Bargaining at Divorce: The Allocation of Custody

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Abstract

We model the bargaining process of parents over custody at the time of divorce. First we assume an institutional setting where only sole custody is available. In a second step we reform this institutional setting and introduce the possibility of joint custody. We show that some parents, who would not be able to find an agreement in the sole custody regime, can find an agreement after the reform. Accordingly, our empirical analysis shows that the introduction of joint custody enables more parents to divorce by mutual consent. A detailed analysis of court record data reveals that the reform had no impact on the odds that children are mainly living with their mother. However, we observe a shift in the determinants of the custody allocation.

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1 Introduction

In recent decades, throughout the western world an increasing incidence of divorce could be observed (OECD, 2007).[1] Marital breakdown can have severe economic and social consequences for all parties involved. Policy-makers and scholars are especially concerned about the welfare of affected children. Recent economic research has stressed the fundamental role of legal institutions at the time of divorce (e. g. Del Boca, 2003). Obviously, the legal framework constitutes the choice-set and defines the rules of the divorce process. Moreover, it can affect the distribution of welfare within non-intact families. Legal institutions determine the families' post-divorce well-being and should be designed to minimize the negative consequences of divorce.

A crucial feature of every divorce is the allocation of custody and consequently custody law is a particular important aspect of the legal framework. In fact, it governs the actual living arrangement after divorce. Since the 1970s many developed countries have introduced various forms of joint custody after divorce to supplement or to replace sole custody arrangements.[2] One typically distinguishes between joint legal custody and joint physical custody. Joint legal custody means that both parents share the right and the obligation of making major decisions about their child's upbringing (e. g. about schooling, religion, and health care.) Joint physical custody means that the child spends a significant amount of time with each parent. In any case policy-makers intended thereby to mitigate the pain of divorce for all parties involved. Since then an ongoing debate – across academic disciplines including economics, law, psychology and sociology – between proponents and opponents of joint custody has started. Researchers have primarily focused on the effect of different custody arrangements on children's well being after divorce. Proponents of joint custody typically argue that children benefit from ongoing support and resources from both parents. This is captured in various dimensions such as behavioral and emotional adjustment (Bauserman, 2002), economic well-being (Seltzer, 1991; Del Boca and Ribero, 1998), educational attainment (Teng Wah, 2006) and parental involvement (Bowman and Ahrons, 1985; Huang, Han and Garfinkel, 2003) among others. Opponents object that children under joint custody are exposed to ongoing parental conflict (Kuehl, 1989). However, the causal relationship between certain custody arrangements and child outcomes is far from clear and the empirical evidence is mostly inconclusive.

In this paper, we go one step back in order to make progress in a comprehensive evaluation of joint custody. We analyze the immediate effects of joint custody at the time of divorce. In particular, we focus on the impact of joint custody on the divorce process.

[1] However, in the United States the divorce rate peaked in the early 1980s and has been declining since then (Stevenson and Wolfers, 2007*a*,*b*).

[2] In the United States joint custody was first introduced in Indiana in 1973 and has since then spread to nearly all states (Brinig and Buckley, 1998). In Europe, joint custody has been introduced, for instance, in Sweden in 1976 (Jänterä-Jareborg, 2003), in Norway in 1981 (Sverdrup and Lødrup, 2003), in Germany in 1997 (Dethloff and Martiny, 2003) and in Austria in 2001 (Roth, 2003).

The arrangements at the time of divorce are decisive for post-divorce development and outcomes. Therefore, we model the bargaining process of parents over custody at the time of divorce.[3] First we assume an institutional setting where only sole custody is available. In a second step we reform this institutional setting and introduce the possibility of joint custody. The bargaining process is characterized by alternating offers. Parents are impatient but want to find a custody agreement that allows both to be better off than with having the judge assign custody. We show that some parents, who would not be able to find an agreement in a sole custody regime, can find an agreement after a joint custody reform. This is a striking argument in favor of joint custody.

In the empirical part of the paper we present evidence which supports our model's prediction. Exploiting the control group nature of couples without minors we show that the introduction of joint custody in Austria has increased the fraction of divorces by mutual consent. In addition, we employ rich micro data of court records to explore in detail the bargaining process of parents over custody before and after this reform. While the custody reform has not changed the odds that children are (mainly) living in the mother's household after divorce, we observe that the reform has altered the determinants of this allocation. In sum, the results indicate that the additional option of joint custody has a mediating effect on the divorce process. The introduction of joint custody substantially reduces monetary and emotional cost of divorce. A larger fraction of couples is now able to find a custody agreement without heavily resorting to courtroom adjudication. This minimizes both private and public cost of litigation.

Whether joint custody has apart from that desirable effects is an open issue. However, in the final section of the paper we highlight that parents with favorable characteristics self-select themselves into joint custody. This finding is of particular importance for other studies analyzing the effect of joint custody on various (child) outcomes. We discuss potential identification strategies for future research.

Apart from the literature studying the effect of joint custody after divorce a couple of papers are related to our theoretical work. Cooter, Marks and Mnookin (1982) use a bargaining model with alternating offers to model negotiations that are influenced by the legal situation, but they do not explicitly refer to divorce and custody. They find that optimism about the outcome in court as well as uncertainty about how much the other party is willing to concede during negotiations can lead to a trial instead of an agreement between the parties. Mnookin and Kornhauser (1979) refer explicitly to divorce, but do not use an explicit model. They examine in detail how the legal situation at divorce influences a couple's bargaining over the division of matrimonial property, comprising tangible and intangible assets. They show that the judge's preferences over different arrangements affect the parents' bargaining behavior. Fella, Manzini and Mariotti (2004) derive an explicit bargaining model between spouses where the transferability of matrimonial property

[3] Rasul (2006) and Francesconi and Muthoo (2003) model the allocation of child custody as a prenuptial contract.

serves as a crucial determinant of whether to divorce or not. Within this model they examine the efficiency of different divorce laws. In our paper we take the divorce decision as given and investigate how parents bargain over custody under different custody law regimes.

2 A bargaining model of the custody allocation

To model the bargaining process over custody, we presume that parents have to find a custody arrangement for their minor in order to dissolve marriage legally.[4] Preferably they agree on it, but if they are not able to find any agreement, a judge assigns sole custody to one parent. There are two different types of divorce available: (i) divorce by mutual consent and (ii) divorce by fault. Divorce by mutual consent is cheaper and easier to obtain than divorce by fault, but it requires that parents cooperate and find a mutually binding agreement concerning custody. If parents do not manage to agree they have to proceed with divorce by fault. In order to find an agreement, parents can bargain over the custody allocation.[5] Firstly, we assume a sole custody regime where parents can choose from two possible arrangements. They can assign sole custody either to the mother or to the father. Then we introduce the possibility of joint custody. In particular, we consider a combination of joint legal and joint physical custody. After the reform the parents can choose from four possible arrangements. The minor can live with either parent in a sole custody or in a joint custody, where the parents have to choose a main residence for the child.[6] However, parents can only keep joint custody with an explicit agreement to do so. Since the available type of divorce depends on whether the parents can find an agreement or not, the bargaining over custody has to take place before filing for divorce.

The negotiation over custody can be modeled in the following way, which is based on Rubinstein (1982). The parents $i \in N = \{m, f\}$ have preferences over time T and over a set of agreements X.[7] There are two agreements x in the sole custody regime $X_S = \{mS, fS\}$ and four agreements x after the joint custody reform $X_J = \{mS, fS, mJ, fJ\}$, where S stands for sole custody and J for joint custody. Each agreement leads to a certain amount of utility for each parent, which is discounted according to the time $t \in T = \{0, 1, 2..., t_C\}$ that it has taken to come to the agreement. We assume that parents have constant discount rates $\delta_i \in [0, 1]$, so that the utility of parent i of an agreement x that has been found at

[4] We assume that there is only one minor to simplify the negotiation and rule out the case where parents split their children.

[5] The negotiation at divorce typically includes the division of the whole matrimonial property. Therefore, divorce settlements include, beside the allocation of custody, an agreement on monetary issues such as the division of assets, alimony awards and child support payments. In the bargaining model we solely focus on the allocation of custody under different regimes. We disregard monetary issues since they affect the allocation of custody in each regime equally. However, we will pick up this issue in the empirical part of the paper.

[6] Consequently, we refer to the parent where the child is living mainly in a joint custody as the resident parent. In section 2.4 we will discuss varying legal systems.

[7] The terms m and f can stand for mother and father or for male and female.

time t is given by $u_i(x,t) = \delta_i^t u_i(x)$. Furthermore, parents are completely and perfectly informed about each others preferences due to their closeness during marriage.

