

Divorce Property Division Laws and the Decision to
Marry or Cohabit

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11 October 2009

CWPE 1101

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October 11, 2009

Abstract

This paper presents a model of the choice between marriage and cohabitation for a couple who have decided to form a relationship. The model is used to analyse the implications of changing from a title based division of property on divorce to an equal sharing regime. There are two opposing effects. In line with popular expectations, the change to an equal sharing regime prevents some wealthy individuals from marrying since they risk losing half of their assets in the event of divorce. Offsetting this, the equal sharing property division regime enables cooperative investments to be made in marriage, and so increases the value of marriage relative to cohabitation for some couples. Overall the impact on the marriage rate is ambiguous, although the rate is most likely to increase where it is more difficult to make cooperative investments due to unilateral divorce laws, and where couples are more similar to each other, reducing their cost of divorce.

JEL codes: D10, K36, J12

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1 Introduction

It is widely documented that there have been sharp declines in marriage rates, and concurrent rises in unmarried cohabitation rates in most Western countries (Bumpass, Sweet and Cherlin 1991, Kiernan 1999). In addition, there have been significant increases in divorce rates since 1960 (Friedberg 1998). Whilst attitudes towards unmarried cohabitation have softened over time (Haskey 2001), there remain concerns over the negative implications of the declining importance and stability of marriage (Morgan 2000, Waite and Gallagher 2000). Legal changes have proceeded in parallel to (and in some cases have precipitated) these trends. These changes have often been driven by immediate fairness concerns – for example addressing the documented financial disadvantage faced by women after divorce (see Duncan and Hoffman (1985)) by making the property division regime more favourable to them. These legal changes affect the choices individuals make regarding partnership formation and dissolution, as well as fertility, labour supply and other outcomes (Stevenson and Wolfers 2007). If a policymaker wishes to use the legal environment to support the institution of marriage it is important to consider these wider implications. This paper shows how changes to laws governing the division of property on partnership dissolution can affect a couple’s incentives to make cooperative investments and so their decision to marry or cohabit.

I present a model of a couple’s choice to marry or cohabit, to make a cooperative investment, and to dissolve their relationship, for a couple who have decided to form a partnership. Once their chosen relationship is formed, the couple have the opportunity to make a relationship-specific investment which will increase their combined payoffs. A random shock to their relationship quality may then cause the relationship to breakdown, awarding the couple their separation payoffs. The separation payoffs are determined by the property division regime in effect for their relationship. I distinguish between equal sharing property division where the couple split equally the combined payoff accrued up to that point, and title based property division where individuals receive what they have directly contributed. If the couple remains together, they share the total product of their relationship equally.

I use this model to evaluate the impact of a change from a title based to equal sharing property division regime for marriage. The shift to an equal sharing regime is popularly expected to lead to fewer marriages as individuals with significant assets are unwilling to risk their loss in the event of divorce (Miles and Harris-Short 2009). Whilst the model captures this mechanism, it also suggests an opposing effect. The equal sharing regime shares the costs and benefits of all cooperative investments and so enables all efficient investments to be made within marriage. So the legal change makes marriage more valuable relative to cohabitation for couples who could not cooperate in a title based regime. I argue that in increasing the value of marriage this legal change reinforces its importance. More couples experience

this increase in the value of marriage in a unilateral divorce regime than in a consent divorce regime. Indeed, in a unilateral divorce regime the model predicts an unambiguous increase in the amount of cooperative investments made. The higher value of marriage increases the marriage rate, so overall there is no clear prediction of the impact of a change from title based to equal sharing property division on the marriage rate.

Turning to divorce rates, the impact of a move from title based to equal sharing property division can be decomposed into two effects.¹ Firstly, there is an incentive effect for couples who are already married. There is a transfer from the wealthier partner to their spouse in the event of a divorce. Under a consent divorce regime, both partners must agree to a divorce. This means that the less wealthy partner makes the divorce decision, and since their divorce payoff is increased by the change to a title based regime, the incentive effect works to increase the divorce rate. Under a unilateral regime the wealthier partner makes the divorce decision and so the incentive effect makes divorce less likely.

Second, there is a long term selection effect on divorce rates which depends upon the characteristics of those getting married under the new regime. Since the model gives no clear prediction of the change in numbers of couples marrying and their characteristics, the long run impact of the regime change on the divorce rate is ambiguous.

The paper contributes to the growing literature concerning the impact of legal regimes governing divorce on divorce rates and other outcomes.

