DISCUSSION PAPER SERIES

IZA DP No. 2544

Bargaining at Divorce: The Allocation of Custody

Christine Atteneder
Martin Halla

January 2007

Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

Bargaining at Divorce: The Allocation of Custody

Christine Atteneder
Johannes Kepler University of Linz

Martin Halla
Johannes Kepler University of Linz
and IZA

Discussion Paper No. 2544
January 2007

IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

IZA Discussion Paper No. 2544
January 2007

ABSTRACT

Bargaining at Divorce: The Allocation of Custody*

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 a sole custody regime, can find an agreement after the joint custody reform. Accordingly, our empirical analysis shows that the introduction of joint custody enables more parents to divorce by mutual consent.

JEL Classification: J12, J13, K36, D1, C78

Keywords: (joint) custody, divorce, family law, bargaining

Corresponding author:

Christine Atteneder
Department of Economics
Johannes Kepler University of Linz
Altenberger Str. 69
A-4040 Linz-Auhof
Austria
E-mail: christine.atteneder@jku.at

* The authors would like to thank René Böheim, Johann K. Brunner, Reiner Buchegger, Uwe Dulleck, Peter Egger, and Rudolf Winter-Ebmer for valuable discussions and support.

1 Introduction

Since the 1970s many developed countries have introduced various forms of joint custody after divorce to supplement or to replace sole custody arrangements.[1] 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), parental involvement (Bowman and Ahrons, 1985; Huang, Han and Garfinkel, 2003), etc. 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 inconclusive. Empirical studies typically suffer from the fundamental problem of confounding factors, such as self-selection. For instance, if one observes a positive correlation between joint custody and a desirable child outcome, it is premature to conclude that this is a causal effect. Instead it may be that committed parents are more likely to have joint custody. A possible source of this are systematic differences in parents' preferences over different custody arrangements (Wilcox, Wolchik and Braver, 1998). Moreover, since an agreement on joint custody requires at least some parental coordination, it seems plausible that joint custody couples have a lower baseline level of conflict (Donnelly and Finkelhor, 1993), from which children would benefit in any case.[2] Consequently, the positive relationship between joint custody and the child outcomes would just reflect self-selection of committed and/or cooperating parents into shared parenting.

Due to the problem of confounding factors empirical studies analyzing the determinants of joint custody and/or the effect of joint custody on various outcomes should build upon a thorough theoretical framework. In this paper we develop a theoretical model to provide this framework. Thereby, even more importantly, we uncover some beneficial features of an institutional setting which provides joint custody as an additional custody arrangement after divorce compared to a regime where sole custody is the only choice.

We model the bargaining process of parents over custody at the time of divorce.[3] First we

[1] In the United States joint custody after divorce was first introduced in Indiana in 1973 and has since then spread to nearly all states (Brinig and Buckley, 1998). In Europe, joint custody after divorce has been introduced, for instance, in Sweden in 1976 (Jänterä-Jareborg, 2005), in Norway in 1981 (Sverdrup and Lødrup, 2005), in Germany in 1997 (Dethloff and Martiny, 2005) and in Austria in 2001 (Roth, 2005).

[2] Even if joint custody is assigned by the judge, the selection problem persists as long as judical screening works.

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

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. The parents come to a conclusion immediately (i.e. the game ends in the first period), but they do not necessarily find an agreement. In some cases one parent opts out and goes to court right away. Whether the parents can find an agreement for the custody arrangement or not depends on their preferences. We show that some parents, who would not be able to find an agreement in an institutional setting where only sole custody is available, can find an agreement after the joint custody reform.

Our results imply that the introduction of joint custody substantially reduces the (monetary and emotional) cost of divorce for all parties involved:[4] A larger fraction of couples is now able to find a custody agreement – the integral part of every divorce settlement with minors – without heavily resorting to courtroom adjudication. This minimizes both private and public cost of litigation. 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 spouse, and more stable over time than a result imposed by a judge.

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 custody arrangements affect the parents' bargaining behavior. Fella, Manzini and Mariotti (2004) derive an explicit bargaining model between spouses where the transferability of matrimonial property 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 custodial rights under different custody law regimes.

In addition to our theoretical work we present empirical evidence that supports our model. We are able to explore in detail the bargaining process of parents over custody before and after a joint custody reform. The introduction of joint custody has increased the fraction of divorces by mutual consent by about 2 percentage points, which supports the model's prediction.

tract.

[4]This is line with the discussion in favor of private ordering in Mnookin and Kornhauser (1979).

2 A bargaining model of the custody decision after divorce

To model theoretically the bargaining process over the custody allocation after divorce, we presume that parents have to find a custody arrangement at the time of divorce for their minor in order to dissolve the marriage legally.[5] Preferably they agree on it, but if they are not able to find any agreement, a judge assigns sole custody to one parent. In principal 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 the custody allocation. If parents do not manage to agree upon custody they have to proceed with divorce by fault. In order to find an agreement, parents can bargain over the custody arrangement.[6]

We first assume an institutional setting where only sole custody is available. Parents can choose from two possible arrangements: to assign sole custody either to the mother or to the father. After a joint custody reform there are 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.[7] 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 the custody allocation has to take place before filing for divorce. This is only one possible set of divorce rules, but it is a natural starting point for our analysis, since further changes in the institutional setting, as for example the introduction of joint custody after divorce without an agreement of the parents, might be thought of as amendments to the presumed custody reform.

The negotiation over the custody arrangement 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.[8] The set of agreements contains the possible types of custody, over which the parents may decide. There are two agreements x in a 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

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

[6] 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 alimony, child support, and visitations. Since the negotiation over these issues depends on the allocation of custody we disregard them in our bargaining model. If these issues are included in a prenuptial contract, a negotiation may not even be necessary when the divorcing couple sticks to the prenuptial contract. For custody though the situation is different: Here a prenuptial contract is not (necessarily) binding, if the 'best interest of the child'-rule is used as the final decision factor. From this we conclude that there will be a negotiation about custody in any case. We do not explicitly include prenuptial contracts in our model, but if such a contract exists, this may influence the utility orderings of the parents, when they have invested more into the child as they would have done without the contract (see for example Rainer (forthcoming)). In this case the parents may want to agree on the contracted custody arrangement, even if they would not without the contract.

[7] Consequently, we refer to the parent where the child is living more than half of the time in a joint custody as resident parent.

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

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 was found at 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 utilities due to their closeness during marriage.

The parents follow certain rules in the bargaining process. We 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'.[9] Furthermore, 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 already 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 $(1-p)$.[10] 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 – in short, cost of disagreement.[11] 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 utility is discounted to a smaller degree, since the game ends sooner and less cost of waiting incur.