The parents have to follow certain rules in the bargaining process. We arbitrarily assume that parent m makes the first proposal x out of the set of agreements X. The parents then alternate in making offers, which the other parent can accept (which ends the game) or reject (which leads to a new period and a new offer). Moreover, in each period the parent who decides about an offer can opt out (which also ends the game) and let the judge assign custody, henceforth called 'going to court'.[8] The negotiation does not go on indefinitely. It ends in period t_C with an assignment by the judge. This date is set exogenously before the negotiation begins. It can be an appointment at court, that is set before the negotiation starts and at which the arrangement has to be fixed. In period t_C the judge assigns sole custody to parent m with probability p and to parent f with probability $(1-p)$.[9] This lottery yields utility $\delta_i^{t_C} U_i^C = \delta_i^{t_C}[pU_i^{mS} + (1-p)U_i^{fS} - \varepsilon_i]$ for parent i, where ε_i are additional monetary and emotional cost of a divorce by fault compared to a divorce by mutual consent – for short, cost of disagreement.[10] When a parent ends the game by opting out, the same lottery less the cost of disagreement applies as in the case of an exogenous end of the negotiation, $[pU_i^{mS} + (1-p)U_i^{fS} - \varepsilon_i]$, but now utility is discounted to a smaller degree, since the game ends sooner and less cost of waiting occur. Every game consists of a set of histories H, where a history $h \in H$ is composed of a series of proposals and reactions to them. The utility of a parent of a certain outcome (x,t) does not depend on the history though, but only on the agreement x and on the point in time t when it was agreed upon. In order to rank the utilities of the parents we have to make assumptions about their preferences: (i) Preferences are stationary; $(x,t) \succeq_i (y,t+1)$ iff $(x,0) \succeq_i (y,1)$ and $(x,t) \succeq_i (y,t)$ iff $(x,0) \succeq_i (y,0)$. (ii) Parents prefer to reach an outcome as soon as possible, due to the discounting of the utility; $(x,t) \succeq_i (x,t+1)$. (iii) If an agreement x is preferred to agreement y, then each parent will wait for one period to achieve the preferred agreement as opposed to getting the less preferred agreement now; $(x,t+1) \succeq_i (y,t)$ iff $(x,t) \succeq_i (y,t)$.

Given the model's setup and these assumptions it remains to specify the utility orderings of the parents. The utility orderings depend on the set of agreements, which in turn depends on the custody regime. In the next section we specify the utility orderings for the baseline case of a sole custody regime and then solve the model for subgame-perfect Nash-equilibria.[11] After that we discuss the bargaining in a joint custody regime. We will

[8] If going to court was a possible agreement, instead of an outside option, the results would not change.

[9] The parents can deduce the probability from former court rulings in similar cases. We assume that both parents have access to the same information and, therefore, form similar beliefs about the probability p. This rules optimism of both parents out.

[10] Emotional cost could result from parents internalizing the utility of the child, which would be lower in case of divorce by fault compared to divorce by mutual consent due to the ongoing disagreements of the parents. We assume that the cost of disagreement do not vary over time.

[11] By concentrating on subgame-perfect Nash-equilibria instead of Nash-equilibria we exclude equilibria with non-credible threats.

then compare the outcomes of the two regimes to identify the effect of allowing for joint custody after divorce.

2.1 Solving the model in a sole custody regime

In a sole custody regime the utility ordering of each parent includes two possible agreements $X_S = \{mS, fS\}$ and the outside option of going to court (the exogenous end of the game). We assume that having custody leads to a higher utility for each parent i than giving custody to the other parent.[12] The outside option of going to court yields an expected utility between the two agreements, as it is not clear who will become custodian. The lottery itself leads to a higher utility level than going to court since no cost of disagreement ε_i arise. Therefore, there are two possible utility orderings for each parent in every period,

$$U_i^i > \mathbf{U_i^C} > U_i^j \quad \text{and} \quad U_i^i > U_i^j > \mathbf{U_i^C}. \tag{1}$$

Whether the utility of the outside option is larger or smaller than the utility of the other parent having custody depends on the relative magnitudes of p and ε_i. If the probability of becoming custodian is large enough and/or the cost of disagreement are small enough, then parent i prefers going to court instead of agreeing to give custody to the other parent. The two possible utility orderings for each parent lead to four possible situations. These situations and their solutions are summarized in Table 1. The situations have three different outcomes: (i) The parents do not agree and go to court immediately. (ii) The parents find a single agreement in the first period $t = 0$. (iii) The parents find an agreement immediately, but it depends on who can make the first proposal and on their relative (im)patience which parent can get her/his preferred agreement. In a real setting, one may associate the right for the first proposal and high patience with any given advantage. For simplicity, we will refer to it as relative bargaining power. The model is solved by

Table 1: Summary of the results in a sole custody regime.

		f	
		$fS \succ C \succ mS$	$fS \succ mS \succ C$
m	$mS \succ C \succ fS$	C	mS
	$mS \succ fS \succ C$	fS	mS / fS

backward-induction: The parents know that eventually (at the exogenous end of the game)

[12] This analysis assumes – as most economic analyzes of the family do (e.g. Becker, 1993; Ermisch, 2003) – that parents are altruistic towards their children in the sense that their utility depends on the welfare of their children. Therefore, it seems to be a natural starting point that parents are interested in spending time with their children and that they want to remain custodian after divorce. However, other preference orderings would not change the basic result.

the judge will assign custody to one of them. The parents want to improve their situation (i.e. increase their utilities) by finding an agreement that is better for both of them, or at least by going to court immediately (which saves the cost of waiting).

Case 1 *When the subset of possible agreements $X^* \subseteq X$, which contains only those agreements that both parents prefer to the outside option, is empty the parents cannot find an agreement and go to court immediately.*

The optimal strategy for each parent in this case is to propose that the child should be living with her/himself, and not to accept the equivalent proposal of the other parent. This means that the game could go on until the exogenous end, with each parent proposing her/himself as custodian and rejecting the proposals of the other parent. Therefore, it is preferable to go to court immediately. In the case where both parents have the utility ordering $U_i^i > U_i^C > U_i^j$, parent m, who by definition starts the game, will propose mS and parent f goes to court immediately to save the cost of waiting.

Case 2 *When the subset of possible agreements X^* is not empty and both parents prefer the same possible agreement, i.e. $x_i^* = x_j^* = x^* \in X^*$, where $x_i^* \in X^*$ is the agreement that parent i values most highly of all the agreements that both parents prefer to the outside option, then the parents come to the agreement x^* immediately.*

Again, the parents try to find an agreement which increases the utility of both of them compared to the eventual assignment by the judge. In this case agreement x^* not only improves the utility of both parents, it is also the preferred agreement of both within the subset of possible agreements X^*. Therefore, the optimal strategy for each parent is to propose x^* and to accept this proposal of the other parent. Consider the utility ordering $U_i^i > U_i^C > U_i^j$ and $U_j^j > U_j^i > U_j^C$ where iS is equal to the preferred possible agreement of both parents (x^*) and the only element of the subset of possible agreements X^*. Therefore, parent i, who has the higher valuation of the outside option, gets custody immediately.

Case 3 *When the subset of possible agreements X^* is not empty and the parents prefer different possible agreements, i.e. $x_i^* \neq x_j^*$ with $x_i^*, x_j^* \in X^*$, then there are two possible outcomes x_i^* and x_j^*. In this case the outcome depends on the relative bargaining power of the parents.*

A priori it is not clear which of the two agreements the parents will choose. It depends on which parent will eventually give in. This in turn is determined by the degree of patience of the parents (δ_i) and by which parent can make the last proposal – or for short by their relative bargaining power.[13] Consider the case where both parents have a utility ordering of $U_i^i > U_i^j > U_i^C$. Both parents have high cost of disagreement and/or a relatively low – and therefore relatively equal – probability to get custody assigned by the judge. In this

[13]Impatience can result from altruism of the parents toward their child, since they internalize that the child suffers from ongoing disputes. Therefore, it is closely related to the emotional cost of disagreement.

case both parents prefer mS or fS over the exogenous end of the negotiation. Depending on whether parent m or parent f has the relative higher bargaining power the solution will be mS or fS.[14]

2.2 Solving the model in a joint custody regime

For the the joint custody regime we have to make some assumptions on the preference orderings over sole custody, joint custody and going to court. Firstly, we assume that each parent prefers that the child is (mainly) living with her/him. However, given that parents may either prefer to be sole custodian or resident parent and share parental rights and obligations under a joint custody with the former spouse. Secondly, given that the child is (mainly) living with the other spouse each parent i wants to be integrated into a joint custody, so that $jJ \succ_i jS$. Therefore, we have two different possible utility orderings for the set of agreements $X_J = \{mS, fS, mJ, fJ\}$. Incorporating the outside option leads to a total of seven different utility orderings for each parent, as the utility of going to court relatively to the other utilities varies with the probability p to get custody assigned by the judge and the cost of disagreement ε_i. There are four possible utility orderings with a preference for sole custody:

$$\begin{aligned}
&\mathbf{U_i^{iS}} > \mathbf{U_i^{C}} > U_i^{iJ} > U_i^{jJ} > U_i^{jS},\\
&\mathbf{U_i^{iS}} > U_i^{iJ} > \mathbf{U_i^{C}} > U_i^{jJ} > U_i^{jS},\\
&\mathbf{U_i^{iS}} > U_i^{iJ} > U_i^{jJ} > \mathbf{U_i^{C}} > U_i^{jS},\\
&\mathbf{U_i^{iS}} > U_i^{iJ} > U_i^{jJ} > U_i^{jS} > \mathbf{U_i^{C}},
\end{aligned} \tag{2}$$

and three possible utility orderings with a preference for joint custody:[15]

$$\begin{aligned}
&\mathbf{U_i^{iJ}} > U_i^{iS} > \mathbf{U_i^{C}} > U_i^{jJ} > U_i^{jS},\\
&\mathbf{U_i^{iJ}} > U_i^{iS} > U_i^{jJ} > \mathbf{U_i^{C}} > U_i^{jS},\\
&\mathbf{U_i^{iJ}} > U_i^{iS} > U_i^{jJ} > U_i^{jS} > \mathbf{U_i^{C}}.
\end{aligned} \tag{3}$$

This results in 49 different situations, for which the solutions are summarized in Table 2. However, the analysis can easily be simplified since there are again only three possible outcomes: (i) There is no agreement from which both parents profit, so that the parents go to court immediately (**Case 1**). (ii) They find a single agreement which improves the situation for both parents (**Case 2**). (iii) There are two possible agreements which the parents may choose, because they have different preferences over the subset of possible agreements (**Case 3**). The utility orderings $U_m^{mS} > U_m^{mJ} > U_m^{fJ} > U_m^{C} > U_m^{fS}$ and $U_f^{fS} > U_f^{C} > U_f^{fJ} > U_f^{mJ} > U_f^{mS}$ are an example of **Case 1**. The parents cannot find any

[14] Refer to the Appendix A for a detailed analysis of relative bargaining power and its effects on the chosen agreement.