The early literature focused on the impact of a change from consent to unilateral divorce laws. Peters (1986) considered the impact of the change on divorce rates, divorce settlement amounts, remarriage rates and labour supply. There has been further research into the impact on divorce rates, for example Friedberg (1998) and Wolfers (2006) for the US, and González and Viitanen (2009) and Smith (1997) for Europe – it is generally accepted that the change to unilateral divorce led to at least a transitory increase in divorce rates. The impact of unilateral divorce on female labour supply is investigated by Gray (1998), Stevenson (2008)² and Chiappori, Fortin and Lacroix (2002), whilst fertility is considered by Alesina and Giuliano (2006). Further outcomes investigated are age at first marriage (Allen 2002), outcomes for children raised under a unilateral divorce regime (Gruber 2004) and the incidence of domestic violence (Stevenson and Wolfers 2006). Wickelgren (2007) provides a theoretical explanation for changes in relationship-specific investments, whilst Stevenson (2007) investigates this outcome empirically (also controlling for the property division regime). The impact of the change on the decision to marry (relative to remaining single) is theoretically explored by Rasul (2006). Matouschek and Rasul (2008) present models of the choice between marriage and cohabitation given that a couple has decided to form a

¹This follows Matouschek and Rasul's (2008) decomposition of the effects of a change from consent to unilateral divorce law.

²Gray (1998) and Stevenson (2008) control for divorce property division regime.

partnership, and investigate their implications empirically using US data.

More recently attention has been given to the effects of different marital property division regimes. To date, research has largely focused on the impact of these regimes on the divorce rate (Mechoulan 2006, Smith 2007, Marcassa 2008, Langlais 2009). Clark (1999), Fella, Manzini and Mariotti (2004) and Chiappori, Iyigun and Weiss (2007) illustrate that property division laws can affect the divorce rate even in the absence of bargaining transaction costs. There has also been some work relating property division regimes to labour supply (Kapan 2008) and the demand for prenuptial contracts (Rainer 2007).³

There has been little work on the effect of marital property regimes on the decision to marry or to cohabit. A partial exception is Dnes (2002), which discusses the impact of different property regimes on cohabitation and marriage, but does not provide a formal model. This paper fills this gap in the literature.

I use the model to assess the implications of recent legal developments in England and Wales. The 2001 the House of Lords ruling in *White v White*⁴ introduced a yardstick of equal division of physical and financial assets on divorce, a significant change from the previous default of limiting a wife to her reasonable requirements. The 2006 *Miller v Miller, McFarlane v McFarlane*⁵ ruling has a similar implication for human capital. My model suggests that these changes should have wider consequences of discouraging marriages between individuals with large differences in assets and human capital, but encouraging marriages where there are gains to be made from cooperative investments, including specialisation.

Although this paper focuses on England and Wales, the analysis can be applied to other jurisdictions and legal changes. For example, a further relationship type could be introduced to model the introduction of covenant marriages which are being considered in several US states.⁶ Alternatively the cohabitation property division regime could be varied. Several jurisdictions are currently contemplating such changes (for example England and Wales (The Law Commission 2007), the United States (American Law Institute 2002) and Ireland (Law Reform Commission 2006)).

The paper proceeds as follows: section 2 presents the model and section 3 describes its solution. Section 4 summarises the results and implications of the model, with the key results in section 4.2. Section 5 discusses the recent legal developments in England and Wales in the context of the model, and section 6 concludes.

³There has also been some work on the impact of variation in child support and child custody laws on marriage and divorce rates (Marcassa 2008, Barham, Devlin and Yang 2006, Halla 2008).

⁴[2001] AC 596.

⁵[2006] UKHL 24.

⁶In a covenant marriage a couple has limited grounds for divorce and must undergo premarital counselling. Louisiana, Arkansas and Arizona currently offer covenant marriages.

2 A model of household formation and separation with one-sided cooperative investment

I present a tractable model which captures the choice between marriage and cohabitation, the decision of one partner to make a cooperative investment, and the subsequent choice to separate or divorce.

I interpret marriage as a contract which imposes two sets of conditions on its dissolution. Firstly, the contract determines the split of marital assets in the event of divorce – either assets are given to the spouse who contributed them (title based property division) or assets are shared equally (equal sharing property division). Second, the contract determines whether both parties must agree to a divorce occurring (consent divorce) or alternatively either partner can simply leave the marriage (unilateral divorce). Figure 1 shows the four possible legal regimes which can apply for marriage.

