294, 295, 296, 298
	Baja California		Civil	264, 269, 271
	Baja California Sur		Civil	305, 273, 277, 278, 279, 284, 288, 289
	Coahuila	2013	Civil	362, 363, 369, 374
	Chihuahua	2016	Civil	255, 256
	Durango	2016	Civil	261-286
	Nuevo Leon	2014	Civil	267, 272, 274
	San Luis Potosi	2016	Family	86, 87
	Sinaloa	2013	Family	181, 182, 184
	Sonora	2015	Family	141-156
	Tamaulipas	2014	Civil	248, 249, 253
	Zacatecas		Family	214, 215, 223, 224, 231
West	Colima	2016	Civil	267, 268, 272, 273, 278
	Jalisco		Civil	404, 405
	Michoacan	2016	Family	256, 257, 258
	Nayarit	2015	Civil	221, 260, 261, 263, 265
South-East	Campeche	2014	Civil	281, 282, 283, 284, 287
	Chiapas	2014	Civil	263, 268, 269, 270
	Guerrero	2012	Ley de Divorcio	4, 11, 12, 13, 16, 17, 27, 28, 44
	Oaxaca	2017	Civil	278, 279, 284, 285
	Quintana Roo	2016	Civil	798, 799, 800, 801, 804, 805
	Tabasco	2015	Civil	257, 258, 267, 268, 269, 272
	Veracruz	2015	Civil	141, 146, 147, 148, 150
	Yucatan	2013	Family	191, 192

SOURCES: Family and civil codes of each state. Popular press articles. Garcia-Ramos (2017). Mendez-Sachez (2014). When the sources conflict, we default to the quarter-year combination where the number of unilateral divorces sentenced passes ten for each state in the national data (see INEGI).

NOTES: Author's combination of the above sources. States with blank year had not passed unilateral divorce as of 2016/2017. The last year of the sample in the ENIGH is 2016, so passage after 2016 will not affect results.

Table A2: Unilateral Divorce Reform and Labor Supply, Additional Checks

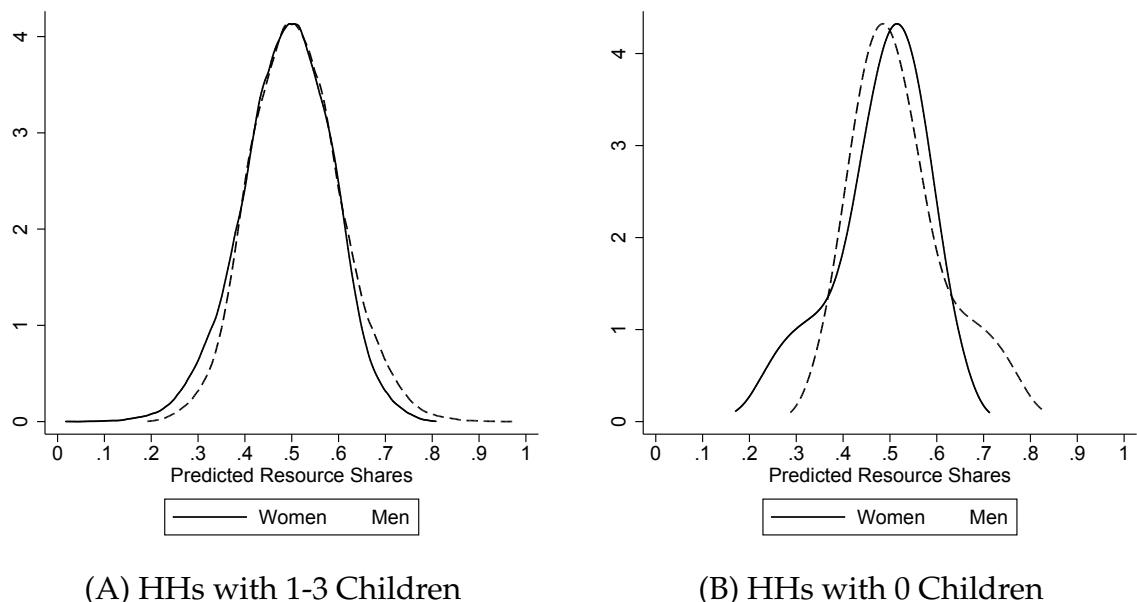
	PANEL A: WOMEN									
	ALL SINGLE INDIVIDUALS		ALL MARRIED INDIVIDUALS		MARRIED NO CHILDREN		FULL SAMPLE		DIVORCE AND MARRIAGE RATES	
Outcome:	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Uni x Post	0.067*	6.659**	0.070***	6.433***	0.026	1.642	0.058**	5.613***	0.066*	7.105***
	(0.035)	(3.247)	(0.021)	(1.621)	(0.049)	(4.039)	(0.024)	(2.104)	(0.035)	(2.568)
N	50,597	50,597	52,774	52,774	12,795	12,795	103,371	103,371	28,948	28,948
Mean Dep	0.57	23.50	0.48	17.76	0.46	17.86	0.52	20.57	0.48	17.70
Controls	X	X	X	X	X	X	X	X	X	X
State x Trend	X	X	X	X	X	X	X	X	X	X