[15] Going to court cannot yield a higher utility than getting a sole custody by agreement due to the lottery $pU_i^{mS} + (1-p)U_i^{fS}$ and the additional cost of disagreement ε_i.

Table 2: Summary of the results after the joint custody reform.[a]

		f						
		$fS \succ C \succ fJ \succ mJ \succ mS$	$fS \succ fJ \succ C \succ mJ \succ mS$	$fS \succ fJ \succ mJ \succ C \succ mS$	$fS \succ fJ \succ mJ \succ mS \succ C$	$fJ \succ fS \succ C \succ mJ \succ mS$	$fJ \succ fS \succ mJ \succ C \succ mS$	$fJ \succ fS \succ mJ \succ mS \succ C$
m	$mS \succ C \succ mJ \succ fJ \succ fS$	C	C	C	mS	C	C	mS
	$mS \succ mJ \succ C \succ fJ \succ fS$	C	C	mJ	mS/mJ	C	mJ	mS/mJ
	$mS \succ mJ \succ fJ \succ C \succ fS$	C	fJ	mJ/fJ	mS/fJ	fJ	mJ/fJ	mS/fJ
	$mS \succ mJ \succ fJ \succ fS \succ C$	fS	fJ/fS	mJ/fS	mS/fS	fJ	mJ/fJ	mS/fJ
	$mJ \succ mS \succ C \succ fJ \succ fS$	C	C	mJ	mJ	C	mJ	mJ
	$mJ \succ mS \succ fJ \succ C \succ fS$	C	fJ	mJ/fJ	mJ/fJ	fJ	mJ/fJ	mJ/fJ
	$mJ \succ mS \succ fJ \succ fS \succ C$	fS	fJ/fS	mJ/fS	mJ/fS	fJ	mJ/fJ	mJ/fJ

[a] The white cells in this table correspond to the upper left case in Table 1; the light grey cells to the upper right and lower left case; and the dark grey cells correspond to the lower right case in Table 1.

agreement which leads to a higher utility than the outside option for both of them. For parent f only fS yields a higher utility, but for parent m this agreement is worse than going to court. Any other agreement which leads to a higher utility for parent m yield a lower utility than the outside option for parent f. Therefore, the parents will go to court immediately. An example for **Case 2** is given by $U_m^{mS} > U_m^{mJ} > U_m^{fJ} > U_m^{fS} > U_m^C$ and $U_f^{fJ} > U_f^{fS} > U_f^C > U_f^{mJ} > U_f^{mS}$. In this case, there are two agreements which lead to a higher utility than going to court for both parents, namely fJ and fS. Since both parents prefer fJ over fS they will agree on fJ immediately. One case which leads to an outcome as stated by **Case 3** is given by the utility orderings $U_m^{mJ} > U_m^{mS} > U_m^{fJ} > U_m^C > U_m^{fS}$ and $U_f^{fS} > U_f^{fJ} > U_f^{mJ} > U_f^{mS} > U_f^C$. The parents will agree on mJ (fJ) if parent m (f) has the relative higher bargaining power.[16]

2.3 Changes due to the joint custody reform

The introduction of joint custody as an additional custody arrangement beside sole custody does not change the parents' way of bargaining. However, the outcome of the negotiation may change. To study these changes, we compare the outcome of a certain couple under

[16] In fact fJ is not the most preferred agreement of parent f in the set of agreements (it is only second-best here), but it is the first-best agreement in the subset of possible agreements.

the joint custody regime with that this couple would have found under the sole custody regime. Most importantly, it turns out that some parents who would not be able to find an agreement in a sole custody regime (**Case 1**) can find an agreement after the reform.

Let us first consider the two situations from the sole custody regime where parents find an agreement immediately (**Case 2**). These two situations, where parents have a different valuation of the outside option, can be distinguished into ten situations each in a regime with joint custody depicted by the light grey cells in Table 2. After the reform parents still manage to find an agreement immediately. However, here are now two possible outcomes in some situations, which improve the utility of both parents compared to going to court. The situation where the parents find more than one possible agreement in the sole custody regime (**Case 3**) can be distinguished into four situations after the introduction of joint custody (dark grey cells in Table 2). All four agreements are better than going to court for both parents. The single situation without agreement in the sole custody regime (**Case 1**) can be distinguished into 25 situations in the joint custody regime (white cells in Table 2). In 12 out of these 25 situations parents can find at least one agreement, even though this would have not been possible before the reform. Of course, these agreements are exactly the additional ones containing joint custody. If an agreement on sole custody is possible, then it would have been possible without allowing for joint custody as well. The affected group are the parents preferring any joint custody agreement compared to a sole custody of the other parent.

Two further points are worth noting: Firstly, considering all possible preference orderings each of the available agreements after the reform, $X_J = \{mS, fS, mJ, fJ\}$, is a possible outcome. Secondly, the comparison of the types of outcome in the two regimes shows that some of the parents who find an agreement (on sole custody) in the sole custody regime, prefer a joint custody arrangement after the reform. These parents are the ones where at least one of them (the one with the higher bargaining power) can improve her/his utility with a joint custody arrangement as compared to a sole custody one.

2.4 Varying legal systems

In this section we show that our model can be easily adapted to other legal systems. The most important aspects of modeling where adaptations may apply are (i) the available types of divorce, (ii) the concrete type of joint custody and (iii) the official channel to maintain joint custody.

Ad (i): The legal system may provide a type of divorce where the monetary cost are independent of the parents' ability to agree on custody. In that case the cost of disagreement ε_i only consist of emotional cost.[17] This implies that the cost of disagreement are

[17] If the trial lasts longer due to a dispute, then ε_i may contain monetary cost as well, but the baseline monetary cost are the same and therefore they do not appear in the cost of disagreement.

comparable lower (provided that the emotional cost are similar). Therefore, the rank of going to court will be higher compared to the case modeled above and divorces without agreement will be more likely.

Ad (ii): Consider a legal system which provides an equally shared joint physical custody. That means, parents do not have to agree on a resident parent, since law intends that the child spends equally or close to half the time with each of her/his parents. In this case there are only three agreements after the reform, $X'_J = \{mS, fS, J'\}$, and the number of possible utility orderings per parent is reduced from seven to five. Consequently, there are only 25 different situations in the model instead of 49.

Ad (iii): In some legal systems joint custody is the default option instead of being a possible arrangement. In this case, divorcing parents keep joint custody, except for the case where one or both of the parents apply to the court to assign custody. If the judge can assign sole or a joint custody the outcome of going to court is even more uncertain than in the case modeled above. This leads to a lower valuation of the outside option. Nevertheless, the same 49 situations may result.

Modifying the model in the proposed ways does not lead to changes in the principles of how the parents negotiate or in their ability to cooperate. Only the chosen custody arrangement in a specific situation may change. Therefore, the result that introducing joint custody facilitates finding an agreement still holds.

2.5 Further policy implications

The cost of disagreement ε_i and the probability p affect the parents' valuation of the outside option. The lower the probability of assignment and the higher the cost of disagreement, the lower is the expected utility of going to court. A low valuation of the outside option in turn promotes cooperation and should increase the incidence of mutually binding arrangements. This fact can be used to design an institutional setting which promotes cooperation of parents and leads to the following policy implication: An (about) equal probability for both parents to get custody assigned by the judge and monetary cost of a divorce depending on the parents' willingness to cooperate. In particular, we suggest that maternal/paternal preference rules for custody should be replaced by neutral rules (e.g. the 'best interest of the child' rule). In addition, monetary cost of divorce by mutual consent should be significantly lower compared to those of a divorce by fault.

3 Empirical analysis

In the empirical part of the paper we employ Austrian data. Austria is a particular suitable case since it had a recent reform (in the year 2001) of its custody law and a unique data set

of court records, which captures the period before and after the reform, is available. The aim of our empirical analysis is threefold. Firstly, we test the model's prediction, namely that the introduction of joint custody facilitates cooperation between parents with data from the Austrian Statistical Office. Secondly, we examine the divorce process of divorces by mutual consent before and after the reform with the court record data in more detail. In particular, we test whether the custody reform has changed the odds that the mother becomes custodian/resident parent and whether the reform has altered the determinants of this allocation. Thirdly, we characterize the couples who agree on joint custody after the reform.