Figure 1: Legal regimes governing divorce

		Divorce regime	
		Consent	Unilateral
Property division regime	Title based	T, C	T, U
	Equal sharing	E, C	E, U

The two dimensions of legal variation combine to give four distinct legal environments for marriage. Cohabitation is governed by titled based property division and unilateral divorce – T, U .

Traditionally the marriage regime in England and Wales was consent divorce and title based property division. As in many other Western countries the divorce regime shifted towards unilateral divorce in the 1960s. More recently the property division regime has more closely resembled equal sharing. This development is discussed further in section 5.

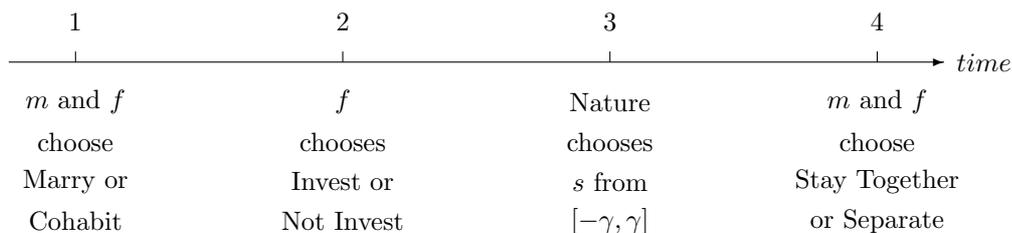
In contrast, cohabiting couples are not subject to the marriage contract and so either partner can leave the relationship without the other’s consent. I assume that title based property division prevails for cohabitants.⁷ So, cohabitation is governed by unilateral separation and title based property division – the top right box in figure 1.

Matouschek and Rasul (2008) identify three key mechanisms to explain why couples might choose

⁷This is a reasonable approximation of the legal position in England and Wales. Other jurisdictions apply a range of different property division regimes to cohabitants.

marriage over cohabitation – an exogenous benefit, derived from conforming to society’s expectations, marriage as a commitment device fostering cooperation, and marriage as a signalling device for private information about one’s intentions. In my model marriage is a commitment device to facilitate cooperation.⁸

Figure 2: Timeline



The timeline for the model is illustrated in figure 2. Parties’ payoffs are their shares of the accumulated household asset⁹ consumed at the end of the game.

There are two actors – individuals *m* (the man) and *f* (the woman)¹⁰ – who are able to contribute x_m and x_f respectively to the household asset. I assume that $x_m > x_f$, so it is always the partner less able to contribute who has the opportunity to make a cooperative investment. At time 1, each individual chooses whether they wish to marry or cohabit. Marriage occurs when both partners choose to marry. At time 2, the woman chooses whether to make a cooperative investment in the household asset. If she makes the investment, she reduces her contribution for that period to $x_f - c$ and increases her partner’s contribution to $x_m + b$. The total household asset contribution prior to Nature’s move is $x_m + x_f + b - c$.

Accumulation of the household asset is assumed to be independent of utility flows through the period. It can be thought of in two ways – first as a physical asset such as a shared residence. In this case the investment reflects the woman’s income being used for day-to-day bills and purchases allowing the man to purchase the property and so be its legal owner. Second, the household asset could be human capital. Then the investment reflects the woman specialising in home production and supporting her partner so increasing his market productivity. This distinction is discussed further in section 5.

At time 3, Nature acts, choosing an additional contribution to the household asset, *s*, which is drawn from a uniform distribution on $[-\gamma, \gamma]$. This gain can be interpreted as a measure of the couple’s match

⁸Adding an exogenous benefit to marriage is straightforward but is not pursued in this paper.

⁹This is similar in spirit to Rainer’s (2007) family asset.

¹⁰This is for expositional clarity and not intended to be a reflection of reality.

quality, which allows economies of scale to be achieved and so frees up resources for investment in the household asset. The couple observe this gain, and then choose whether to separate or remain together at time 4. The outcome of this stage depends upon the relationship type (separation from cohabitation happens if either partner chooses it) and the prevailing divorce regime (under consent divorce, both partners must wish to divorce for divorce to occur).

In the event of separation or divorce, the household asset is split according to the relevant property division regime, giving each partner their own individual household asset. Individuals then contribute to their own household asset (adding x_m or x_f), giving their final payoff.