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 another 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

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

[10] The parents can deduce the probability from 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.

[11] Emotional cost could result from parents internalising 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.

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.[12] After that we discuss the negotiation in a joint custody regime, where sole and joint custody are available. We will then compare the outcomes of the two regimes to identify the effects 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 (which is the same as 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, which is common knowledge.[13] The lottery of going to court yields an expected utility between the two agreements, as it is not clear who will become custodian. In addition, going to court leads to a lower utility level than the lottery itself, as additional cost of disagreement ε_i incur. 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 to go 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 their relative bargaining power which parent can get her/his preferred agreement.

To solve the model we apply backward-induction: The parents know that eventually (at the exogenous end of the game) the judge will assign custody to one of them. The parents want to improve the 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).

Proposition *(Case 1)* *When the subset of possible agreements $X^* \subseteq X$, which contains*

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

[13] This analysis assumes – as most economic analyses 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. Moreover, other preference orderings do not change the results.

Table 1: Summary of the results before the reform.

		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

only those agreements that both parents prefer to the outside option, is empty, then the parents cannot find an agreement. Therefore, they go to court immediately.

Proof of *Case 1* 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, without ever coming to an agreement, because there is no agreement that both parents prefer to the outside option. Therefore, it is preferable to go to court instead of rejecting the proposal of the other parent. This ends the game immediately.

An example for this case is when both parents have the utility ordering $U_i^i > U_i^C > U_i^j$. Then they both prefer to go to court than to give away custody. Therefore, there is no agreement which leads to a higher utility for both parents at the same time. The result is that parent m, who by definition starts the game, proposes mS and parent f goes to court immediately to save the cost of waiting.[14]

Proposition *(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.*

Proof of *Case 2* Again the parents try to find an agreement which increases the utility of both of them compared to the eventual assignment of custody by the judge. In this case agreement x^* not only improves the utility for both parents, it is also the preferred agreement of both parents 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.

This is the case when parent i has the utility ordering $U_i^i > U_i^C > U_i^j$ and parent j has the utility ordering $U_j^j > U_j^i > U_j^C$. Here iS is x^* – the preferred possible agreement of both parents

[14] If one parent wants to divorce, but the other does not, then the latter can claim the last (and/or the first) proposal in exchange for her/his consent to the divorce. This reflects the larger bargaining power of the second parent.

(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.

Proposition *(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.*[15]

Proof of *Case 3* *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.[16]

When, for example, both parents have a utility ordering of $U_i^i > U_i^j > U_i^C$, then the outcome depends on the relative bargaining power of the parents. In this case both parents have high cost of disagreement and/or a relatively low – and therefore relatively equal – probability to get custody assigned by the judge. This means, that both parents prefer any agreement to going to court. In this case mS and fS are the possible agreements which lead to a higher utility for both parents compared to the exogenous end of the negotiation. The solution will be mS if parent m can enforce her claim and fS if parent f can get his way due to being more patient or due to having the last proposal.

2.2 Solving the model in a joint custody regime

The preference orderings after the introduction of joint custody include sole custody, going to court and joint custody. Again, each parent prefers being custodian compared to giving custody to the other parent. But if the other parent becomes the custodian, then each parent i wants to be integrated into custody, so that $jJ \succ_i jS$. If parent i gets custody her/himself on the other hand, then parent i can either prefer sole or joint custody.[17] Therefore, there are 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

[15] Refer to the Appendix for an analysis of the relative bargaining power of the parents and its effects on the chosen agreement.

[16] 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.

[17] Again, other preference orderings do not change the results.

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:[18]

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

This means that there are now 49 different situations, for which the solutions are summarized in Table 2. Nevertheless, there are again only three possible outcomes, which correspond to the outcomes (and the proposition) stated in the last section: (i) There is no agreement from which both parents profit, so that the parents go to court immediately (see ***Case 1***). (ii) They find a single agreement which improves the situation for both parents, because they prefer the same possible agreement (see ***Case 2***). (iii) There are two possible agreements which the parents may choose, because they have different preferences over the subset of possible agreements (see ***Case 3***).

An example for ***Case 1*** can be found with the utility orderings $U_m^{mS} > U_m^{mJ} > U_m^{fJ} > U_m^{C} > U_m^{fS}$ and $U_f^{fS} > U_f^{C} > U_f^{fJ} > U_f^{mJ} > U_f^{mS}$. The parents cannot find any agreement which leads to a higher utility than the outside option for both of them. The reason is that for parent f only fS yields a higher utility, but this agreement is worse than going to court for parent m. On the other hand all the agreements which lead 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, instead of waiting until the exogenous end of the game.

An example for an agreement independent of the relative bargaining power of the parents (***Case 2***) can be found with utility orderings $U_m^{mS} > U_m^{mJ} > U_m^{fJ} > U_m^{fS} > U_m^{C}$ 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. Nevertheless, the chosen agreement does not depend on the relative bargaining power of the parents, since both parents prefer fJ to fS. Therefore, the parents 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 $U_f^{fS} > U_f^{fJ} > U_f^{mJ} > U_f^{mS} > U_f^{C}$. Here the parents

[18] 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 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.

will agree on mJ if parent m has her way and on fJ if parent f can put through his preferred agreement. 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.

To sum up, parents always want to get consent to the agreement that yields the highest utility for themselves, provided that the agreement also improves the utility of the other parent compared to the outside option (i.e. the agreement has to be an element of the subset of possible agreements X^*). If the aspired possible agreements of the parents differ, then the solution depends on their relative bargaining power.

2.3 Changes due to the joint custody reform

The introduction of joint custody after divorce as an additional custody arrangement beside sole custody does not change the parents' way of bargaining. In either custody regime it depends on the parents' preferences whether they can find an agreement or not. It is also determined by their preferences on which custody arrangement they agree – or may agree when the parents have different preferences over the subset of possible agreements. In this last case it is necessary, but not sufficient, to know the parents' preferences. On top of that, one has to consider their relative bargaining power, captured by the fact of who can make the last proposal and the

parents' patience.[19]

The outcome of the negotiation on the other hand is affected by the joint custody reform. To show this, we compare the number and type of outcomes of a certain couple of divorcing parents under the joint custody regime with those that this couple would find under the sole custody regime. It turns out that if the parents cannot find an agreement in a sole custody regime, they may nevertheless find one after the introduction of joint custody. Due to the additional agreements the single situation without agreement in the sole custody regime can be distinguished into 25 situations in the joint custody regime. These situations are represented by the white cells in Table 2. In 12 of these 25 situations parents can find at least one agreement, even though this would not be possible without allowing for joint custody. The agreements to which the parents can consent are exactly the additional ones containing joint custody, because, if an agreement on sole custody would be possible, then it would be possible without allowing for joint custody as well.