3.1 Testing the bargaining model

Our bargaining model predicts that by switching from a sole custody regime to a joint custody regime parents should be able to find a custody agreement more easily. Consequently, the introduction of joint custody should enable additional parents to divorce by mutual consent. In this section we present evidence that the joint custody reform in Austria on the 1st of July 2001 indeed led to an increase of the fraction of divorces by mutual consent and therefore to a decrease of the fraction of divorces by fault.

We employ data that has been retrieved from the Austrian Statistical Office database. District Courts have jurisdiction over divorce proceedings and report every single divorce case with its basic data to the Austrian Statistical Office. Unfortunately, the data is available on a Federal State level only. However, the completeness and accuracy of this administrative database is its striking advantage. We assembled a panel data set for the nine Austrian Federal States for the years 1991 to 2006. This balanced panel data set with 144 observations comprises ten years before the reform, the year of the reform (2001) and five years after the reform. In a first step we estimate a panel fixed effects model where the dependent variable is the percentage of divorces by mutual consent ($DMC_{s,t}$) in state s in year t,

$$DMC_{s,t} = \sum_s \alpha_s + \beta t + \gamma JC_t \left[+\delta DL_t + \zeta D_{s,t}\right] + \varepsilon_{s,t}, \tag{4}$$

where $\sum_s \alpha_s$ are state fixed effects and βt captures a time trend. The explanatory variable of primary interest is JC_t which captures the period after the reform including the whole year 2001. We cannot distinguish the first half of the year 2001 (before the reform came into effect) from the later half, because we only have yearly data.[18] In an additional specification (Ib) we control for the period before the divorce law reform from the year 1999 (DL_t). This reform abolished adultery and the refusal to have children as so-called absolute reasons for divorce but had no influence on custody law. For completeness, we also consider the possibility that the introduction of joint custody had an impact on the

[18]However, in order to check the robustness of our results we dropped the observations of the year 2001a nd the qualitative results did not change.

incidence of divorce. Therefore, we ran a third specification (Ic) where we include the number of divorces per 1,000 residents ($D_{s,t}$) as an additional control variable. Moreover, we re-ran all three specifications where we allow for state-specific time trends (specifications IIa-IIc). We use population weights for our estimations and robust standard errors are calculated throughout, allowing for clustering by state.[19] The results for our six estimations of the share of divorces by mutual consent are summarized in Table 5. Each specification shows a positive and a statistically significant effect of the introduction of joint custody on the share of divorces by mutual consent. The richer specifications suggest an increase of about 1.7 percentage points. This effect is quantitatively important since in the year 2000 already 90 percent of all divorces were divorces by mutual consent (Statistik Austria, 2003).

Control group approach While there is no evidence that the timing of joint custody reform was endogenous, i. e. it was introduced in a period of an increasing share of divorces by mutual consent, we provide additional results where we exploit the control group nature of couples without minors. The estimation results above are based on a sample of all divorcing couples (with and without minors). The joint custody reform, however, does only apply to couples with minors at the time of divorce and should have no impact on couples without. Therefore, couples without minors constitute a clear control group. While, we do not have separate figures for the share of divorces by mutual consent for couples with and without minors we can exploit the variation of number of divorces with minors across states. In each year we rank the states according to their average number of minors per divorce. Based on this ranking we build three groups: states with a low, with a medium and with a high number of minors per divorce. For each group we define a binary variable M_t^l, M_t^m and M_t^h which is equal to one if the state belongs in year t to the group with a low, a medium or a high number of minors per divorce. Notably, there is variation in the composition of these three groups over time.[20] Compared to equation (4) we substitute the joint custody reform dummy with the binary variables identifying the three groups and respective interaction terms with the joint custody reform dummy,

$$\begin{aligned} DMC_{s,t} = \sum_s \alpha_s + \beta t + \theta_m M_t^m + \theta_h M_t^h \\ +\gamma_l JC_t \times M_t^l + \gamma_m JC_t \times M_t^m + \gamma_h JC_t \times M_t^h \\ [+\delta DL_t + \zeta D_{s,t}] + \varepsilon_{s,t}. \end{aligned} \tag{5}$$

The base group is now equal to the group with a low number of minors for the period before the reform. The idea is that the effect of the joint custody reform should increase with the average number of minors per divorce (i. e. with the share of the treatment group).

[19] We have tested the potential effect of the custody reform on the incidence of divorce in a separate panel fixed-effects model too. We estimated a panel model for the number of divorces per 1,000 residents in state s in year t for the years 1991 to 2006 (see Table 4). Neither specification shows a statistically significant effect of the custody law reform on the number of divorces.

[20] Only the Federal State of Vienna is in each year in the group with the lowest average number of minors per divorce.

Accordingly, we expect $\hat{\gamma}_l < \hat{\gamma_m} < \hat{\gamma}_h$. The estimation results (in Table 6) indeed show that the quantitative effect of the joint custody reform on the share of divorces by mutual consent increases with the number of minors. For instance, considering specification (IIb) we find for the group with the lowest number of minors an effect of the joint custody reform of about 1.6 percentage points. For the group with a medium number of minors the effect is equal to 1.9 percentage points. Finally, for the group with the highest number of minors we obtain the largest effect of two percentage points. The average number of minors had no effect on the share of divorces by mutual consent before the reform. These estimated coefficients are strong support for the causal interpretation of our results.[21] Taken together, the results provide convincing evidence that the introduction of joint custody led to qualitatively significant increase in divorces by mutual consent.

3.2 Who gets custody?

So far we have presented evidence that the introduction of joint custody has increased the share of parents who find an agreement and lead to more divorces by mutual consent. In this section we examine the divorce process of divorces by mutual consent before and after the reform in more detail. We test whether the custody reform has changed the probability that the mother becomes custodian/resident parent and whether the reform has altered the determinants of this allocation. Our empirical analysis in this section is based on rich micro data from Austrian court records.[22]

We have collected information on 7,062 divorce cases from five district courts in Austria.[23] These divorces were initiated between 1997 and 2003, and completed by May 2004. A divorce record is an official record comprising all relevant information on the case.

[21] To check the robustness of our results we refine our control group. According to Austrian legal practice children above 14 years of age have the right to choose their primary place of residence. The judge will only act against the child's wishes if her/his well-being is endangered. Therefore, it seems plausible that the number of children below 14 years of age is more decisive for our analysis (compared to the average number of minors, i. e. children below the age of 19). The allocation of custody should not complicate the conflict between parents and the divorce process if the child's will is pivotal anyway. Therefore, we replicate our analysis for the average number of children below 14 years of age (see Table 7). According to our expectation the results show the same patterns, however, with increased statistical significance.

[22] Please note, we could not use this data set to study the impact of the joint custody reform on the share of divorces by mutual consent compared to the divorces by fault in the last section, since divorces by fault are undersampled in this data set. While in the period from 1997 to 2003 on average about 10 percent of all divorces where divorces by fault in the relevant federal states, we observe in our data set only about 2 percent divorces by fault. This is due to the fact that the access to divorce records of divorces by fault at the data collection was on average more difficult compared to that of divorce records covering divorces by mutual consent. Divorces by fault are on average under longer examination and sent to other courts more often. On top of that divorce records covering divorces by fault very often lack essential information, since parents agree on some issues in other proceedings documented in separate records. While this fact causes no problem for the analysis in this sections, it would have biased the results above.

[23] The courts were selected to represent rural and urban areas. The courts which gratefully cooperated with compiling the data were Hall, Kitzbuehel, Kufstein, Linz, and the district of Favoriten in Vienna. Data were collected on nearly all divorces in the period in the courts in Hall and Kitzbühel. In Kufstein data of about 90 per cent of all cases could be collected. In Linz and Vienna (Favoriten) data of approximately 80 percent of all divorces could be collected.

Therefore, a divorce record consists of socio-economic information on the whole family, transcripts of all proceedings, the correspondence between the litigants and the court, different certificates and the judgment or the settlement. Since we are only interested in divorces by mutual consent with minors we exclude all observations on divorces by fault and cases without minors. As the unit of interest we use the oldest minor in every family which leads to 3,242 observations.[24] Table 3 shows that before the joint custody reform about 90 percent of the minors lived with their mother after the divorce and about 10 percent with their father.[25] Similarly, after the reform about 91 percent of the minors are (mainly) living with their mother and 9 percent with their father, but 45 percent of all parents have agreed upon joint custody. These simple descriptive statistics hint that the

Table 3: Share of different custody arrangements for oldest minor.

	Before the reform	**After the reform**	**Overall**
Sole custody by mother	90.29	50.63	77.58
Sole custody by father	9.71	4.33	7.99
Joint custody, mainly living with mother	-	40.33	12.92
Joint custody, mainly living with father	-	4.72	1.51
Number of oldest minors	2,203	1,039	3,242

share of minors (mainly) living in the mother's household after divorce has not changed due to the reform. However, in order to get a more in-depth answer we employ data from the whole time period and estimate a probit model explaining the probability that the father becomes custodian/resident parent. In other words we explain the probability that the child is (mainly) living in the father's household. As the explanatory variable of primary interest we include a binary variable capturing the period after the reform. As additional control variables we employ information on the child's sex and the child's age, on the parents' income, on their education, on their number of joint children, on the length of their marriage, on their former marriages, on the usage of lawyers and whether the mother has been a homemaker.[26] Further we control for the judge's sex, for the courts where divorce took place, as well as for the month and the year of divorce.[27] Table 8

[24] We have excluded all cases with a-typical custody arrangements where, for instance, grandparents became custodians.