If the couple remain together, they add to their joint household asset according to their ability (adding $x_m + x_f$), and their realised value of s . Their total joint household asset is assumed to be equally owned, so each partner's payoff is 50% of the total.

2.1 Key assumptions

I make several simplifying assumptions in order to gain a clear view of the impact of different property regimes on relationship choice and dissolution decisions. I focus on investments in a household asset, with payoffs being linked only to the amount of this asset accumulated. I therefore assume that individuals' ability to make these investments is independent of their instantaneous utility flow during the game.

I assume that prenuptial contracts are not available. This means that couples face a choice between marriage and its accompanying legal regime, or cohabitation. I justify this assumption on two grounds. Firstly, in some jurisdictions these contracts are not enforceable. This is currently the case in England and Wales. Second, even in jurisdictions where prenuptial contracts are enforceable there are usually requirements relating to independent legal advice and full disclosure which must be fulfilled (Scherpe 2007). This means that such contracts are expensive to write and limited in their scope. In addition, the cooperative investment is noncontractible as it is not verifiable by third parties. For example, if the woman reduced market work in order to support her partner, an outside party would be unable to verify if that support was being provided, or instead that the woman had taken the spare time as leisure, with any increase in the partner's human capital being down to his own efforts. This means that the woman cannot induce marriage by guaranteeing that she will invest.

I assume that transaction costs and borrowing constraints prevent Becker-Coasean bargains being made. This means that marriage and divorce cannot be induced or prevented with transfers. If the Becker-Coase theorem holds, then changes in divorce regimes should have no impact upon outcomes since only efficient divorces should occur when utility is transferable.¹¹ However, there is anecdotal

¹¹The failure of the Becker-Coase theorem does not necessarily imply inefficient outcomes (Clark 1999), (Chiappori et al. 2007), (Fella et al. 2004). Permitting its failure whilst retaining efficiency of outcomes would require non-transferability

evidence that the costs involved in contracting over personal relationships are very high. For example family lawyers in Australia reported that few couples enquiring about prenuptial contracts eventually signed them (Fehlberg and Smyth 2002).

The model applies to couples who have already matched and decided to form a household together – individuals do not have the option of remaining single. There is considerable heterogeneity in types of cohabiting couples. For example, cohabitation as a trial marriage (“nubile” cohabitation) suggests cohabitation as an alternative to being single (Murhpy 2000). However, cohabitation durations are growing (Ermisch and Francesconi 2000) (Stevenson and Wolfers 2007). This model best describes the partnership decision of a couple who have possibly undergone a period of nubile cohabitation and are subsequently deciding whether to marry.

I do not model the equilibrium of the marriage market. This means that whilst I can evaluate a given couple’s choice, I do not know what the distribution of parameter combinations in a population of partnering couples would be. In addition there is no market for repartnering. This implies that the woman never wishes to separate since there is no chance of finding a better match. Repartnering is in fact widespread. In England and Wales, 43% of divorcing women and 51% of divorcing men repartner within 5 years. However, the probability of repartnering falls dramatically with age, falling by around 3% for each year older a woman is, and also if a woman has children (Fisher and Low 2009). My analysis is therefore most relevant for older couples and those with children. These are the couples for whom the trade off between the benefits of cooperative investment and the potential cost of divorce is greatest.

3 Model solution

The model is solved using backward induction. I first consider the decision to separate or remain together given the outcome of Nature’s move at time 3. This determines separation probabilities. Then the woman’s decision to make the cooperative investment is studied, before expected payoffs from marriage and cohabitation are compared to ascertain the relationship choice made.

I proceed by calculating expected payoffs in the four possible legal regimes governing marriage.

3.1 Separation probabilities

When a couple chooses whether to remain together or to separate, they have full knowledge of their future payoffs (s has been revealed), and so choose to remain together or separate optimally. The payoffs vary depending on whether the woman has made the cooperative investment.

of utility in either marriage or after divorce.

$R_{i,I}$ denotes the payoff from remaining together and $S_{i,I}^P$ denotes the payoff from separating, where $i \in \{m, f\}$, $I \in \{0, 1\}$ (equal to one when the investment has been made) and $P \in \{E, T\}$ (property division regime – E denotes equal sharing, T denotes title based).