	PANEL B: MEN									
	ALL SINGLE INDIVIDUALS		ALL MARRIED INDIVIDUALS		MARRIED NO CHILDREN		FULL SAMPLE		DIVORCE AND MARRIAGE RATES	
Outcome:	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked	1(Work)	Hours Worked
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Uni x Post	0.011	0.572	-0.004	0.593	-0.040	-5.047	0.007	0.864	-0.000	1.821*
	(0.028)	(1.507)	(0.010)	(0.626)	(0.039)	(3.584)	(0.015)	(0.989)	(0.014)	(1.006)
N	52,028	52,028	49,137	49,137	10,956	10,956	101,165	101,165	28,581	28,581
Mean Dep	0.81	40.33	0.94	49.21	0.89	45.11	0.87	44.65	0.96	50.74
Controls	X	X	X	X	X	X	X	X	X	X
State x Trend	X	X	X	X	X	X	X	X	X	X

NOTES: Difference-in-differences estimation. Columns (1)-(2) represent the single men and women. Columns (3)-(4) show all married couples. Columns (5)-(6) display married couples with no children. Columns (7)-(8) show the estimates over all individuals in the sample. Columns (9)-(10) show results with additional controls for municipal-level divorce rates and marriage rates. Controls for men and women include age, age-squared, indicators for education, urban-rural status, and the number of children. Robust standard errors are clustered at the state level and reported in parentheses. ***, **, * mean statistical significance at 1, 5 and 10 percent levels.

SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

Figure A2: Empirical Distributions of Estimated Resource Shares



NOTES: GMM estimates. SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

Table A3: Descriptive Statistics

PANEL A: HOUSEHOLDS WITHOUT CHILDREN

	Mean	Median	Std. Dev.	Min.	Max.
<i>Household Characteristics:</i>					
Treat × Post	0.358	0	0.480	0	1
Women Working	0.521	1	0.500	0	1
Women Secondary Schooling	0.641	1	0.480	0	1
Men Secondary Schooling	0.655	1	0.475	0	1
Women's Age	43.966	48	11.614	18	60
Men's Age	46.165	50	11.409	18	60
Urban	0.586	1	0.493	0	1
<i>Year:</i>					
2008	0.162	0	0.369	0	1
2010	0.177	0	0.382	0	1
2012	0.055	0	0.227	0	1
2014	0.134	0	0.341	0	1
2016	0.471	0	0.499	0	1
<i>Household Expenditures:</i>					
Women's Clothing Budget Shares	0.018	0.008	0.027	0	0.264
Men's Clothing Budget Shares	0.017	0.003	0.026	0	0.296
Total Expenditure (K)	21.803	15.679	18.766	2.395	123.757
N = 4,849					

PANEL B: HOUSEHOLDS WITH CHILDREN

	Mean	Median	Std. Dev.	Min.	Max.
<i>Household Characteristics:</i>					
Treat × Post	0.400	0	0.490	0	1
Women Working	0.473	0	0.499	0	1
Women Secondary Schooling	0.761	1	0.427	0	1
Men Secondary Schooling	0.754	1	0.431	0	1
Women's Age	34.649	34	7.620	18	60
Men's Age	37.329	37	8.014	18	60
Urban	0.553	1	0.497	0	1
Proportion Female Children	0.484	0.5	0.383	0	1
Average Children's Age	8.219	8	4.288	0	17
Number of Children	1.998	2	0.743	1	3
<i>Year:</i>					
2008	0.207	0	0.405	0	1
2010	0.184	0	0.387	0	1
2012	0.055	0	0.229	0	1
2014	0.123	0	0.328	0	1
2016	0.432	0	0.495	0	1
<i>Household Expenditures:</i>					
Women's Clothing Budget Shares	0.010	0	0.017	0	0.324
Men's Clothing Budget Shares	0.009	0	0.018	0	0.359
Total Expenditure (K)	23.438	18.336	17.529	2.135	124.941
N = 26,459					