[25] Taking all minors into account leads to virtually the same picture since there are hardly any cases where minors are 'split' between parents, i. e. that minors within one family have different custodians/resident parents.

[26] There are only four fathers in the whole data set who are homemakers.

[27] Unfortunately information on income is missing frequently, especially for mothers. In 22 percent of the cases there is no information on both parents' income. In 50 percent of the cases only the mother's, and in 10 percent of the cases only the father's income is missing. In the remaining 18 percent of the cases we have complete information on both parents' income. Fortunately, we have very detailed information on the parents' occupation which allow us to impute for missing incomes based on multivariate OLS-regressions. The imputed incomes in our estimation analysis below are based on separate regressions for males and females. In each estimation below we control with binary variables for the cases with missing income and we will report on the robustness of our results due to imputation. Based on the sample of all couples with at least one minor child at the time of divorce we imputed in 32 percent of the cases for the father's income

provides descriptive statistics for all covariates. The estimation results are summarized in columns 1 and 2 of Table 9. The effect of the custody reform is positive but basically insignificant (p-value= 0.104). The estimations results affirm the descriptive statistics.

3.3 Determinants of the allocation of custody

To examine the determinants of the allocation of custody before and after the reform we split the sample. For the period before the reform the estimation strategy is obvious and we estimate a probit model. After the reform the situation is less clear. One could argue that the custody allocation has now two dimensions: The parents can first choose between sole and joint custody, and secondly they have to agree on a custodial or a resident parent. This results in an estimation strategy with two binary decisions. Consequently, we estimate a bivariate probit model on the joint determination of who becomes resident/custodial parent (mother vs. father) and the custody type (sole vs. joint). This estimation procedure allows for a correlation between the two error terms of these equations.[28] The results from the conventional probit estimation for the period before the reform are listed in columns 4 to 6 of Table 9. The dependent variable takes on the value one if the father is the sole custodian and zero if the mother is the sole custodian. Columns 7 to 12 summarize the estimation results of the bivariate probit model. In this section we consider the results of the first equation (columns 7 to 9), where the dependent variable is equal to one if the child is mainly living in the father's household, and zero otherwise. Comparing these two estimations we focus on the comparison of the determinants of the child's main place of residence under the two regimes.

The outside option Since we only consider divorces by mutual consent the custody allocations we observe in our data are definitely the outcome of an agreement of the parents and not due to a judgment. Nevertheless, according to our theoretical considerations we should find that the allocation of custody in divorces by mutual consent to be influenced by the outside option (probability of assignment and cost of disagreement for the counterfactual case of a divorce by fault). For instance, a high probability for parent i leads to a higher valuation of the outside option and it is therefore easier for parent i to get the preferred

and in 72 percent of the cases for the mother's income. The explanatory variables in these two regressions comprise age at marriage, age at the birth of the first child, dummy variables for the different occupations (unskilled blue collar worker, skilled blue collar worker or craftsman, white collar worker, civil servant, self-employed, etc.), for the place of birth, for citizenship and for the place of residence (zip code). All coefficients show the expected sign and are of reasonable size. The predictive power of these two regressions is quite good with an R^2 of 0.53 for the regression of the females and of 0.17 for the regression of the males. All estimation results which are discussed but not presented in the paper are of course available upon request.

[28] Alternatively, one could argue that the custody decision has four dimensions after the reform, since there are now four different custody arrangements available: the mother gets sole custody, the father gets sole custody, joint custody with the mother as resident parent and joint custody with the father as resident parent. This view results in a multinomial choice model. We have calculated a multinomial probit model. These estimation results from this are consistent with those from the bivariate probit model discussed below, however, provide no additional insights.

custody agreement. Parents can deduce the probability of assignment p from former divorces by fault. According to Austrian legal practice derived from law and former findings mothers (fathers) are the preferred custodians for female (male) minors.[29] Mothers are the preferred custodians for young children and in general Austrian legal practice prefers homemakers as custodians, since they have already demonstrated that they manage to take care of the child. The estimation results for the period before (columns 3 and 4 in Table 9) indeed show that if the minor in question is a girl, the father is less likely to become custodian (by about two percentage points). Further, as expected the probability that he gets custody increases with the child's age[30] and decreases with the mother being a homemaker (by about minus three percentage points). For the period after the reform (columns 5 and 6 in Table 9) we find a comparable effects of the child's age and the mother being a homemaker. However, the child's sex seems to play no role anymore.

Income & education High-income parents may cope more easily with the higher cost of divorce by fault than parents with lower income. Therefore, the utility equivalent of the monetary cost of disagreement of a high-income parent may be lower than that of a low-income parent. This leads to a higher valuation of the outside option and should thereby increase the probability that the high-income parent gets her/his preferred agreement. On the other hand, a high-income parent may face higher opportunity cost of taking care of the child. This may lead to a reversed utility ordering, where, for instance, this parent prefers the other to be the resident parent in a joint custody. The estimation results for the period before the reform suggest that in the case of mothers the second effect dominates. An increase in the mother's income slightly raises the probability that the father gets custody.[31] The father's income has no statistically significant impact. Possibly, the two countervailing effects cancel each other out. After the reform neither the mother's nor the father's income has an impact on the residence decision. With respect to the mother, this change is plausible, since under joint custody the effect of the opportunity cost of time may be less crucial. The parents' education has no effect in any period.

Lawyers According to Austrian law divorcees are free to hire a lawyer. During the time period covering our data it was also possible for divorcing couples to hire a joint lawyer.[32] Therefore, we have to distinguish five different cases: neither parent has a lawyer, parents have a joint lawyer, both parents have a lawyer each, only the mother has a lawyer and only the father has a lawyer. In our estimations we include a binary variable for each case where the base group is equal to couples without any lawyer. The

[29] In the following we embrace by the term custodian/custodianship both – the custodian under the sole custody regime and the resident parent under a joint custody.

[30] An increase in the minor's age from half a standard deviation below the mean to half a standard deviation above the mean (i.e. from about 7.4 to about 12.5 years) increases the probability of the father being the custodian by nearly three percentage points.

[31] An increase in the mother's income from half a standard deviation below the mean to half a standard deviation above the mean (i.e. from €461 to €803) increases the probability that the father gets custody by one percentage point.

[32] On 1st of January 2005 a new draft of the so-called Non-Contentious Proceedings Act entered into force and repealed the possibility of joint lawyers.

estimation results for the period before the reform show a higher probability of getting custody for fathers who are they only parent who has retained a lawyer compared to fathers of couples who have no lawyer at all (about plus 5 percentage points). The reversed effect is true for mothers (minus 2 percentage points). We do not observe a statistically significant effect of the involvement of lawyers on the custody allocation if parents have a separate lawyer each. It seems that if both parents hire a lawyer their effects cancel out. There is also no impact of a joint lawyer. Although these results seem to be very suggestive it is not clear whether the statistically significant effects are indeed due to a causal effect of lawyers or rather due to a systematic selection of couples with fairly different characteristics into specific situations.[33] In the sample after the reform we face the problem of separation (Albert and Anderson, 1984): The variable 'only the mother has a lawyer' perfectly predicts the outcome, i. e. in every case where only the mother had a lawyer she became custodian/resident parent. Fortunately, separation has in the case of a bivariate probit model not as severe consequences as in the conventional probit model, where either the affected variable or observations have to be dropped in order to fit the model (Zorn, 2005). We still can estimate our bivariate probit model with the full set of covariates and observations. However, the coefficient and standard errors of the variable 'only the mother has a lawyer' are upward biased. Compared to the period before the reform, we do not observe a statistical significant impact of the father's lawyer and in the case where both parents have a lawyer the mother's lawyer outperforms the father's lawyer. This suggest that the joint custody reform has increased the relative power of mother's lawyers. Alternatively, the reform may have changed the sex-specific selection into legal representation.

Alimony In our basic specification we do not control for alimony payments. The allocation of custody and alimony payments may be simultaneously determined and consequently alimony payments are a potentially endogenous variable. However, if we add the alimony payment to the wife as an additional explanatory variable the qualitative results of all other covariates are unchanged in all estimations (see Table 10)[34]. This indicates that we do not have a problem of omitted variable bias in our estimation results. The coefficient of the alimony payment itself is throughout negative and statistically significant in the estimation for the whole period and in the period before the reform. However, since there is no obvious way to fix the endogeneity problem of alimony we do not stress this result.

The results from this section show that the introduction of joint custody had no impact on the probability that minors are living with their mothers after divorce. However, we observe some differences in the determinants of the main place of residence. In general, these changes may be due to two reasons. Firstly, the availability of joint custody may

[33] For a detailed discussion of the role of lawyers in divorce processes see Halla (2007).