First consider couples where the woman has made the cooperative investment. All couples who remain together split their retirement savings equally, so have identical payoffs given by $R_{i,1}$, regardless of the prevailing separation regime.

$$R_{i,1} = x_m + x_f + \frac{1}{2}(b - c + s), \quad i \in \{m, f\}$$

Payoffs in the case of separation vary between the man and the woman, and also depend upon the property division regime. In the case of a title based regime (and so also within cohabitation), separation payoffs are $S_{i,1}^T$:

$$\begin{aligned} S_{m,1}^T &= 2x_m + b \\ S_{f,1}^T &= 2x_f - c \end{aligned}$$

However, in an equal sharing regime the marital assets are shared, so divorce payoffs are $S_{i,1}^E$:

$$S_{i,1}^E = \frac{1}{2}x_m + \frac{1}{2}x_f + x_i + \frac{1}{2}(b - c), \quad i \in \{m, f\}$$

Where the woman has not made the cooperative investment, payoffs are as above, but with b and c set to zero, that is:

$$\begin{aligned} R_{i,0} &= x_m + x_f + \frac{1}{2}s, & i \in \{m, f\} \\ S_{i,0}^T &= 2x_i, & i \in \{m, f\} \\ S_{i,0}^E &= \frac{1}{2}x_m + \frac{1}{2}x_f + x_i, & i \in \{m, f\} \end{aligned}$$

For individuals to find it optimal to remain together, they must have $R_{i,I} > S_{i,I}^P$. This requires that the realised value of s is sufficiently high. Table 1 shows the individuals' threshold values of s in the two property regimes when the investment is undertaken. The values when investment is not undertaken can be found by setting b and c equal to zero. I denote $X = x_m - x_f$ for notational convenience, where $X > 0$ by assumption.

In a title based regime b and c enter the expression with the same sign. This is because in a title based

Table 1: Values of s for which couples wish to stay together, $I = 1$

	Title based	Equal sharing
m	$s > 2X + (b + c)$	$s > X$
f	$s > -2X - (b + c)$	$s > -X$

regime the gain for the man (and loss for the woman) from separating relative to remaining together is $\frac{1}{2}(b + c)$. If separation occurs the man does not share the benefit b and does not shoulder any of the cost c . In contrast the costs and benefits of investment are shared equally under equal sharing, and so b and c do not enter the expressions.

In a unilateral divorce regime, only one of the relevant thresholds for s need fail for separation to occur, whereas in a consent divorce regime both must fail. Since $X > 0$ we see that the man's inequality always holds when the woman's does. So, in a unilateral divorce regime, the man determines whether or not separation occurs, whereas in a consent regime the woman does. Given knowledge of the distribution of s (uniform on $[-\gamma, \gamma]$), separation probabilities in the four regimes can be found – these are shown in table 2 for the situation where the investment has been made (again, set b and c to zero for the no investment case).¹²

Table 2: Separation/Divorce probabilities, $I = 1$

	Unilateral	Consent
Title based	$\frac{1}{2\gamma}(\gamma + 2X + (b + c))$	$\frac{1}{2\gamma}(\gamma - 2X - (b + c))$
Equal sharing	$\frac{1}{2\gamma}(\gamma + X)$	$\frac{1}{2\gamma}(\gamma - X)$

For given parameter values there is a clear descending ranking of divorce probabilities: title based and unilateral; equal sharing and unilateral; equal sharing and consent; title based and consent. In a unilateral divorce and title based property division regime the man can retain all of his wealth and the additional benefit of any investment made without incurring the associated costs on separation. Under a unilateral and equal sharing regime, the man cannot opportunistically appropriate the benefits of any cooperative investment, and faces a lower payoff in the event of separation ($\frac{1}{2}(x_m - x_f)$ less). He is therefore less likely to initiate a divorce under the equal sharing regime. In a consent and equal sharing regime, the woman makes the divorce decision and she prefers to stay married and add $\frac{1}{2}(x_m + x_f)$ to her payoff rather than just x_f (unless s is very low). Under a consent and title based regime the woman stands to lose even more from divorce relative to remaining married – she extracts only her own x_f and loses any claim on b whilst incurring cost c . So the title based regime discourages her from initiating divorce.

¹²I proceed by assuming that γ is sufficiently high so that all probabilities in table 2 are between 0 and 1. My results and conclusions are robust to relaxing this assumption.

