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Did Unilateral Divorce Laws Raise Divorce Rates? A Reconciliation and New Results: Comment

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There is a debate in the United States whether the change in divorce law from fault-based mutual divorce law to no-fault unilateral divorce law has had an effect on the decision to divorce (Peters, 1986; Allen, 1992; Nakonezny et al., 1995; Glenn, 1997; Friedberg, 1998; Rodgers et al., 1999; Glenn, 1999; Wolfers, 2006). This debate has its origins in the soaring divorce rates during the 1970s. Many believe that this spike in the divorce rate was the result of the change in divorce law. However, the empirical results in the extant literature do not provide clear evidence of a positive effect of the divorce law change on divorces. Nevertheless, two influential contributions in this *Review*, the articles of Friedberg (1998) and Wolfers (2006), aim to settle the debate. Both studies' results suggest that the implementation of the no-fault unilateral divorce law has had a positive effect on divorce rates. The main empirical strength of both papers is the inclusion of controls for the heterogeneity of divorce propensities across states and time by using state-level panel data. Both papers utilize Weighted Least Squares (WLS) by multiplying the variables used in the regression analysis by weights to correct for heteroskedasticity. This heteroskedasticity is caused by the aggregation of the decision to divorce towards state-level divorce rates. However, both papers do not include regressions based on Ordinary Least Squares (OLS) without weighting, although it is common practice to report these results in addition to WLS.

In this comment, we replicate the results of Friedberg (1998) and Wolfers (2006) and show that the estimates based on OLS without weighting do not provide evidence of a significant positive effect of the divorce law change on divorce rates. Therefore, the regression results of Friedberg (1998) and Wolfers (2006) cannot be used to draw any meaningful conclusions about the effect of the regulatory change in divorce law on divorce rates. Consequently, there is still no solid evidence that could settle the aforementioned debate in favor of the common belief that the no-fault unilateral divorce law has led to more divorces.

The relationship between divorces and divorce laws is of ongoing interest to policy makers and interest groups alike since changes in these laws may have a profound impact on the family structure in the United States. In addition, the empirical results are interesting from an economic point of view, since they provide a test of the Coase theorem in a marital bargaining setting. In particular, it is argued that if the divorce law change is only a redistribution of property rights between spouses, it should not change the efficient bargaining solution.[1] Friedberg (1998) finds a strong positive effect of the change in divorce law on divorce rates across states. Specifically, the implementation of the no-fault unilateral divorce law explains about 17 percent of the increase in divorce rates during the 1970s and 1980s. Wolfers (2006) extends the work of Friedberg (1998) using a set of lags to investigate the dynamics in the response to the change in divorce law. In particular, according to Wolfers (2006) a key problem in the study by Friedberg (1998) is to separate preexisting trends from the dynamic response to the change in divorce law. The inclusion of a dynamic response function may help to solve this problem. Wolfers (2006) concludes that there is an immediate positive effect of the divorce law change on the divorce rates, but finds that this effect dissipates over time. Hence, strictly speaking, both Friedberg (1998) and Wolfers (2006) reject the Coase theorem in a marital bargaining setting.

Friedberg (1998) aggregates the decision to divorce at the individual level towards divorce rates at the state level and uses analytical weights based on the state population to correct for the heteroskedasticity caused by the aggregation. The same approach has been followed by Wolfers (2006) and others (e.g., Gonzáles and Viitanen, 2009). If the proposed form of the heteroskedasticity is correct, Weighted Least Squares (WLS) results in efficiency

[1] See Friedberg (1998) for a discussion.

gains compared to Ordinary Least Squares (OLS) with robust standard errors (Huber-White sandwich estimator). However, both WLS and OLS should give consistent estimates under the standard assumptions. Hence, similar parameter estimates are expected from both estimation methods.

I. The model

Friedberg (1998) aggregates the marital status, divorced or not divorced, at the state level at a particular point in time to obtain the divorce rate:

$$divrate_{st} = \beta_1 unilateral_{st} + \alpha_s + u_{st} \qquad (1)$$

where $divrate_{st}$ is the divorce rate (per thousand persons), $unilateral_{st}$ is the divorce law dummy, u_{st} is the error term and s and t are the state and time subscripts. The α_s are the state fixed effects and capture average values of demographic variables at the state level (e.g. fraction of urban residents and average number of children) that are assumed to remain time constant. Wolfers (2006) creates a response function instead, by decomposing the divorce law dummy into separate indicators that represent the years after implementation of the divorce law change. In addition to the model in equation (1), Friedberg (1998) and Wolfers (2006) also include year effects and a state-specific linear and quadratic time trend in some of their other basic specifications. Moreover, the specifications of Friedberg (1998) include a set of dummies to account for coding breaks.