[34] In the estimation for the whole period the dummy for the period after the reform, the number of children and the dummy indicating a female judge carry one asterisk – indicating a statistically significance at a 10-percent level – after controlling for alimony. Please note, the p-values of these coefficients (0.104, 0.104 and 0.101) have been pretty much the same before controlling for alimony.

have an impact on parent's way of bargaining over the allocation of custody. Secondly, since the custody reform has increased the share of divorces by mutually consent, we observe a potentially different population of divorcing couples after the reform. However, since the share of this additional parents is comparable small the latter explanation seems to be less likely. In sum, we interpret the results as indicating that the introduction of joint custody had a mediating effect on the bargaining process over custody after divorce without changing the final resident allocation.[35]

3.4 Who takes joint custody?

Who are the 45 percent of all couples who agree on joint custody after the reform? In order to answer this question we examine the second equation of our bivariate probit model for the period after the reform (see Columns 10 to 12 of Table 9). Most strikingly, the estimation results show that any involvement of lawyers has a tremendously negative effect on an agreement on joint custody. We observe a reduced probability (compared to the case without any lawyer) of 20 percentage points if only the mother has a lawyer, minus 16 percentage points if only the father has a lawyer and minus 22 percentage points if parents have a separate lawyer each or a joint lawyer. Again, these negative correlation can be explained by a true causal effect of lawyers or by a systematic selection of parents with distinct characteristics into specific situations. For instance, it seems plausible that parents with grave conflicts are more likely to hire lawyers and would have not agreed on joint custody in the counterfactual situation without any lawyers. The second important results is that the probability of a joint custody arrangement increases with the parents' income. Again, this result suggests sorting. Parents with a higher socio-economic status and higher abilities self-select them into joint custody. Surprisingly, the parents' education has no statistically significant impact. Moreover, we find that the probability of join custody increases with mother's age and decreases with the number of the father's prior marriages. Taken together, the results suggest that parents with favorable characteristics self-select themselves into joint custody. This finding is crucially important for studies examining the effects of joint custody on child-outcomes. Apart from that we find some evidence that female judges seem to be biased against joint custody and manage to influence parents in their decision. A female judge reduces the likelihood of an agreement on joint custody by about seven percentage points. This effect can be interpreted causally since couples are matched randomly to judges. Finally, the year dummies reveal a trend towards joint custody over time. The purpose of this small section is simply to highlight the fact that

[35] In order to check the robustness of our results concerning the imputation procedure we did the estimation analysis based on the smaller sample with complete income information for both parents. The results for the whole period and for the period before the reform are very similar to the results reported in Table 9. The effect of the parents' income is unchanged, only the statistical significance of some control variables changes. An estimation of the bivariate probit model for the period after the reform based on this sample cannot be realized, since no convergence is achieved. This is caused by the few cases in this sample where the father is the sole custodian (11) or resident parent under joint custody (10).

couples with joint custody are selected group. It may be the case that empirical studies neglecting this fact are biased due to confounding factors and overestimate the positive effect of joint custody. An promising way to disentangle causal effects of joint custody on future child outcomes is given by different timing of custody law reforms across countries. The timing of the introduction of joint custody regimes across European countries would allow such a difference-in-differences analysis. Similarly Teng Wah (2006) exploits the variation across the Unites States to study the impact of joint custody on educational attainment.

4 Summary & conclusions

We have modeled the allocation of custody at the time of divorce as bargaining between parents with alternating offers and a finite horizon for two different custody regimes. First we assume a sole custody regime. In a second step we introduce joint custody as an additional option. We have shown that some parents, who would not be able to find a custody agreement in the first regime, can find an agreement after the joint custody reform. Empirical evidence based on a recent joint custody reform in Austria supports our model. Exploiting the control group nature of couples without minors we find that the introduction of joint custody has increased the fraction of divorces by mutual consent. Based on rich micro data of court records we inspect the bargaining process of divorces by mutual consent before and after this reform. The custody reform has not changed the odds that children are mainly living with their mothers, however, some determinants of the custody allocation are altered.

Given our findings we support the introduction of joint custody. Joint custody has mediating effects on the divorce process and enables facilitating cooperation among parents. This, in turn, minimizes both private and public cost of litigation. Furthermore, the circumvention of painful adversary proceedings and of substantial delays induced by contested judicial proceedings reduces emotional stress. Above all, consensual solutions are by definition more consistent with the preferences of each parent, and should thereby lead to an outcome that is more stable over time than a result imposed by a judge. The fact that female judges distract couples to take joint custody should be observe and discussed by the judicial profession.

Whether joint custody has apart from the mediating influence on the divorce process desirable effects after divorce is an open issue and deserves further research. However, our court data clearly shows that parents who agree on joint custody are a highly selected group. Future research on post-divorce outcomes has to take this into account.

References

Albert, A. and J. A. Anderson (1984), 'On the Existence of Maximum Likelihood Estimates in Logistic Regression Models', *Biometrika* **71**(1), 1–10.

Bauserman, Robert (2002), 'Child Adjustment in Joint-Custody Versus Sole-Custody Arrangements: A Meta-Analytic Review', *Journal of Family Psychology* **16**(1), 91–102.

Becker, Gary S. (1993), *A Treatise on the Family, Enlarged Edition*, Harvard University Press, Cambridge, MA.

Bowman, Madonna E. and Constance R. Ahrons (1985), 'Impact of Legal Custody Status on Fathers' Parenting Postdivorce', *Journal of Marriage and the Family* **47**(2), 481–488.

Brinig, Margaret F. and Francis H. Buckley (1998), 'Joint Custody: Bonding and Monitoring Theories', *Indiana Law Journal* **73**(2), 393–452.

Cooter, Robert, Stephen Marks and Robert Mnookin (1982), 'Bargaining in the Shadow of the Law: A Testable Model of Strategic Behavior', *Journal of Legal Studies* **11**(2), 225–251.

Del Boca, Daniela (2003), 'Mothers, Fathers and Children After Divorce: The Role of Institutions', *Journal of Population Economics* **16**(3), 399–422.

Del Boca, Daniela and Rocio Ribero (1998), 'Transfers in Non-Intact Households', *Structural Change and Economic Dynamics* **9**(4), 469–478.

Dethloff, Nina and Dieter Martiny (2003), Country Chapter Germany, *in* K.Boele-Woelki, B.Braat and I.Sumner, eds, 'European Familiy Law in Action, Vol. III Parental Responsibilities', Intersentia, Antwerpen.

Ermisch, John (2003), *An Economic Analysis of the Family*, Princeton University Press, Princeton, NJ.

Fella, Giulio, Paola Manzini and Marco Mariotti (2004), 'Does Divorce Law Matter?', *Journal of the European Economic Association* **2**(4), 607–633.

Francesconi, Marco and Abhinay Muthoo (2003), An Economic Model of Child Custody, Discussion Paper 857, Forschungsinstitut zur Zukunft der Arbeit (IZA), Bonn.

Halla, Martin (2007), Divorce and the Excess Burden of Lawyers, Discussion Paper No. 2962, Forschungsinstitut zur Zukunft der Arbeit (IZA), Bonn.

Huang, Chien-Chung, Wen-Jui Han and Irwin Garfinkel (2003), 'Child Support Enforcement, Joint Legal Custody, and Parental Involvement', *Social Service Review* **77**(2), 255–278.

Jänterä-Jareborg, Maarit (2003), Country Chapter Sweden, *in* K.Boele-Woelki, B.Braat and I.Sumner, eds, 'European Familiy Law in Action, Vol. III Parental Responsibilities', Intersentia, Antwerpen.

Kuehl, S J. (1989), 'Against Joint Custody: A Dissent to the General Bull Moose Theory', *Family & Conciliation Courts Review* **27**(2), 37–45.

Mnookin, Robert H. and Lewis Kornhauser (1979), 'Bargaining in the Shadow of the Law: The Case of Divorce', *Yale Law Review* **88**(5), 950–997.

OECD (2007), *Society at a Glance : OECD Social Indicators 2006*, OECD, Paris.

Rasul, Imran (2006), 'The Economics of Child Custody', *Economica* **73**(1), 1–25.

Roth, Marianne (2003), Country Chapter Austria, *in* K.Boele-Woelki, B.Braat and I.Sumner, eds, 'European Familiy Law in Action, Vol. III Parental Responsibilities', Intersentia, Antwerpen.

Rubinstein, Ariel (1982), 'Perfect Equilibirium in a Bargaining Model', *Econometrica* **50**, 97–109.

Seltzer, Judith A. (1991), 'Legal Custody Arrangments and Children's Economic Welfare', *The American Journal of Sociology* **96**(4), 895–929.

Statistik Austria (2003), *Demographisches Jahrbuch 2001/02*, Wien.

Stevenson, Betsey and Justin Wolfers (2007*a*), 'Marriage and Divorce: Changes and their Driving Forces', *Journal of Economic Perspectives* **21**(2), 27–52.

Stevenson, Betsey and Justin Wolfers (2007*b*), Trends in Marital Stability, Unpublished manuscript, University of Pennsylvania.

Sverdrup, Tone and Peter Lødrup (2003), Country Chapter Norway, *in* K.Boele-Woelki, B.Braat and I.Sumner, eds, 'European Familiy Law in Action, Vol. III Parental Responsibilities', Intersentia, Antwerpen.

Teng Wah, Leo (2006), From Maternal Preference to Joint Custody: The Impact of Changes in Custody Law on Child Educational Attainment, Unpublished manuscript, University of Toronto.

Zorn, Christopher (2005), 'A Solution to Separation in Binary Response Models', *Political Analysis* **13**(2), 157–170.

Appendix A

In **Case 3**, it is a priori not clear which of the two possible agreements x_i^* or x_j^* the parents will choose. The outcome depends on their relative bargaining power, i. e. who can make the last/first proposal and on their relative (im)patience.In the following we characterize four sub-cases which result from different combinations of who can make the last proposal and the impatience of the parents.