NOTE: The sample in Panel A includes married couples age 18 to 60 with no co-resident children. The sample in Panel B includes married couples age 18 to 60 with 1 to 3 children. Total Expenditure is quarterly nominal expenditure and is reported in thousands of pesos. SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

Table A4: Determinants of Women's Resource Shares (HHs with Children)

	FULL SAMPLE		TREATED STATE SAMPLE	
	(1)	(2)	(3)	(4)
Uni × Post	-0.013*	-0.013*	-0.010	-0.012
	(0.007)	(0.007)	(0.008)	(0.008)
Working Women	0.048***	0.044***	0.054***	0.044***
	(0.014)	(0.013)	(0.014)	(0.013)
Women's Education	0.056***	0.053***	0.057***	0.023
	(0.020)	(0.018)	(0.020)	(0.020)
Men's Education	0.045**	0.018	0.074***	0.009
	(0.019)	(0.018)	(0.019)	(0.020)
Woman's Age	-0.178	0.629	-0.243	1.385*
	(0.824)	(0.789)	(0.814)	(0.795)
Woman's Age ²	0.292	0.459	-0.134	-2.262**
	(0.818)	(0.786)	(1.085)	(1.052)
Men's Age	-0.091	-1.243	0.163	-0.704
	(1.094)	(1.035)	(0.806)	(0.791)
Men's Age ²	-0.717	-0.661	-0.525	0.722
	(1.011)	(0.955)	(1.002)	(0.973)
Urban	-0.002	0.060***	-0.014	0.056***
	(0.016)	(0.015)	(0.015)	(0.016)
Children's Age	0.542***	0.482**	0.807***	0.759***
	(0.205)	(0.193)	(0.213)	(0.204)
Proportion Female Children	-0.043**	-0.050***	-0.042**	-0.045***
	(0.017)	(0.016)	(0.017)	(0.017)
2 Children	0.017	-0.008	-0.000	-0.017
	(0.017)	(0.016)	(0.017)	(0.016)
3 Children	0.026	-0.005	0.031	-0.005
	(0.020)	(0.018)	(0.020)	(0.020)
Intercept	0.479***	0.612***	0.495***	0.401***
	(0.028)	(0.048)	(0.027)	(0.034)
Region Fixed Effects	X		X	
State Fixed Effects		X		X
Year Fixed Effects	X	X	X	X
N	26,459	26,459	22,461	22,461

NOTES: * p<0.1, ** p<0.05, *** p<0.01. The full sample includes all households with 1 married couple, and 1 to 3 children. The treated state sample drops households that reside in states that have at no point adopted unilateral divorce laws. Robust standard errors in parentheses. Age variables are divided by 100 to ease computation. SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

Table A5: Determinants of Women's Resource Shares
(HHs without Children)

	FULL SAMPLE (1)	TREATED STATE SAMPLE (2)
Uni × Post	-0.016 (0.010)	-0.018 (0.011)
Working Women	0.014 (0.015)	0.008 (0.016)
Women's Education	-0.053** (0.021)	-0.041* (0.022)
Men's Education	0.047** (0.020)	0.036 (0.022)
Woman's Age	-0.025 (0.745)	-1.667** (0.734)
Woman's Age ²	0.453 (0.868)	2.976*** (0.848)
Men's Age	-0.324 (0.766)	1.541** (0.738)
Men's Age ²	-0.166 (0.875)	-2.677*** (0.838)
Urban	-0.012 (0.019)	-0.002 (0.020)
Intercept	0.505*** (0.032)	0.457*** (0.033)
Region Fixed Effects	X	X
Year Fixed Effects	X	X
N	4,849	4,127

NOTES: * p<0.1, ** p<0.05, *** p<0.01. The full sample includes all households with 1 married couple, and no children. The treated state sample drops households that reside in states that have at no point adopted unilateral divorce laws. Robust standard errors in parentheses. Age variables are divided by 100 to ease computation. SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