For the two situations in the sole custody regime where the parents have different valuations of the outside option, with $iS \succ_i C \succ_i jS$ and $jS \succ_j iS \succ_j C$, the parents can find a single agreement in this regime. These two situations can be distinguished into 10 situations each in a regime with joint custody depicted in the light grey cells in Table 2. In the joint custody regime the parents manage to find an agreement, but now the solution is not constrained to a single possible agreement, instead there may be more than one, which would improve the utility of both parents compared to going to court. Besides, the parents may agree on joint custody as well as on sole custody. The situation where the parents find more than one possible agreement in the sole custody regime can be distinguished into four situations after the introduction of joint custody (dark grey cells in Table 2). Here all four agreements are better than going to court for both parents. Taking all possible preference orderings of the parents into account each of the agreements in $X_J = \{mS, fS, mJ, fJ\}$ is feasible.

Furthermore, the comparison of the types of outcome in the two regimes indicates that some of the parents who find an agreement (on sole custody) in the sole custody regime, prefer to keep joint custody after divorce, if it is possible. The parents who want to keep joint custody 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 as compared to a sole custody. The most important change is that some parents who would not be able to find an agreement in a sole custody regime can find an agreement on joint custody, once it is introduced. This is due to parents preferring any joint custody agreement compared to a sole custody of the other parent. Therefore, allowing for a joint custody, where parents do not have to agree on a custody allocation which entirely excludes one of them from parenting helps them to cooperate. This is a striking argument

[19] This again is not sufficient if the parents are about equally impatient. As stated in the Appendix, in this case the first proposal is decisive – independent of the type of the custody regime.

for the introduction of joint custody after divorce, because by facilitating cooperation in the allocation of custody at divorce it enables parents to divorce by mutual consent. 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 (Mnookin and Kornhauser, 1979). 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.

2.4 Varying legal situations

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

Ad (i): If there is a type of divorce where the monetary cost are independent of the parents' ability to agree on custody, then the cost of disagreement ε_i only consist of emotional cost.[20] This implies that the cost of disagreement are lower (provided that the emotional cost are similar). Therefore, the rank of the utility of going to court will be higher compared to the case modeled above and divorces without agreement will be more likely.

Ad (ii): There are legal systems where an equally shared joint physical custody (where each parent spends half of the time with the child) is possible. In this case, there are two possible ways to adjust the model, depending on the exact legal situation. If, on the one hand, a distinction between different types of joint custody is not necessary, then there are only three agreements (two sole and one joint custody agreement). In this case, the number of possible utility orderings per parent is reduced from seven to five, so that there are only 25 different situations in the model instead of 49. If, on the other hand, a distinction between the types of joint custody (i.e. mostly with the mother, mostly with the father, or equally shared) is necessary, then an additional agreement with equally shared joint custody is included. In the utility ordering this agreement would be ranked between the other two joint custody agreements. This increases the number of possible utility orderings per parent to 12 and the total number of situations to 144.

Ad (iii): In some legal systems joint custody is the default option instead of being just 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 for a sole custody. If the parents cannot find an agreement (i.e. going to court) the judge can assign a sole or a joint custody. Therefore, the outcome of going to court is even more uncertain than in the case modeled above, which leads to a lower

[20] 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.

valuation of the outside option for risk-averse parents. Nevertheless, the same 49 situations may result (provided that there are two joint custody agreements).

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, as well as the situations themselves (when there is an equally shared joint physical custody) 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 to get custody assigned from the judge provide an additional way (beside the introduction of joint custody) to facilitate an agreement of the parents. These parameters influence how parents value the outside option of going to court. The higher the probability to get custody and the lower the cost of disagreement, the higher is a parent's expected utility of going to court. Therefore, these two parameters can be used by policymakers in order to promote cooperation of parents by setting the parameters such that the parents' valuation of the outside option is low.

To be concrete, altering ε_i and p induces changes in the rank of the outside option in the utility orderings of the parents. For instance, if the monetary cost of divorce by fault increase sufficiently in comparison to the cost of a divorce by mutual consent (which are the benchmark), both parents rank the outside option lower than before.[21] For instance, in the case of divorce before the custody reform the utility ordering of parent i could change from $U_i^i > U_i^C > U_i^j$ to $U_i^i > U_i^j > U_i^C$. An increase in the probability to get custody assigned would cause a change in both parents' utility orderings, but in opposite directions. For example, if p increases sufficiently, then the valuation of the outside option of parent m increases, whereas the valuation of parent f decreases.

A low valuation of the outside option for both parents promotes cooperation and increases the incidence of mutually binding custody arrangements. This leads to the following policy implication: High monetary cost of divorce by fault and an (about) equal probability for both parents to get the child assigned by the judge can be used to enhance the cooperation of the parents.

[21] As the benchmark, the monetary (and emotional) cost of divorce by mutual consent can be thought of as normalized to zero. The cost of disagreement are actually equal to the difference between the cost of divorce by fault and the cost of divorce by mutual consent.

3 Testing the bargaining model

In this section we want to verify that the model we have presented so far is applicable. We explore the allocation of custody before and after a joint custody reform in detail. We aim to test the model's prediction, namely that the introduction of joint custody facilitates cooperation between parents and thereby increases the fraction of divorces by mutual consent. For this empirical analysis we use data from Austrian court records.

3.1 Who gets custody?

In this section we want to identify the factors which influence the parents' agreement on the custody allocation. We test hypotheses concerning the effect of the probability to get custody assigned by the court (see *Hypothesis 1-4a*), of the cost of disagreement (see *Hypothesis 4b-5a*) and of varying preferences (see *Hypothesis 5b*).[22] These three factors indicate the valuation of the outside option of going to court, which in turn gives a strong indication of which parent will have her/his way under certain circumstances (the one with the higher relative valuation of the outside option). The mechanism behind the probability to get custody assigned is that a high probability for parent i not only influences the outcome in court, but leads to a higher valuation of the outside option for parent i. This means that it is easier for parent i to get the preferred custody agreement.[23] The effect of the cost of disagreement works along similar lines, with the exception that there is no influence on the outcome in court. To work with the monetary cost of disagreement we refer to the utility equivalent of the actual monetary cost, in order to allow for different valuations of a certain amount of money by different individuals. Variations in the preference ordering of one parent can facilitate that the other parent gets her/his preferred custody agreement.