Definition *Impatience of a parent i means, that there is a critical time span z_i for which $(x_i^*, t + z_i) \preceq_i (x_j^*, t)$.*

Therefore, parent i having her/his way after the critical time span z_i leads to a lower (or equal) utility for parent i than letting the other parent have her/his way now. Hence, it is not credible for parent i to reject x_j^* now, if s/he could get x_i^* only after the critical time span z_i.

Case 3.1 *If parent i with the last proposal is sufficiently patient, i.e. $z_i > t_C - 1$ and therefore $(x_i^*, t_C - 1) \succeq_i (x_j^*, 0)$, then the parents agree on x_i^* immediately – independent of parent j's patience.*

In the penultimate period, when the last proposal is made, the not-proposing parent j will agree to x_i^*, because it is still better than having to go to court in the next period. The parents know that parent j with the penultimate proposal will finally give in, therefore they agree on x_i^* immediately.

Case 3.2 *If parent i with the last proposal is not sufficiently patient, i.e. $z_i \leq t_C - 1$ and therefore $(x_i^*, t_C - 1) \preceq_i (x_j^*, 1)$, but parent j is sufficiently patient, then the parents agree on x_j^* immediately.*[36]

In this case parent i has an advantage due to the last proposal, but s/he cannot use it, because it is not credible for her/him to wait until the penultimate period (with the last proposal). The reason for this is that accepting the proposal of the other parent in period 0 or period 1 leads to (at least) as much utility as having x_i^* in the penultimate period. Therefore, parent i cannot credibly reject, if parent j proposes x_j^* in the beginning (or in period 1). Parent i will even propose x_j^* her/himself, to save the cost of waiting. If both parents are (sufficiently) impatient, so that the other parent's preferred possible agreement now yields at least as much utility as the own preferred possible agreement in the penultimate period, then there are two possible outcomes: If one parent is more patient than the other parent, then the more patient parent will have her/his way. If both parents are equally impatient, then the parent with the first move will get her/his preferred possible agreement.

[36] We have to include period 1 here. If parent j has the first proposal and parent i could become credible by waiting one period, then parent i would get her/his way.

Case 3.3a *If both parents are not sufficiently patient, i.e.* $(x_i^*, t_C - 1) \preceq_i (x_j^*, 1)$*, and parent* i *is more patient then parent* j*, i.e.* $z_i > z_j + 1$*, then the parents agree on* x_i^* *immediately – independent of who can make the last proposal.*

The reason is that parent j will not get the consent of parent i during z_j. Parent i may or may not consent to x_j^* after z_j – it does not matter for parent j, for whom it is in any case better to consent to x_i^* now (and it would not be credible to do otherwise). Parent i on the other hand can credibly threaten to wait longer than z_j, but not long enough for the last proposal. This does not matter though, parent j will consent to x_i^* as soon as parent i proposes it. Parent j will even propose x_i^* her/himself, because $(x_i^*, 1) \succeq_j (x_j^*, z_j + 1)$ and $(x_i^*, 0) \succeq_j (x_i^*, 1)$.

Case 3.3b *If both parents are not sufficiently patient, i.e.* $(x_i^*, t_C - 1) \preceq_i (x_j^*, 1)$*, and both parents are (nearly) equally impatient, i.e.* $z_i = z_j$ *or* $z_i = z_j \pm 1$*, then the parents agree on* x_i^* *(*x_j^**) immediately if parent* i *(parent* j*) makes the first proposal.*

In this case both parents know that they cannot get their preferred possible agreement within their critical time spans. Therefore, each parent has an incentive to propose the own preferred possible agreement, but also to consent to the preferred possible agreement of the other parent, as soon as it is proposed, because they cannot increase their utility by waiting. Parent m (who by assumption makes the first proposal) proposes x_m^* and parent f agrees to it.

Appendix B

Table 4: The effect of joint custody on the number of divorces.[a]

	(I)	(II)	(III)
Joint custody reform	-0.057	-0.057	0.014
	(0.034)	(0.035)	(0.090)
Controlling for:			
Divorce law reform	Yes	Yes	Yes
Trend	Yes	Yes	Yes
State dummies	Yes	Yes	Yes
Trend*State dummies		Yes	Yes
Trend^2			Yes
Trend^2*State dummies			Yes
R-squared	0.967	0.971	0.982

[a] The dependent variable is the number of divorces per 1,000 residents in state s in year t, where $s = 1, \ldots, 9$ and $t = 1991, \ldots, 2006$. The number of observations is in each estimation equal to 144. Estimated using state population weights. Robust standard errors in parentheses. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level.

Table 5: The effect of joint custody on the share of divorces by mutual consent.[a]

	(Ia)	(Ib)	(Ic)	(IIa)	(IIb)	(IIc)
Joint custody reform	2.161***	1.775***	1.748**	2.160***	1.775***	1.735**
	(0.438)	(0.487)	(0.525)	(0.451)	(0.501)	(0.529)
Constant	88.651***	91.864***	92.620***	85.963***	89.178***	90.073***
	(0.467)	(0.536)	(1.870)	(0.210)	(0.482)	(1.564)
Controlling for:						
State dummies	Yes	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes	Yes
Trend*State dummies				Yes	Yes	Yes
Divorce law reform		Yes	Yes		Yes	Yes
Divorces per 1,000 residents			Yes			Yes
R-squared	0.398	0.488	0.488	0.481	0.571	0.572

[a] The dependent variable is the percentage of divorces by mutual consent in state s in year t, where $s = 1, \ldots, 9$ and $t = 1991, \ldots, 2006$. The number of observations is in each estimation equal to 144. Estimated using state population weights. Robust standard errors in parentheses. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level.

Table 6: The effect of JC on the share of divorces by mutual consent by the no. of minors.[a]

	(Ia)	(Ib)	(Ic)	(IIa)	(IIb)	(IIc)
JC*Low no. of minors	1.819**	1.452**	1.409*	1.921**	1.581*	1.530
	(0.600)	(0.624)	(0.677)	(0.776)	(0.796)	(0.851)
JC*Medium no. of minors	2.363***	2.022***	2.010***	2.191***	1.864**	1.853**
	(0.402)	(0.399)	(0.417)	(0.618)	(0.582)	(0.574)
JC*High no. of minors	2.632**	2.167**	2.130*	2.531***	2.019**	1.969**
	(0.797)	(0.919)	(0.939)	(0.734)	(0.777)	(0.802)
Medium no. of minors	-0.153	-0.234	-0.239	0.467	0.353	0.331
	(0.456)	(0.328)	(0.338)	(0.979)	(0.835)	(0.854)
High no. of minors	-0.346	-0.268	-0.239	-0.150	-0.067	-0.058
	(0.785)	(0.844)	(0.866)	(1.126)	(1.237)	(1.235)
Constant	88.775***	91.992***	92.876***	86.060***	89.160***	90.037***
	(0.758)	(0.693)	(1.927)	(1.022)	(1.112)	(2.021)
Controlling for:						
State dummies	Yes	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes	Yes
Trend*State dummies				Yes	Yes	Yes
Divorce law reform		Yes	Yes		Yes	Yes
Divorces per 1,000 residents			Yes			Yes
R-squared	0.404	0.493	0.494	0.492	0.577	0.579

[a] The dependent variable is the percentage of divorces by mutual consent in state s in year t, where $s = 1, \ldots, 9$ and $t = 1991, \ldots, 2006$. The number of observations is in each estimation equal to 144. Estimated using state population weights. Robust standard errors in parentheses. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level.

Table 7: The effect of JC on the share of divorces by mutual consent by the no. of kids<14.[a]

	(Ia)	(Ib)	(Ic)	(IIa)	(IIb)	(IIc)
JC*Low no. of kids<14	1.875**	1.508**	1.454*	2.111**	1.746**	1.697*
	(0.590)	(0.604)	(0.676)	(0.767)	(0.752)	(0.811)
JC*Medium no. of kids<14	2.254***	1.815***	1.818***	2.185***	1.737***	1.739***
	(0.401)	(0.447)	(0.440)	(0.413)	(0.421)	(0.402)
JC*High no. of kids<14	2.536**	2.209**	2.145**	2.318**	2.012**	1.921**
	(0.846)	(0.816)	(0.879)	(0.917)	(0.754)	(0.791)
Medium no. of kids<14	-0.098	-0.124	-0.126	0.529	0.483	0.464
	(0.501)	(0.460)	(0.468)	(0.705)	(0.574)	(0.599)
High no. of kids<14	0.425	0.318	0.358	1.043	0.888	0.912
	(0.889)	(0.662)	(0.695)	(1.298)	(0.948)	(0.969)
Constant	88.403***	91.665***	92.627***	85.169***	88.456***	89.325***
	(0.591)	(0.514)	(2.037)	(1.142)	(1.046)	(2.017)
Controlling for:						
State dummies	Yes	Yes	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes	Yes	Yes
Trend*State dummies				Yes	Yes	Yes
Divorce law reform		Yes	Yes		Yes	Yes
Divorces per 1,000 residents			Yes			Yes
R-squared	0.412	0.500	0.501	0.495	0.582	0.584

[a] The dependent variable is the percentage of divorces by mutual consent in state s in year t, where $s = 1, \ldots, 9$ and $t = 1991, \ldots, 2006$. The number of observations is in each estimation equal to 144. Estimated using state population weights. Robust standard errors in parentheses. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level.