A.2 Child Welfare

Empirical Strategy We next analyze the impact of unilateral divorce on child welfare. Past work has demonstrated that increases in women's bargaining power result in more household resources devoted to children (Calvi et al., 2017). Then if the introduction of unilateral divorce shifts bargaining power within the household, that may have a corresponding effect on investments in children. We begin by examining changes in child health. However, since we do not observe child weight, height, vaccinations, or any other direct measure of child health, we instead focus on food expenditures. Food is a natural proxy for child health and serves as an input in the child's health production function. We follow recent work by Attanasio and Lechene (2010), Armand et al. (2016), and Tommasi (2018) and analyze how Engel curves for food respond to potential changes in women's bargaining power. We use a model of household demand where we assume that household preferences for food follow a PIGLOG indirect utility function.²³ This results in Working-Leser Engel curves which are linear in log expenditure. For household h in state s in year t , the food Engel curve is written as follows:

$$W_{hst}^{food}(y) = \delta^X X_h + \psi Uni_{st} + \gamma_t + \phi_s + \gamma_s t + \beta \ln y + \epsilon_{hst} \quad (\text{A1})$$

where W_{hst}^{food} are the household_level budget shares for food, X_h is a vector of household characteristics, and y is total household expenditure. γ_t and ϕ_s denote year and state fixed effects respectively and we control for state-specific time trends with $t\gamma_s$. ϵ_{hst} is a household-specific error. In other specifications we interact $\ln y$ with X_h and Uni_{st} to allow the slope of the Engel curve to vary with household characteristics and treatment.²⁴ The coefficient of interest is ψ , which quantifies the effect of unilateral divorce on food expenditures in treated states as the deviation from state-level trends. We also estimate the effect of unilateral divorce on education expenditures and assume household preferences follow a similar functional form.

Estimation of Equation (A1) may suffer from endogeneity due to the inclusion of total expenditure. As discussed in Armand et al. (2016), total expenditure is likely measured with error or correlated with unobservable preference shocks. We therefore use income as an identifying instrument for total expenditure as is typical in the literature.²⁵ We estimate the model using Hansen (1982)'s Generalized Method of Moments. Our exogenous variables are log income, our treatment indicator, and their interaction with the vector of household characteristics, which includes the age and education of the man and woman, number of children, average child age, female employment status, state residence, and whether the household lives in an urban area. Our endogenous variable is total expenditure.

Results Table A6 provides the results. We estimate three specifications. In columns (1) and (2), we limit the effect of unilateral divorce on food demand to be an intercept shift in

²³The PIGLOG indirect utility takes the following form: $V(p, y) = e^{b(p)}[\ln y - a(p)]$.

²⁴Armand et al. (2016) show that conditional cash transfers target at mothers had different effects for different expenditure levels. We therefore test for similar responses in this context.

²⁵See, for example, Lewbel (1996).

Table A6: Unilateral Divorce and Household Expenditure Decisions

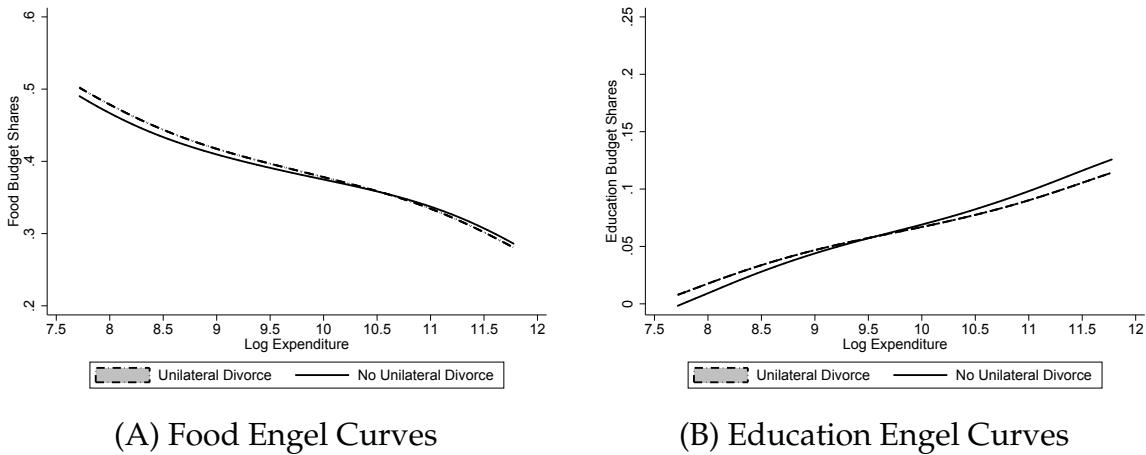
	Food			Education		
	(1)	(2)	(3)	(4)	(5)	(6)
Uni × Post	0.006 (0.005)	0.006 (0.004)	-0.194 (0.129)	0.001 (0.004)	-0.002 (0.003)	0.045 (0.096)
Log Expenditure	-0.136*** (0.004)	-0.106*** (0.006)	-0.120*** (0.010)	0.050*** (0.004)	0.012** (0.005)	0.015* (0.009)
Uni × Post × Log Expenditure			0.020 (0.013)			-0.005 (0.010)
Sample Size	26,457	26,457	26,457	26,457	26,457	26,457
Mean Dependent Variable	0.410	0.410	0.410	0.097	0.097	0.097