Looking at court records the custody allocation itself does not indicate whether the parents or the court took the final decision. However, we can exploit the information on the type of divorce: The custody allocation of a divorce by mutual consent is definitely the outcome of an agreement of the parents, whereas in the case of a divorce by fault the judge assigns custody. Observations on divorces by fault contain no information on the parents' behavior in the case of an agreement, therefore we exclude them. Nevertheless, divorces by fault are important for the analysis of the parents' ability to cooperate. We will come back to this issue in Section 3.2 when we examine the effect of the joint custody reform on the number of divorces by mutual consent.

[22] We cannot measure the patience of the parents, therefore, we cannot directly test its effect on the outcome. Furthermore, a test of the effect of the last (and the first) proposal would in principle be possible – through the indication of who initiated divorce – but we lack the respective data.

[23] In addition a higher valuation of the outside option makes it more likely that the parents will go to court.

We have collected information on 7,062 divorce cases from five district courts in Austria.[24] These divorces were initiated between 1997 and 2003, and completed by May 2004. The data contain information on the spouses, on children and on the outcomes of the divorce case. For the analysis only observations with minors are of interest. We use the oldest minor in every family as the unit of interest which leads to 3,583 observations.[25] Table 3 shows that before the joint custody reform on the 1st July 2001 nearly 90 percent of the minors lived with their mother after the divorce and 10 percent with their father.[26] After the reform, again about 90 percent of the minors are living with their mother and 9 percent with their father, but 44 percent of all parents have agreed upon joint custody.

Table 3: Custody arrangements for oldest minors.

Type of arrangement	Percent		
	Before the reform	**After the reform**	**Whole period**
Mother sole custody	89.4	51.3	77.0
Father sole custody	9.9	4.5	8.1
Joint custody, living with mother	-	39.3	13.0
Joint custody, living with father	-	4.5	1.5
Other	0.7	0.3	0.4
Number of oldest minors	2,410	1,173	3,583

In the model we assume that parents deduce the probability of assignment p from former court rulings. Therefore, the parents should both come to the following conclusions: According to Austrian legal practice (derived from law and former findings) mothers (fathers) are the preferred custodians for female (male) minors. Therefore, if the minor in question is a girl, we expect the mother to be more likely to become custodian (*Hypothesis 1*).[27] Furthermore, mothers are the preferred custodians for young children. Therefore, the probability of the mother being custodian should decline with the child's age (*Hypothesis 2*). According to Austrian law divorcees are free to hire a lawyer. We expect parents represented by a lawyer to be more likely to become custodians (*Hypothesis 3a*). If both parents hire a lawyer we suppose the effects may cancel out (*Hypothesis 3b*). Austrian legal practice prefers homemakers as custodians, since they have already demonstrated that they manage to take care of the child. Therefore, we expect

[24]District courts have jurisdiction over divorce proceedings. 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 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.

[25]Taking all minors into account leads to virtually the same numbers 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]The remaining 0.7 percent of the cases contain a-typical custody arrangements where, for instance, grandparents were custodians.

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

parents who have stayed at home with the child as a homemaker before divorce to be more likely to become custodian (*Hypothesis 4a*). On the other hand, being a homemaker may generate higher emotional cost due to the closeness to the child (*Hypothesis 4b*). This would cause a lower valuation of the outside option and thereby works in the opposite direction of *Hypothesis 4a*. 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 of going to court and should thereby increase the probability that the high-income parent gets her/his preferred agreement (*Hypothesis 5a*). On the other hand, a high-income parent may face higher opportunity cost of spending time with the child. This may lead to a reversed utility ordering, where, for example, this parent prefers the other to be the resident parent in a joint custody (*Hypothesis 5b*).

To test the hypotheses about the allocation of custody due to an agreement of the parents, we investigate the process of choice selection among the alternative custody arrangements before and after the joint custody reform.[28] We take a causal perspective and state that there are factors that determine the parents' collective choice. Before the reform there are two different custody arrangements and after the reform four different custody arrangements available. The process of choice selection among a certain number of alternatives is empirically best captured by a discrete choice model. We start from a random utility model (Thurstone, 1927; McFadden, 1973) where the family i faces a choice among J alternative custody arrangements. The N families indexed by i obtain from custody arrangement j the utility U_{ij} with $j = 0, \ldots, J-1$. They choose the custody arrangement that provides the greatest utility

$$U_{ik} > U_{ij}, \quad \forall j \neq k. \tag{4}$$

The utility levels are known to the family but are not observable. It is assumed that there exists an underlying latent variable $\mathbf{V}_{ij}^*$ denoting the level of utility for family i associated with the custody arrangement j. This latent variable is determined by

$$\mathbf{V}_{ij}^* = \mathbf{X}_i \beta_j + \epsilon_{ij}, \tag{5}$$

where $\mathbf{X}_i$ are characteristics of the family i. The characteristics of primary interest in these estimations are sex and age of the child, information on the usage of lawyers, the monthly income of each parent and whether the mother has been a homemaker.[29] As control variables we include the length of divorce and of marriage, age of the parents, academic degrees of the parents, number of marriages of each parent, binary variables for the courts where divorce took place, the number of children and a binary variable indicating whether the minor is the youngest or the

[28] For this we only use observations with sole or joint custody.

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

only child of the family, plus an interaction of this variable with the age of the mother.[30] The set of parameters for the j-th equation is denoted by β_j and ϵ_{ij} is a stochastic disturbance term capturing unobserved characteristics. This means that utility has a deterministic component $(\mathbf{X}_i\beta_j)$ as well as a stochastic component (ϵ_{ij}). We assume that the ϵ_{ij}'s are distributed J-variate normally with zero mean and a positive definite covariance matrix

$$\Omega_i = \begin{bmatrix} \sigma_{i_1}^2 & \sigma_{i_{12}} & \cdots & \sigma_{i_{1J}} \\ \sigma_{i_{12}} & \sigma_{i_2}^2 & \cdots & \sigma_{i_{2J}} \\ \vdots & \vdots & \ddots & \vdots \\ \sigma_{i_{1J}} & \sigma_{i_{2J}} & \cdots & \sigma_{i_J}^2 \end{bmatrix}, \tag{6}$$

where $VAR(\epsilon_{ij}) = \sigma_{i_j}^2$ and $COV(\epsilon_{ij}, \epsilon_{ik}) = \sigma_{i_{jk}}$. Moreover, there exists an observable variable, C_i, which takes the value j when the family i selects the j-th custody arrangement. Before the reform this variable takes on the value one if the father has sole custody and zero if the mother has sole custody. After the reform the variable has the following categories: one if the mother has sole custody, two if the father has sole custody, three if the mother is the resident parent in a joint custody, and four if the father is the resident parent. The probability that family i chooses custody arrangement k is