In a unilateral divorce regime separation probabilities are increasing in X . Here the man determines separation. As x_m increases separation becomes more attractive; as x_f increases remaining together becomes more attractive. In contrast in a consent regime probabilities are decreasing in X , since the woman's divorce payoffs are increasing in x_f whereas her payoffs from remaining together are increasing in x_m . Separation probabilities in an equal sharing regime are identical regardless of whether the woman has made the investment as any costs and benefits are split equally, so the investment does not create an incentive for the man to opportunistically leave the marriage. In a title based property regime, making the investment makes divorce less likely in a consent divorce environment since the woman would lose $\frac{1}{2}(b + c)$ in the case of divorce. However, with unilateral divorce the investment increases separation probabilities due to the man's ability to extract all of the benefit of the investment at no cost to himself.

3.2 Investment decision

I next consider the woman's choice to make the cooperative investment. The probabilities in table 2 can be used to calculate the expected value of s given that the couple stays together (s exceeds the relevant threshold, Y) – this is γ multiplied by the divorce probability:

$$\begin{aligned} E[t|t > Y] &= \frac{1}{2}(\gamma + Y) \\ &= \gamma Pr(t < Y) \end{aligned}$$

This conditional expectation of s and the relevant probability can be used to find the woman's expected payoffs in the different regimes if the relationship continues, or ends. So, if $p_I^{P,D}$ is the relevant separation probability, with $D \in \{U, C\}$ representing the divorce regime (unilateral, U, or consent, C), expected payoffs for continuing relationships will be:

$$\begin{aligned} E[R_{i,1}|P, D] &= x_m + x_f + \frac{1}{2}(b - c) + \frac{1}{2}\gamma p_1^{P,D} \\ E[R_{i,0}|P, D] &= x_m + x_f + \frac{1}{2}\gamma p_0^{P,D} \end{aligned}$$

Denoting the expected payoff from a given relationship as $E[Q_i|I, P, D]$, expected payoffs can be found by evaluating equation 1 at the relevant expected payoffs and probabilities (separation payoffs are not a function of s and so are deterministic).

$$E[Q_i|I, P, D] = (1 - p_I^{P,D})E[R_{i,I}] + p_I^{P,D}E[S_{i,I}^P] \quad (1)$$

Table 3: f 's expected payoffs

Regime	$I = 1$	$I = 0$
T,U	$Z_f - \frac{3X^2}{2\gamma} - \frac{3}{2\gamma}(b+c)X - \frac{3}{8\gamma}(b+c)^2 + \frac{1}{4}(b-3c)$	$Z_f - \frac{3X^2}{2\gamma}$
T,C	$Z_f + \frac{X^2}{2\gamma} + \frac{1}{2\gamma}(b+c)X + \frac{1}{8\gamma}(b+c)^2 + \frac{1}{4}(b-3c)$	$Z_f + \frac{X^2}{2\gamma}$
E,U	$Z_f + \frac{X}{4} - \frac{3X^2}{8\gamma} + \frac{1}{2}(b-c)$	$Z_f + \frac{X}{4} - \frac{3X^2}{8\gamma}$
E,C	$Z_f + \frac{X}{4} + \frac{X^2}{8\gamma} + \frac{1}{2}(b-c)$	$Z_f + \frac{X}{4} + \frac{X^2}{8\gamma}$

$$Z_f = \frac{\gamma}{8} + \frac{1}{2}x_m + \frac{3}{2}x_f$$

Substituting for the relevant probabilities results in the expected payoffs for the woman shown in table 3. Her expected payoffs are higher under consent divorce than under unilateral divorce due to her controlling the divorce decision in a consent regime. Her expected payoffs are higher with equal sharing than with title based property division as equal sharing gives her a claim on x_m .

The decision to invest is made by comparing $E[Q_f|1, P, D]$ with $E[Q_f|0, P, D]$, that is based on which payoff in table 3 is higher.

By inspection, under an equal sharing property division regime, the woman will always find it optimal to make the investment. This is because she gains $\frac{1}{2}(b-c)$ from doing so in all outcomes, sharing the cost and benefits of the investment. For example, she would be happy to work part time, reducing her human capital, to support her husband in increasing his human capital, since she would receive half of the value of his enhanced human capital in the event of divorce.

However, under a title based property division regime, she will not always make the investment, as she is not guaranteed to reap the benefits and risks bearing the costs. The condition required for investment is different in consent and unilateral divorce regimes. In a unilateral divorce regime, the woman invests if condition 2 holds.

$$X < \frac{\gamma(b-3c)}{6(b+c)} - \frac{1}{4}(b-c) = \bar{X}^{T,U} \quad (2)$$

As X increases, the man's incentive to unilaterally end the marriage increases (as explained above), and so the woman is less willing to make the investment. An increase in c reduces the attractiveness of investment since both its cost and the separation probability increase. The impact of an increase in b is ambiguous since it increases the benefit of the investment whilst simultaneously increasing the probability of separation.