<i>Intercept Shifters</i>						
Household Characteristics	X	X	X	X	X	X
<i>Uni × Post</i>	X	X	X	X	X	X

<i>Slope Shifters</i>						
Household Characteristics		X	X		X	X
<i>Uni × Post</i>			X			X

NOTES: * p<0.1, ** p<0.05, *** p<0.01. Engel curves for food and education for reference households with all household characteristics at their median value. The sample includes all households with 1 married couple, and 1 to 3 children. In columns 1, 2, 4, and 5 the effect of unilateral divorce is restricted to an intercept shift. In columns 2, 3, 5, and 6 we allow the slope of the Engel curve to vary with household characteristics. In columns 3 and 6 we allow the effect of unilateral divorce to affect both the slope and intercept of the Engel curve. SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

Figure A3: Household Expenditure by Unilateral Divorce Adoption



NOTES: Engel curves for food and education for reference households with all household characteristics at their median value. SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.

the Engel curve. In column (2) we allow the slope of the Engel curve to vary with household characteristics. Finally, in column (3), we allow the slope of the Engel curve to vary with both the introduction of unilateral divorce and household characteristics. We also examine the relationship between unilateral divorce and education expenditure in columns (4) to (6). If women value children's education more than men, we may see a the introduction of unilateral divorce shifting demand for these goods. This proves not to be the case.

We present the results graphically in Figure A3. We plot Engel curves setting household characteristics to their median value separately for households in and not in unilateral divorce states. We predict Engel curves using the parameter estimates from columns (3) and (6) of Table A6, respectively.²⁶ Panel A illustrates the food Engel curves whereas panel B does the same for the education Engel curves. There is not a statistical difference in either the slope or intercept for both the food and education Engel curves.

A.3 Reduced-form Child Outcomes

We also test the difference-in-differences strategy from Equation 1 for child outcomes. We limit the sample to children in nuclear families with one to three children. The results across all five columns show little positive effect. Children are not changing their labor supply, school attendance, or time use. There is evidence for a slight negative effect in terms of literacy, as treated children are less likely to be literate than untreated individuals. A portion of this effect could be the younger children present in these households, as well as the younger age of women in the treated group.

²⁶The Engel curves show little curvature suggesting that including a quadratic term for log expenditure would do little to improve the fit of the model.

Table A7: Unilateral Divorce Reform and Children's Outcomes

Outcome:	CHILDREN					
	1(In School) (1)	1(Worke) (2)	1(Behind) (3)	1(Literate) (4)	Household Hours (5)	Leisure Hours (6)
Post Reform	-0.015 (0.018)	-0.007 (0.017)	-0.006 (0.024)	-0.023** (0.011)	-0.205 (0.365)	-0.441 (1.191)
N	53,467	53,467	24,508	53,467	53,278	53,351
Mean Dep	0.92	0.10	0.13	0.95	4.73	10.53
Controls	X	X	X	X	X	X
State x Trend	X	X	X	X	X	X

NOTES: Difference-in-differences estimation. OLS coefficients are reported for continuous variables, with the exclusion of hours worked for women. We estimate female hours worked with a Tobit to account for censoring. Binary outcomes are estimated with a Probit and the reported coefficients are the estimated average marginal effects. Controls for children include indicators for age, indicators for mother's education, urban-rural status, and indicators for the children in household. Robust standard errors are clustered at the state level and reported in parentheses. ***, **, * mean statistical significance at 1, 5 and 10 percent levels.

SOURCE: National Household Income and Expenditures Survey (ENIGH) for the years 2008, 2010, 2012, 2014, and 2016.