$$\begin{aligned} P_{ik} &= Prob\left(U_{ik} > U_{ij}, \quad \forall j \neq k\right) \\ &= Prob\left(\mathbf{X}_i\beta_k + \epsilon_{ik} > \mathbf{X}_i\beta_j + \epsilon_{ij}, \quad \forall j \neq k\right) \\ &= Prob\left(\xi_{i_{jk}} < \mathbf{X}_i\beta_k - \mathbf{X}_i\beta_j, \quad \forall j \neq k\right), \end{aligned} \tag{7}$$

where $\xi_{i_{jk}}$ is equal to $\epsilon_{ij} - \epsilon_{ik}$. Since all ϵ_{ij} are distributed J-variate normally, $\xi_{i_{jk}}$ is also distributed normally. To keep things simple and without loss of generality let $J = 4$, which is equal to the greatest number of custody arrangements available. Therefore, P_{ik} is a cumulative distribution, equal to the probability that each error term $\xi_{i_{jk}}$ is smaller than $\mathbf{V}_{ik}^* - \mathbf{V}_{ij}^*$. Defining the density $f(\xi_{i_{jk}})$ we can rewrite P_{ik} as

$$P_{ik} = \int_{\xi_{i_{jk}}} I\left(\xi_{i_{jk}} < \mathbf{X}_i\beta_k - \mathbf{X}_i\beta_j, \quad \forall j \neq k\right) f(\xi_{i_{jk}}) d\xi_{i_{jk}}. \tag{8}$$

Depending on the concrete specification of this density different discrete choice models result.[31] We assume that ϵ_{ij} is distributed j-variate normally with mean vector zero and a positive definite covariance matrix Ω_i and attain a multinomial probit model (Hausman and Wise, 1978; Train, 2003).[32]

[30] The last two variables are included in order to control for an especially strong emotional attachment of the parents to the child.

[31] The most widely used discrete choice model is the multinomial logit model. It assumes that each ϵ_{ij} is an independently, identically distributed extreme value. While this model gives a formula for the choice probabilities with a closed form that is easy to calculate, it imposes fairly restrictive assumptions. In particular it cannot represent random taste variation and imposes restrictive substitution patterns due to the independence of irrelevant alternatives assumption.

[32] The density function is therefore $\phi(\epsilon_i) = \frac{1}{(2\pi)^{J/2}|\Omega_i|^{1/2}} e^{-\frac{1}{2}\epsilon_i' \Omega_i^{-1} \epsilon_i}$. We can rewrite (8) as $P_{ik} =$

Before the reform ($J = 2$) the multinomial probit model outlined above simplifies to a binary probit model:

$$P_{i1} = \int_{-\infty}^{\mathbf{X}_i\beta_1 - \mathbf{X}_i\beta_2} f\left(\xi_{i_{21}}, \Omega_{i1}\right) d\xi_{i_{21}}. \tag{9}$$

After the reform four alternative custody arrangements are available ($J = 4$). To take a specific example, we consider the probability that the first custody arrangement is chosen:

$$P_{i1} = \int_{-\infty}^{\mathbf{X}_i\beta_1 - \mathbf{X}_i\beta_2} \int_{-\infty}^{\mathbf{X}_i\beta_1 - \mathbf{X}_i\beta_3} \int_{-\infty}^{\mathbf{X}_i\beta_1 - \mathbf{X}_i\beta_4} \phi_3\left(\xi_{i_{21}}, \xi_{i_{31}}, \xi_{i_{41}}, \Omega_{i1}\right) d\xi_{i_{21}} d\xi_{i_{31}} d\xi_{i_{41}}, \tag{10}$$

where ϕ_3 is trivariate normally distributed with zero mean and covariance matrix

$$\Omega_{i1} = \begin{bmatrix} \sigma_1^2 + \sigma_2^2 + 2\sigma_{12} & \sigma_1^2 - \sigma_{12} - \sigma_{13} + \sigma_{23} & \sigma_1^2 - \sigma_{12} - \sigma_{14} + \sigma_{24} \\ & \sigma_1^2 + \sigma_3^2 - 2\sigma_{13} & \sigma_1^2 - \sigma_{13} - \sigma_{14} + \sigma_{34} \\ & & \sigma_1^2 + \sigma_4^2 - 2\sigma_{14} \end{bmatrix}. \tag{11}$$

The probabilities for the custody arrangements $j = 2, 3, 4$ can be similarly calculated.

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.[33] In each estimation below we control with binary variables for the cases with missing income.[34]

$\int_{\epsilon_i} I\left(\epsilon_i < \mathbf{X}_i\beta_k - \mathbf{X}_i\beta_j, \quad \forall j \neq k\right) \phi(\epsilon_i) d\epsilon_i$. This integral does not have a closed form and has to be evaluated numerically through simulation.

[33] Based on the sample of all couples with at least one minor child at the time of divorce we imputed in 32 percent $(1,059)$ of the cases for the father's income and in 72 percent $(2,358)$ 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 (zipcode). 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.

[34] In order to check the robustness of our results concerning the imputation procedure we repeated the imputation based on a larger sample including couples with only adult children at the time of divorce. The results of the estimations from the Tables 4, 5 and 6 change only marginally. In addition, a reanalysis with a smaller sample with complete income information for both parents gives results that are very similar to the results reported in Tables 4 and 5. The effect of the parents income is unchanged, only the statistical significance of some control variables changes. A multinomial probit estimation based on this sample cannot be realized though, since no convergence is achieved. This is caused by the relatively small sample size and/or the few cases where the father is the custodian. Therefore, we ran probit estimations – explaining in which parent's household the child lives after divorce – based on the two different samples for the period after the reform. Again, the effect of the parents' income is unchanged and we observe only changes in the statistical significance of some control variables. The detailed regression output for all mentioned estimations is available upon request.