In a consent divorce regime, the woman invests if condition 3 holds.

$$X > -\frac{\gamma(b-3c)}{2(b+c)} - \frac{1}{4}(b-c) = \bar{X}^{T,C} \quad (3)$$

As X increases, the probability of separation falls, and so the woman is more willing to invest. Increasing b unambiguously increases the attraction of making the investment as its return increases and the probability of separation falls. An increase in c has an ambiguous effect as it reduces the separation probability and also reduces the return on investment.

I have made the restriction that $X > 0$ and so constraints 2 and 3 will only be relevant when $\bar{X}^{T,U} > 0$ and $\bar{X}^{T,C} > 0$ respectively. If $\bar{X}^{T,U} < 0$ then investment never occurs in a title based, unilateral regime, and if $\bar{X}^{T,C} < 0$ then investment always occurs in a title based, consent regime. As $\bar{X}^{T,U} < -\bar{X}^{T,C}$, only one of conditions 2 and 3 is relevant at any one time. This means that if 2 holds, 3 must also hold (but not vice versa). So, there is always a larger range of X at which investment takes place under a title based, consent regime than under a title based, unilateral regime – and by implication, there is always more cooperative investment in marriage than in cohabitation.

This analysis shows that an equal sharing regime solves the investment hold-up problem within marriage – all efficient investments can be made. In a title based, consent divorce regime the net benefit of investment must be sufficiently high for the investment to be made since the woman loses out in the event of separation. Fewest couples invest in a title based, unilateral regime.

3.3 Relationship choice

Individuals make their choice between marriage in the prevailing legal regime and cohabitation by comparing the expected payoffs from each in the knowledge of whether the cooperative investment will be made in either relationship state. The woman's expected payoffs are shown in table 3 above. Analogously, the man's expected payoffs can be found. These are shown in table 4. The man's expected payoffs are higher under unilateral divorce than consent divorce, and under title based than equal sharing property division.

In this model, the expected payoff from cohabitation is identical to the expected payoff from marriage under a title based, unilateral regime, therefore couples are indifferent between cohabitation and marriage in a title based, unilateral regime. There are multiple equilibria where the man and woman each choose either marriage or cohabitation.

In all other regimes the woman will always prefer marriage to cohabitation. This is because she always experiences a higher payoff when she remains in a relationship instead of separating, and marriage leads to a lower separation probability and so a higher chance of achieving this outcome. This is because there is no remarriage market, as discussed in section 2.1. It is therefore the man's decision which determines

Table 4: m 's expected payoffs

Regime	$I = 1$	$I = 0$
T,U	$Z_m + \frac{X^2}{2\gamma} + \frac{1}{2\gamma}(b+c)X + \frac{1}{8\gamma}(b+c)^2 + \frac{1}{4}(3b-c)$	$Z_m + \frac{X^2}{2\gamma}$
T,C	$Z_m - \frac{3X^2}{2\gamma} - \frac{3}{2\gamma}(b+c)X - \frac{3}{8\gamma}(b+c)^2 + \frac{1}{4}(3b-c)$	$Z_m - \frac{3X^2}{2\gamma}$
E,U	$Z_m - \frac{X}{4} + \frac{X^2}{8\gamma} + \frac{1}{2}(b-c)$	$Z_m - \frac{X}{4} + \frac{X^2}{8\gamma}$
E,C	$Z_m - \frac{X}{4} - \frac{3X^2}{8\gamma} + \frac{1}{2}(b-c)$	$Z_m - \frac{X}{4} - \frac{3X^2}{8\gamma}$

$$Z_m = \frac{\gamma}{8} + \frac{3}{2}x_m + \frac{1}{2}x_f$$

when a marriage takes place.

If condition 2 holds, then the cooperative investment will be made in cohabitation and also in all forms of marriage (condition 3 must also hold). In this case, the man will never want to marry. This is because entering into a marriage constrains his future action and brings no benefit. In an equal sharing, unilateral regime, he risks losing $\frac{1}{2}X$ in the event of divorce; in a title based, consent regime he opens up the possibility of being trapped in a marriage when the realised s is not sufficiently high for him to wish to remain in it; and both of these effects combine in an equal sharing, consent regime.