The error term u_{st} in equation (1) equals $(\sum_{i=1}^{N_{st}} \varepsilon_{ist}) / pop_{st}$, where the individual error terms ε_{ist} are aggregated over N_{st} individuals per state and divided by the state population in thousands (pop_{st}).[2] Therefore, Friedberg (1998) argues that u_{st} is heteroskedastic and uses population weights as a correction.[3] Wolfers (2006) uses the same approach. The analytical weights lead to the following transformed model:

$$divrate_{st}\sqrt{pop_{st}} = \beta_1 unilateral_{st}\sqrt{pop_{st}} + \alpha_s\sqrt{pop_{st}} + u_{st}\sqrt{pop_{st}} \qquad (2)$$

The transformation does not change the coefficient of the divorce law dummy. In particular, the weights are only used as a correction for heteroskedasticity to obtain correct standard errors and efficiency gains. As a result, we expect a consistent parameter estimate of β_1 after performing OLS on both equations (1) and (2).

II. The results

Table 1 replicates the regression results of Friedberg (1998) and Wolfers (2006). Specifically, we use the results of Friedberg (1998) as replicated by Wolfers (2006). The estimates of Friedberg (1998) are based on divorce rates between 1968 and 1988. Wolfers (2006) uses divorce rate data between 1956 and 1988 in his basic specifications. We report the regression estimates with year effects, state fixed effects and state-specific time trends. Columns 1 and 3 show the replicated results (i.e. WLS, equation (2)). Columns 2 and 4 report the results of Friedberg (1998) and Wolfers (2006) without weights (i.e. OLS, equation (1)), respectively. Huber-White robust standard errors are used in column 2 and 4 to correct for an unknown form of heteroskedasticity.[4] Column 2 indicates that the divorce law dummy is insignificant. In addition, column 4 shows that the estimated response function parameters are

[2] The individual error term is the error term from the microeconomic model with an indicator variable, divorced or not divorced, as the dependent variable (see Friedberg, 1998).

[3] Friedberg correctly notices that the aggregation is actually over married women (population of marriages). This leads to divorces per population of married women. However, the use of weights based on the population of married women does not substantially change the estimates.

[4] This correction does not change the parameter estimates.

jointly insignificant. These results are not consistent with the findings of Friedberg (1998) and Wolfers (2006) as stated in columns 1 and 3.[5]

Table 2 provides an overview including several preferred specifications of Friedberg (1998) and Wolfers (2006) with and without weights. We report the effect of the unilateral divorce law dummy used by Friedberg (1998), the total summed effect of the response function utilized by Wolfers (2006) and the short-run effect based on the first four out of eight response dummies. This short-run effect is especially of interest as Wolfers (2006) finds a dynamic response that is positive in the short-run, but the response diminishes over time and even becomes negative in some specifications. This dynamic response cannot be inferred from the total summed effect. As is evident from the results in Table 2, without analytical weights, there is no significant positive effect of the divorce law change on divorce rates in any of the basic specifications of Friedberg (1998) and Wolfers (2006).[6] Specifically, the short-run and long-run (total) effects are either significantly negative or insignificant.[7]

III. Conclusion

The seminal papers by Friedberg (1998) and Wolfers (2006) find a positive effect of the regulatory change in divorce laws on divorce rates. Their results are based on analytical weights to correct for heteroskedasticity (WLS). In contrast, the OLS regression results in this comment indicate that there is no evidence in favor of a positive significant relationship between the divorce law change and divorce rates if those weights are excluded. Estimates based on OLS and WLS always differ to some extent due to sampling error. However, the large discrepancies between our results and the results of Friedberg (1998) and Wolfers (2006) are an indication of functional form or model misspecification. The counterintuitive negative effect of the divorce law change on divorce rates in some of our and Wolfers' regression estimates are in line with this explanation. Hence, future research should focus on improving the model. The results in this comment imply that economists and policy makers should be cautious when they interpret the results of Friedberg (1998) and Wolfers (2006) as evidence of a positive effect of the divorce law change on divorce rates. In particular, their results cannot be used to draw conclusions about the validation of the Coase theorem in a marital bargaining setting.

[5] To examine the influence of each particular state on the regression results, we also estimated specifications 1-4 in Table 1 excluding one state at a time. Our conclusion that the results in specifications 1 and 3 (2 and 4) are (not) significantly positive holds in most of the resulting 204 regressions. However, we find a significant negative long-run effect in specification 3 if we exclude California. In addition, we find a significant positive effect of the unilateral dummy in specification 2 and a significant negative long-run effect in specification 4 if we exclude Nevada.

[6] We obtain similar findings without robust standard errors. Clustered standard errors, to account for possible serial correlation, only leads to a positive jointly significant (long-run) effect of the divorce law dummies in the specification of Wolfers (2006) with state fixed effects and state-specific linear time trends.