3.1.1 Results for the period before the reform

We first consider a probit estimation which uses the data from the period before the reform. The dependent variable takes on the value one if the father is the sole custodian and zero if the mother is the sole custodian. The results are listed in Table 4. This estimation shows clear evidence in favor of *Hypothesis 1*. If the minor is female, the father is less likely to have custody (by about two percentage points). Furthermore, we find support for *Hypothesis 2*, since the probability that the father is the sole custodian rises with the child's age.[35]

Table 4: Probit estimation of father being the custodian.[a]

	Before the reform	
	Coeff.	Marg. eff.[b]
child is female	-0.342	-0.020
	(0.101)***	(0.006)***
child's age	0.101	0.006
	(0.020)***	(0.001)***
mother has lawyer	-0.497	-0.022
	(0.262)*	(0.009)*
father has lawyer	0.596	0.051
	(0.218)***	(0.026)***
both have lawyer	-0.093	-0.036
	(0.355)	(0.043)
mother is housewife	-0.680	-0.027
	(0.184)***	(0.006)***
mother's income in 100 €	0.045	0.003
	(0.017)***	(0.001)***
fathers's income in 100 €	-0.009	-0.001
	(0.010)	(0.001)
constant	-2.366	
	(0.626)***	
Mc Fadden's R^2	0.432	
Number of Observations	2,203	

[a] Standard errors are in parentheses. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level. The estimation includes as further control variables the length of divorce and of marriage, the mother's age, the parent's age difference, binary variables for academic degrees of the parents, number of marriages of each parent, binary variables for the courts where divorce took place, binary variables for imputed incomes, the number of children and a binary variable indicating whether the minor is the youngest or the only child of the family, plus the interaction term. [b] The marginal effect is the change in the probability that the father is the custodian 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. For the interaction term 'both have lawyer' we report the discrete double difference.

Concerning *Hypotheses 3a-b*, we find that the mother's lawyer decreases, as expected, the probability that the father gets custody (by two percentage points), and the father's lawyer increases this probability (by five percentage points). If both parents take a lawyer there is no effect.[36] In

[35] 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.

[36] Note that we have calculated the marginal effect of the interaction term 'both have lawyer' by computing the discrete double differences $\Delta^2\Phi(\cdot)/\Delta x_1 \Delta x_2$ where x_1 stands for 'mother has lawyer' and x_2 for 'father has

short, this is clear evidence for *Hypothesis 3a* and *Hypothesis 3b*. In accordance with *Hypothesis 4a* the probability of the father having custody is reduced (by nearly three percentage points) if the mother has been a homemaker before divorce. Higher emotional cost of housewives due to closeness with the child (*Hypothesis 4b*) do not seem to play a major role, or at least the effect on the assignment probability clearly outweighs this effect. In any case there is clear evidence for *Hypothesis 4a*.

Of the two income variables only the mother's income is statistically significant. An increase in her income slightly raises the probability that the father gets custody.[37] This is partial evidence for *Hypothesis 5b*, as the income of the father has no statistically significant impact. It seems that the high opportunity cost of spending time with the child (due to a high income of the mother) alter her preferences. We cannot conclude whether there is an effect of the income on the valuation of the outside option (*Hypothesis 5b*) or not, because this effect may work in the same direction as the effect of the changed preferences.[38] Recapitulating the results from the probit estimation describing the situation before the reform we can put forward that we find (at least partial) evidence for all five hypotheses concerning the allocation of custody.

3.1.2 Results for the period after the reform

After the reform the custody decision has four dimensions. In a first step we simplify the problem and estimate a probit model where the dependent variable is equal to one if the father is the resident parent and zero otherwise (columns 1 and 2 in Table 5).[39] Compared to the probit estimation for the period before the reform the child's sex and the involvement of lawyers seems to be of no importance, whereas, an increase in the father's income decreases the probability that the child lives with him.[40]

In Table 6 we present the estimation results of the richer model, the corresponding multinomial probit estimation. The dependent variable takes the values one to four for the custody outcomes 'mother sole custody', 'father sole custody', 'mother joint custody' and 'father joint custody'. The first equation compares 'father sole custody' to 'mother sole custody'. It shows that the older the child is, the more likely is the father to get sole custody – which is his preferred

lawyer'. The corresponding standard error is found by applying the Delta method. For details see Ai and Norton (2003). We applied the same procedure for the interaction term in Table 5.

[37] 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 469 Euro to 812 Euro) increases the probability that the father gets custody by only one percentage point.

[38] However, for the mother we can conclude that there is a change in the preferences, because without this change the effect on the valuation of the outside option would go in the opposite direction.

[39] For the sake of comparison we estimate a further probit model which uses data from the whole time period (columns 3 and 4 in Table 5). In this case the dependent variable is equal to one if the father is the custodian/resident parent and zero otherwise.

[40] In all the estimations for the period after the reform it was not possible to include the variable 'both have lawyer', since no convergence was achieved. As this variable is not statistically significant in the other estimations, we conclude that omitting it does not change the results.

Table 5: Probit estimations of father being the resident parent.[a]

	After the reform		Whole period	
	Coeff.	Marg. eff.[b]	Coeff.	Marg. eff.[b]
child is female	-0.141	-0.004	-0.268	-0.015
	(0.159)	(0.005)	(0.083)***	(0.005)***
child's age	0.105	0.003	0.096	0.005
	(0.031)***	(0.001)***	(0.016)***	(0.001)***
mother has lawyer	-0.405	-0.010	-0.665	-0.026
	(0.330)	(0.007)	(0.246)***	(0.007)***
father has lawyer	0.075	0.003	0.293	0.019
	(0.329)	(0.012)	(0.194)	(0.015)
both have lawyer			0.286	0.009
			(0.324)	(0.031)
mother is housewife	-0.594	-0.013	-0.643	-0.024
	(0.336)*	(0.006)*	(0.156)***	(0.005)***
mother's income in 100€	0.057	0.002	0.048	0.003
	(0.033)*	(0.001)*	(0.014)***	(0.001)***
fathers's income in 100€	-0.031	-0.001	-0.012	-0.001
	(0.019)*	(0.001)*	(0.008)	(0.0004)
after the reform			0.169	0.010
			(0.092)*	(0.006)*
constant	-1.653		-2.410	
	(0.943)*		(0.507)***	
Mc Fadden's R^2	0.479		0.433	
Number of Observations	1,039		3,248	

[a] Standard errors are in parentheses below . *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level. Each estimation includes as further control variables the length of divorce and of marriage, the mother's age, the parent's age difference, academic degrees of the parents, number of marriages of each parent, binary variables for the courts where divorce took place, binary variables for imputed incomes, the number of children and a binary variable indicating whether the minor is the youngest or the only child of the family, plus the interaction term. [b] The marginal effect is the change in the probability that the father is the custodian 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. For the interaction term 'both have lawyer' we report the discrete double difference.

agreement (as compared to a mother sole custody). This is clear evidence for *Hypothesis 2*. Moreover, we find that the probability of the outcome 'father sole custody' decreases (by nearly one percentage point) if the mother is a homemaker, which supports *Hypothesis 4a*.