Table 8: Descriptive statistics of court record data.[a]

	Before the reform $N = 2,203$		**After the reform** $N = 1,039$	
	Mean	S.D.	Mean	S.D.
Child is female	0.50		0.48	
Child's age	9.95		10.25	
Mother is housewife	0.18	0.39	0.16	0.37
Mother's income in € 100	6.40	3.43	6.64	3.24
Father's income in € 100	14.68	6.20	15.76	6.78
Mother's education	1.03	0.19	1.04	0.24
Father's education	1.06	0.31	1.07	0.33
Neither parent has a lawyer	0.76		0.74	
Only the mother has a lawyer	0.05		0.06	
Only the father has a lawyer	0.04		0.03	
Both parents have a lawyer each	0.10		0.10	
Parents have a joint lawyer	0.05		0.07	
Mother's age at divorce	35.00	6.24	36.18	6.25
Age difference	2.95	4.84	2.67	4.89
No. of joint children	1.58	0.70	1.66	0.70
Length of marriage in years	10.65	6.12	11.04	5.94
Mother's no. of marriages	1.12	0.35	1.09	0.31
Father's no. of marriages	1.14	0.40	1.12	0.36
Judge is female	0.28		0.37	

Table 9: The allocation of custody.[a]

	Overall			Before the reform			After the reform					
Method of estimation	Probit			Probit			Bivariate probit					
Dependent variable	Father is custodian/resident			Father is custodian			Father is custodian/resident			Joint custody		
	Coeff.	S.E.	MFX	Coeff.	S.E.	MFX	Coeff.	S.E.	MFX	Coeff.	S.E.	MFX
Joint custody reform	0.344	0.237	0.020									
Outside option												
Child is female	-0.264***	0.085	-0.013	-0.332***	0.102	-0.019	-0.088	0.169	-0.001	-0.143*	0.085	-0.056
Child's age	0.093***	0.016	0.005	0.095***	0.019	0.005	0.111***	0.032	0.001	0.003	0.016	0.001
Mother is housewife	-0.662***	0.158	-0.022	-0.695***	0.184	-0.026	-0.739**	0.361	-0.005	0.014	0.208	0.005
Income & education												
Mothers's income in €100	0.050***	0.014	0.002	0.049***	0.017	0.003	0.050	0.035	0.001	0.044**	0.022	0.017
Fathers's income in €100	-0.011	0.008	-0.001	-0.009	0.010	0.000	-0.017	0.021	0.000	0.029***	0.007	0.011
Mother's education	-0.084	0.222	-0.004	-0.054	0.267	-0.003	-0.026	0.454	0.000	-0.059	0.196	-0.023
Father's education	0.145	0.130	0.007	0.192	0.151	0.011	-0.020	0.317	0.000	0.152	0.151	0.060
Lawyers												
Only the mother has a lawyer	-0.692***	0.253	-0.019	-0.532**	0.269	-0.019	-6.513	25182	-0.011	-0.534***	0.191	-0.196
Only the father has a lawyer	0.296	0.194	0.020	0.576***	0.217	0.054	-1.036	0.718	-0.004	-0.434*	0.238	-0.162
Parents have a lawyer each	-0.312**	0.140	-0.012	-0.230	0.170	-0.011	-0.598**	0.268	-0.004	-0.610***	0.152	-0.223
Parents have a joint lawyer	0.176	0.155	0.010	0.210	0.199	0.014	0.026	0.270	0.000	-0.615***	0.168	-0.222
Further control variables												
Mother's age at divorce	-0.019	0.012	-0.001	-0.030**	0.015	-0.002	0.008	0.024	0.000	0.025**	0.012	0.010
Age difference	0.015	0.010	0.001	0.018	0.012	0.001	0.023	0.021	0.000	0.006	0.011	0.003
No. of joint children	0.099	0.061	0.005	0.063	0.073	0.003	0.135	0.121	0.002	-0.080	0.068	-0.032
Length of marriage in years	0.011	0.013	0.001	0.016	0.015	0.001	-0.004	0.027	0.000	-0.019	0.014	-0.007
Mother's no of marriages	0.259*	0.139	0.013	0.384**	0.162	0.021	-0.030	0.303	0.000	-0.062	0.146	-0.024
Father's no of marriages	-0.164	0.129	-0.009	-0.158	0.144	-0.009	-0.467	0.339	-0.005	-0.263*	0.137	-0.104
Judge is female	-0.174*	0.106	-0.008	-0.185	0.127	-0.009	-0.406	0.247	-0.004	-0.187*	0.110	-0.073
Constant	1.854***	0.420		-1.770***	0.498		-1.314	1.090		-1.566**	0.626	
No. of observations	3,242			2,203			1,039					
Log-likelihood	569.144			395.152			776.553					
McFadden Pseudo R-squared	0.441			0.437								
ρ(s.e.)							0.171 (0.101)					
Likelihood-ratio test of $\rho = 0$							$\chi^2_{(1)} = 2.756$, P-value= 0.097					

[a] In each estimation we further control with binary variables for the court, for the month and the year of divorce of divorce. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level. [b] The marginal effect is the change in the probability of the dependent variable caused by an infinitesimal change of each independent continuous variable or, the discrete change in the probability for a changing binary variable with all the other variables fixed at their means.

Table 10: The allocation of custody controlling for alimony payments.[a]

	Overall			**Before the reform**			**After the reform**					
Method of estimation	Probit			Probit			Bivariate probit					
Dependent variable	Father is custodian/resident			Father is custodian			Father is custodian/resident			Joint custody		
	Coeff.	S.E.	MFX	Coeff.	S.E.	MFX	Coeff.	S.E.	MFX	Coeff.	S.E.	MFX
Alimony payment in €100	-0.041***	0.014	-0.002	-0.058***	0.020	-0.003	-0.020	0.026	-0.0002	-0.042***	0.014	-0.017
Joint custody reform	0.406*	0.246	0.023								0.000	
Outside option												
Child is female	-0.269***	0.085	-0.013	-0.341***	0.104	-0.018	-0.092	0.171	-0.001	-0.148*	0.085	-0.058
Child's age	0.087***	0.016	0.004	0.088***	0.019	0.005	0.109***	0.032	0.001	-0.003	0.016	-0.001
Mother is housewife	-0.651***	0.160	-0.022	-0.681***	0.188	-0.024	-0.740**	0.362	-0.005	0.015	0.211	0.006
Income & education												
Mother's income in €100	0.045***	0.015	0.002	0.045***	0.017	0.002	0.046	0.035	0.001	0.033	0.022	0.013
Father's income in €100	-0.006	0.009	0.000	-0.003	0.010	0.000	-0.012	0.021	-0.0001	0.040***	0.008	0.016
Mother's education	-0.114	0.224	-0.006	-0.059	0.270	-0.003	-0.054	0.458	-0.001	-0.069	0.200	-0.027
Father's education	0.141	0.135	0.007	0.161	0.160	0.008	-0.001	0.314	-0.00001	0.189	0.158	0.075
Lawyers												
Only the mother has a lawyer	-0.837***	0.279	-0.020	-0.699**	0.298	-0.020	-6.492	25133	-0.011	-0.566***	0.193	-0.206
Only the father has a lawyer	0.339*	0.196	0.023	0.622***	0.219	0.058	-1.105	0.744	-0.004	-0.484**	0.246	-0.178
Parents have a lawyer each	-0.267*	0.142	-0.010	-0.165	0.172	-0.008	-0.571**	0.272	-0.004	-0.561***	0.156	-0.206
Parents have a joint lawyer	0.208	0.157	0.012	0.267	0.203	0.018	0.032	0.271	0.0004	-0.582***	0.169	-0.212
Further control variables												
Mother's age at divorce	-0.013	0.013	-0.001	-0.023	0.016	-0.001	0.010	0.024	0.0001	0.027**	0.012	0.011
Age difference	0.015	0.010	0.001	0.016	0.012	0.001	0.026	0.022	0.0003	0.005	0.011	0.002
No. of joint children	0.103*	0.062	0.005	0.067	0.075	0.004	0.131	0.123	0.002	-0.083	0.069	-0.033
Length of marriage in years	0.011	0.013	0.001	0.016	0.015	0.001	-0.002	0.027	-0.00002	-0.018	0.014	-0.007
Mother's no. of marriages	0.237*	0.139	0.012	0.365**	0.162	0.019	-0.009	0.311	-0.0001	-0.136	0.149	-0.053
Father's no. of marriages	-0.182	0.130	-0.009	-0.169	0.146	-0.009	-0.494	0.340	-0.006	-0.254*	0.138	-0.100
Judge is female	-0.185*	0.107	-0.008	-0.195	0.129	-0.009	-0.413*	0.249	-0.004	-0.200*	0.112	-0.078
Constant	-1.885***	0.423		-1.830***	0.505		-1.359	1.095		-1.504**	0.637	
No. of observations	3,211			2,184			1,027					
Log-likelihood	556.773			383.449			761.778					
McFadden Pseudo R-squared	0.448			0.447			-					
ρ(s.e.)	-			-			0.174 (0.103)					
Likelihood-ratio test of $\rho = 0$	-			-			$\chi^2_{(1)} = 2.752$, P-value= 0.097					

[a] In each estimation we further control with binary variables for the court, for the month and the year of divorce of divorce. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level. [b] The marginal effect is the change in the probability of the dependent variable caused by an infinitesimal change of each independent continuous variable or, the discrete change in the probability for a changing binary variable with all the other variables fixed at their means.