[7] This conclusion also holds if we exclude the weights in the specifications of Wolfers (2006) in Table 4, Panel A (the extended sample) and Table 5 (robustness testing).

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Table 1–Friedberg and Wolfers with and without weighting
(Dependent variable: Annual divorces per 1,000 persons)

	(1) Friedberg **With analytical weights**	(2) Friedberg **Without analytical weights**	(3) Wolfers **With analytical weights**	(4) Wolfers **Without analytical weights**
Unilateral	0.431***	0.0673	-	-
	(0.051)	(0.075)		
First 2 years	-	-	0.342***	0.141
			(0.062)	(0.11)
Years 3-4	-	-	0.319***	0.211*
			(0.070)	(0.12)
Years 5-6	-	-	0.300***	0.177
			(0.077)	(0.13)
Years 7-8	-	-	0.322***	0.250**
			(0.084)	(0.13)
Years 9-10	-	-	0.0812	0.133
			(0.091)	(0.14)
Years 11-12	-	-	-0.102	0.144
			(0.099)	(0.15)
Years 13-14	-	-	-0.202*	0.210
			(0.11)	(0.17)
Years 15 onwards	-	-	-0.210*	0.311
			(0.12)	(0.21)
Controls				
Year FE	F=95.3	F=68.8	F=53.9	F=57.4
State FE	F=191.6	F=173	F=468.2	F=519.7
State * time	F=24.4	F=17.9	F=49.4	F=30.7
F-value divorce dummies	-	-	F=19.8	F=1.0
Sample	1968-1988, n=1043		1956-1988, n=1631	

Notes: ***,**,* significance at the 1%, 5% and 10% respectively. Standard errors in parentheses. In the specifications without population weights, we use Huber-White robust standard errors. All replications are based on the estimates of Wolfers (2006). For specification (1) of Friedberg see Wolfers (2006) Table 1, specification (2). For specification (3) of Wolfers see Wolfers (2006) Table 2, specification (2). The specifications of Friedberg (1998) include a set of dummies to account for coding breaks.

Table 2–Overview basic specifications Friedberg and Wolfers
(Dependent variable: Annual divorces per 1,000 persons)

	With analytical weights	**Without analytical weights**
Friedberg: With state fixed effects	Total effect:0.0003 t-value:0.01 Significant at 5%: yes/**no**	Total effect:-0.280 t-value:-2.54 Significant at 5%: **yes**/no
Wolfers: With state fixed effects	Total effect:-0.614 F-value:12.83 Significant at 5%: **yes**/no Short-run effect:0.800 F-value: 3.56 Significant at 5%: **yes**/no	Total effect:-4.434 F-value:4.61 Significant at 5%: **yes**/no Short-run effect:-1.370 F-value: 2.70 Significant at 5%: **yes**/no
Friedberg: With state fixed effects, and with state-specific linear time trends	Total effect:0.431 t-value:8.52 Significant at 5%: **yes**/no	Total effect:0.067 t-value:0.90 Significant at 5%: yes/**no**
Wolfers: With state fixed effects, and with state-specific linear time trends	Total effect:0.850 F-value:19.75 Significant at 5%: **yes**/no Short-run effect:1.284 F-value: 8.65 Significant at 5%: **yes**/no	Total effect:1.577 F-value:1.03 Significant at 5%: yes/**no** Short-run effect: 0.779 F-value: 1.18 Significant at 5%: yes/**no**
Friedberg: With state fixed effects, with state-specific linear and quadratic time trends	Total effect:0.435 t-value:7.84 Significant at 5%: **yes**/no	Total effect:0.143 t-value:1.59 Significant at 5%: yes/**no**
Wolfers: With state fixed effects, with state-specific linear and quadratic time trends	Total effect:1.723 F-value:13.54 Significant at 5%: **yes**/no Short-run effect:1.233 F-value: 8.49 Significant at 5%: **yes**/no	Total effect:-0.945 F-value:2.25 Significant at 5%: **yes**/no Short-run effect: 0.050 F-value: 0.61 Significant at 5%: yes/**no**

Notes: All specifications are based on the results stated in Wolfers (2006). The column with analytical weights uses the specifications as stated in Table 1 (the results of Friedberg) and Table 2 (the results of Wolfers) reported in Wolfers (2006). The replicated results of Friedberg (1998) are based on the sample between 1968 and 1988. Her specifications include a set of dummies to account for coding breaks. We use the sample between 1956 and 1988 to replicate the regression results of Wolfers (2006). For Wolfers' own specifications we show the total effect and the joint significance of the set of deregulation dummies, not the significance of the aggregated total effect. In addition, we report the short-run effect based on the sum of the first four divorce law dummies: first 2 years, years 3-4, years 5-6, and years 7-8. For the Friedberg specifications we show the t-value of the unilateral dummy. In the specifications without population weights, we use Huber-White robust standard errors.