The second equation compares 'mother joint custody' to 'mother sole custody'. To test the hypotheses in this comparison is less straightforward, because both parents may prefer 'mother joint custody' to 'mother sole custody'. In this case the model predicts that the parents agree on 'mother joint custody'.[41] Therefore, we interpret the estimated coefficients only for the case where the mother prefers 'mother sole custody' over 'mother joint custody'. The negative impact of the child being female on the probability of the outcome 'mother joint custody' (about five percentage points) indicates that the mother gets her way more easily if her probability to get the child assigned by the judge is high. This is clear evidence for *Hypothesis 1*. A lawyer increases the probability that the mother gets her preferred arrangement (by 12 percentage points), which supports *Hypothesis 3a*. The increased probability of the outcome 'mother joint custody' (one percentage point) due to an increase of the father's income (by 100€) supports *Hypothesis 5a*,

[41] There is one exception: If the father values the outside option higher than 'mother joint custody', then custody is assigned by the judge.

since it shows that it is easier for the father to get his preferred agreement when his valuation of the outside option is high.[42]

Table 6: Multinomial probit estimation of custody allocation after the reform.[a]

	father sole vs. mother sole		**mother joint vs. mother sole**		**father joint vs. mother sole**	
	Coeff.	Marg. eff.[b]	Coeff.	Marg. eff.[b]	Coeff.	Marg. eff.[b]
child is female	-0.281	-0.002	-0.202	-0.054	-0.207	-0.001
	(0.250)	(0.003)	(0.119)*	(0.033)*	(0.250)	(0.002)
child's age	0.162	0.002	-0.006	-0.003	0.105	0.001
	(0.052)***	(0.001)**	(0.023)	(0.006)	(0.048)**	(0.001)
mother has lawyer	-0.611	-0.004	-0.459	-0.121	-0.763	-0.003
	(0.542)	(0.004)	(0.212)**	(0.056)**	(0.553)	(0.003)
father has lawyer	0.286	0.006	-0.283	-0.079	-0.397	-0.002
	(0.536)	(0.010)	(0.219)	(0.059)	(0.564)	(0.003)
mother is housewife	-0.904	-0.006	0.052	0.019	-0.557	-0.003
	(0.528)*	(0.003)*	(0.314)	(0.088)	(0.525)	(0.002)
mother's income in 100€	0.067	0.001	0.046	0.012	0.108	0.001
	(0.051)	(0.001)	(0.035)	(0.010)	(0.050)**	(0.001)
fathers's income in 100€	-0.039	-0.001	0.034	0.010	-0.0004	-0.0001
	(0.029)	(0.0004)	(0.009)***	(0.003)***	(0.032)	(0.0003)
constant	-2.805		-0.857		-1.432	
	(1.523)*		(0.812)		(1.548)	

[a] The number of observations is 1,039. Standard errors are in parentheses. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level. The estimation includes as further control variables the length of divorce and of marriage, the mother's age, the parent's age difference, binary variables for the academic degrees of the parents, number of marriages of each parent, binary variables for the courts where divorce took place, binary variables for imputed incomes, the number of children and a binary variable indicating whether the minor is the youngest or the only child of the family, plus the interaction term. [b] The marginal effect is the change in the probability that the father is the custodian 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.

The third equation compares 'father joint custody' to 'mother sole custody'. Again, we find evidence for *Hypothesis 2*. As in the first equation the probability of a 'father (joint) custody' increases with the age of the child. The increase in the probability to get the child assigned from the judge helps the father to get his preferred agreement. There is also partial evidence for *Hypothesis 5b*: With an increasing income of the mother the probability of a 'father joint custody' rises. This indicates that the mother's preferences are influenced toward the father being the custodian due to her high opportunity cost of spending time with the child.

Overall we find evidence for all five hypotheses from the model for both time periods (before and after the reform). *Hypotheses 4a* and *4b* have countervailing effects. In both custody regimes we find evidence in favor of *Hypothesis 4a* (assignment probability) but not for *Hypothesis 4b* (emotional cost). However, we cannot conclude that the higher emotional cost due to being a homemaker are negligible, since the effect of the probability may outweigh this effect. *Hypothesis*

[42] The necessary conditions for 'mother joint custody' to be the outcome in the theoretical model in these circumstances are, that both parents prefer the outside option to the other parent's sole custody and that either the mother values the outside option higher than 'father joint custody' or the father values 'mother joint custody' higher than 'father joint custody' (this can be the case due to high opportunity cost of the father as in *Hypothesis 5b*).

5 also consists of two effects: A higher income leads to a higher valuation of the outside option (*Hypothesis 5a*) and it may change the preference ordering of the respective parent (*Hypothesis 5b*). Here we find evidence for both effects.

3.2 To agree or not to agree?

Our theoretical 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. Therefore, the introduction of joint custody enables additional parents to divorce by mutual consent (*Hypothesis 6*). In this section we present evidence that the joint custody reform in Austria 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. This corresponds to a reduction of monetary and emotional cost of divorce and is a striking argument for the introduction of joint custody.

In order to test *Hypothesis 6* we cannot use the data that we have collected from the five district courts and employed for the other estimations, since divorces by fault are undersampled in this data set.[43] 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.[44] While this fact caused no problem for the analysis in the previous sections, it would bias the results when we examine the effect of the joint custody reform on the number of divorces by mutual consent.

Therefore, we employ data from the Austrian Statistical Office in this section. These data have been retrieved from the Austrian Statistical Office database. District Courts report every single divorce case with its basic data to the Austrian Statistical Office, which regularly publishes information on the evolution of divorces in Austria, but unfortunately on a Federal State level only. In addition, we do not have separate figures for couples with and without minors at the time of divorce. On the other hand, the completeness of this administrative database is its striking advantage. Therefore, we assembled a panel data set for the years 1991 to 2004 from this database. This panel data set comprises ten years before the reform, 2001 (the year of the reform) and three years after the reform.

We estimate a panel fixed effects model where the dependent variable is the percentage of divorces by mutual consent (see Table 7).[45] The explanatory variable of primary interest is 'custody reform' which captures the period after the reform including the whole year 2001. We

[43] 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.

[44] 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.

[45] The specification test devised by Hausman (1978) yields a test statistic of about 21 and suggests the fixed-effects model compared to a random-effects model.

Table 7: The custody reform and the % of divorces by mutual consent.[a]

	(I)	(II)	(III)
custody reform[b]	1.094	1.897	1.897
	(0.528)**	(0.546)***	(0.507)***
controlling for:			
divorce law reform	yes	yes	yes
trend		yes	yes
trend×state			yes
R^2 within	0.086	0.179	0.337
R^2 between	0.000	0.000	0.004
R^2 overall	0.058	0.120	0.070

[a] In each regression the number of groups (Federal States) is equal to 9 and the number of observations is equal to 135. [b] Standard errors are in parentheses. *, ** and *** indicate a statistical significance at the 10-percent level, 5-percent level and 1-percent level.

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. In order to check the robustness of our results we dropped the observations of the year 2001. The results changed only marginally. In each estimation we control for the period before a divorce law reform in the year 1999. This reform abolished adultery and the refusal to have children as so-called absolute reasons for divorce but had no influence on custody law. As further control variables we include in the richest model (specification III), a general time trend and federal state specific time trends. A squared time trend and squared federal state specific time trends turned all out to be insignificant and did not alter the results. The same is true fur cubic trends. Specifications I and II implicitly assume that relevant control variables are unchanging within a federal state over time. Specification III, which allows for federal state specific divorce behavior over time, suggest an increase in the fraction of divorces by mutual consent due to the joint custody reform of 1.9 percentage points, which is roughly in line with the other specifications. This effect is statistically significant and thereby supports *Hypothesis 6*. Furthermore, it is quantitatively important since in the year 2000 already 90 percent of all divorces were divorces by mutual consent (Statistik Austria, 2001). In addition, the estimated effect is probably downward biased, since our estimation sample includes couples without minors at the time of divorce, for whom the joint custody reform does not apply.

4 Conclusions

We have modeled the process of the custody allocation at divorce as bargaining between parents with alternating offers and a finite horizon for two different custody regimes. The first regime is

a sole custody regime. In the second, joint and sole custody are available. The introduction of joint custody does not alter the way how parents negotiate, but it changes the agreements the parents find. More importantly, the introduction of joint custody facilitates finding an agreement for the parents. This means that the act of allowing for joint custody has a positive effect for all parties involved, since it minimizes private and public cost of litigation. Moreover, consensual solutions should be more stable over time than a custody arrangement imposed by the judge. Therefore, we suggest that joint custody should be introduced as additional option beside sole custody in countries where a sole custody regime prevails. Furthermore, maternal/paternal preference rules for custody after divorce should be replaced by neutral rules (e.g. the 'best interest of the child' rule), such that both parents have an equal chance to get custody of their child at divorce. In addition, we suggest that the monetary cost of a divorce should depend on the parents ability to cooperate, i.e. if parents agree on custody, divorce should be less costly than without an agreement. All these measures facilitate finding an agreement for the parents and thereby help to reduce the overall monetary and emotional cost of a divorce.

With an extensive data set from Austrian court records we find convincing evidence for our model and its prediction that joint custody facilitates finding an agreement. Therefore, we suggest that our model can be used as theoretical framework for further research about custody after divorce. In particular, our model may have interesting implications for the ongoing debate about whether joint custody itself is desirable or not: Since the model shows that parents with a joint custody arrangement are not necessarily more cooperative than parents with a sole custody arrangement (at least as those with an agreement on sole custody), it seems to suggest that the finding in the literature that joint custody improves the situation for children after divorce is not due to a higher level of cooperation of parents with joint custody. Of course, the observed positive relationship between joint custody and child outcomes may be due to other confounding factors, but cooperation can be excluded as the driving force. This issue deserves further research.

References

Ai, Chunrong and Edward C. Norton (2003), 'Interaction Terms in Logit and Probit Models', *Economics Letters* **80**, 123–129.

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

Dethloff, Nina and Dieter Martiny (2005), Country Chapter Germany, *in* K.Boele-Woelki, B.Braat and I.Curry-Sumner, eds, 'European Familiy Law in Action, Vol. III Parental Responsibilities', Intersentia, Antwerp – Oxford.

Donnelly, Denise and David Finkelhor (1993), 'Who Has Joint Custody? Class Differences in the Determination of Custody Arrangements', *Family Relations* **42**(1), 57–60.

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.

Hausman, Jerry A. (1978), 'Specification Tests in Econometrics', *Econometrica* **46**(6), 1251–1271.

Hausman, Jerry A. and David A. Wise (1978), 'A Conditional Probit Model for Qualitative Choice: Discrete Decisions Recognizing Interdependence and Heterogeneous Preferences', *Econometrica* **46**(2), 403–426.

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 (2005), Country Chapter Sweden, *in* K.Boele-Woelki, B.Braat and I.Curry-Sumner, eds, 'European Familiy Law in Action, Vol. III Parental Responsibilities', Intersentia, Antwerp – Oxford.

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

McFadden, Daniel L. (1973), Conditional Logit Analysis of Qualitative Choice Behavior, *in* P.Zarembka, ed., 'Frontiers in Econometrics', Academic Press, New York, chapter 4, pp. 105–142.

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.

Rainer, Helmut (forthcoming), 'Should We Write Prenuptial Contracts?', *European Economic Review* .

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

Roth, Marianne (2005), Country Chapter Austria, *in* K.Boele-Woelki, B.Braat and I.Curry-Sumner, eds, 'European Familiy Law in Action, Vol. III Parental Responsibilities', Intersentia, Antwerp – Oxford.

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 (2001), *Statistisches Jahrbuch Österreichs 2002*, 52. Jahrgang, Neue Folge, Wien.

Sverdrup, Tone and Peter Lødrup (2005), Country Chapter Norway, *in* K.Boele-Woelki, B.Braat and I.Curry-Sumner, eds, 'European Familiy Law in Action, Vol. III Parental Responsibilities', Intersentia, Antwerp – Oxford.

Thurstone, Louis L. (1927), 'A Law of Comparative Judgment', *Psychological Review* **34**, 273–286.

Train, Kenneth E. (2003), *Discrete Choice Methods with Simulation*, Cambridge University Press, Cambridge, UK.

Wilcox, Kathryn L., Sharlene A. Wolchik and Sanford L. Braver (1998), 'Predictors of Maternal Preference for Joint or Sole Legal Custody', *Family Relations* **47**(1), 93–101.

Appendix

Bargaining power of the parents

In ***Case 3***, where it is not *a priori* clear which of the two possible agreements x_i^* or x_j^* the parents will choose, the relative bargaining power of the parents decides which parent has her/his way. This relative bargaining power depends on who can make the last proposal, on the (im)patience of the parents and on the parent who makes the first proposal. 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.

Proposition *(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.*

Proof of *Case 3.1* 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.

Proposition *(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.*[46]

Proof of *Case 3.2* 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.

Proposition *(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.*

Proof of *Case 3.3a* The reason is that parent j will not get the consent of parent i during

[46] 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.

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 $(x_i^*, 0) \succeq_j (x_i^*, 1)$.

Proposition *(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.*

Proof of *Case 3.3b* 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.