If condition 2 does not hold, then the cooperative investment is never made in cohabitation. This means that there is always a gain made by marrying under an equal sharing regime (where the man always makes the investment) – if this gain is sufficiently large to offset the constraint on his future action, the man will wish to marry and so marriage will occur. The conditions under which marriage occurs under unilateral and consent divorce are given in inequalities 4 and 5 respectively.

$$3X^2 + 2\gamma X - 4\gamma(b-c) < 0 \quad (4)$$

$$7X^2 + 2\gamma X - 4\gamma(b-c) < 0 \quad (5)$$

In both regimes, marriage becomes less likely as X increases, since the man's loss in the event of divorce ($\frac{1}{2}X$) increases. As $b-c$ increases, the payoff from marriage increases and so more marriages occur. Marriage is less likely under consent divorce than unilateral divorce as the man additionally risks being in an unsatisfactory marriage that he cannot dissolve.

If condition 2 does not hold, but condition 3 does, then we have investment in marriage under a title based, consent regime but not in cohabitation. So, marriage will take place if condition 6 holds.

$$16X^2 + 12X(b + c) + 3(b + c)^2 - 2\gamma(3b - c) < 0 \quad (6)$$

Again, marriage is less likely as X increases and as $b - c$ falls.

If neither of conditions 2 or 3 holds, then investment does not take place in cohabitation or any title based property division marriage regime. So, under any title based property division marriage regime, the man will never wish to marry since there is no compensation for the additional restrictions on future behaviour.

So marriage occurs where it enables a cooperative investment which compensates the man for the risk to his contributions in the case of divorce. The equilibria are summarised in the following proposition.

PROPOSITION 1. *Equilibria exist in the different legal regimes as follows:*

A. *Title based property division, unilateral divorce*

- (i) *f chooses to marry or to cohabit;*
- (ii) *m chooses to marry or to cohabit;*
- (iii) *f chooses $I = 1$ if $X < \bar{X}^{TU}$, and $I = 0$ otherwise;*
- (iv) *m chooses to separate if $t < 2X + (b + c)$, and to stay together otherwise; and*
- (v) *f chooses to separate if $t < -2X - (b + c)$, and to stay together otherwise.*

B. *Title based property division, consent divorce*

- (i) *f chooses to marry;*
- (ii) *m chooses to marry if $X > \bar{X}^{TU}$, $X > \bar{X}^{TC}$ and $16X^2 + 12X(b + c) + 3(b + c)^2 - 2\gamma(3b - c) < 0$, and to cohabit otherwise;*
- (iii) *f chooses $I = 1$ if m chooses to marry and $X > \bar{X}^{TC}$ or if m chooses to cohabit and $X < \bar{X}^{TU}$, and $I = 0$ otherwise;*
- (iv) *m chooses to separate if $t < 2X + (b + c)$, and to stay together otherwise; and*
- (v) *f chooses to separate if $t < -2X - (b + c)$, and to stay together otherwise.*

C. *Equal sharing property division, unilateral divorce*

- (i) *f chooses to marry;*
- (ii) *m chooses to marry if $X > \bar{X}^{TU}$ and $3X^2 + 2\gamma X - 4\gamma(b - c) < 0$, and to cohabit otherwise;*
- (iii) *f chooses $I = 1$ if m chooses to marry or if m chooses to cohabit and $X < \bar{X}^{TU}$, and $I = 0$ otherwise;*
- (iv) *m chooses to separate if m chooses marry and $t < X$ or if m chooses cohabit and $t < 2X + (b + c)$, and to stay together otherwise;*
- (v) *f chooses to separate if m chooses marry and $t < -X$ or if m chooses cohabit and $t < -2X - (b + c)$, and to stay together otherwise.*

D. *Equal sharing property division, consent divorce*

- (i) *f chooses to marry;*
- (ii) *m chooses to marry if $X > \bar{X}^{TU}$ and $7X^2 + 2\gamma X - 4\gamma(b - c) < 0$, and to cohabit otherwise;*
- (iii) *f chooses $I = 1$ if m chooses to marry or if m chooses to cohabit and $X < \bar{X}^{TU}$, and $I = 0$ otherwise;*

- (iv) m chooses to separate if m chooses marry and $t < X$ or if m chooses cohabit and $t < 2X + (b + c)$, and to stay together otherwise; and
- (v) f chooses to separate if m chooses marry and $t < -X$ or if m chooses cohabit and $t < -2X - (b + c)$, and to stay together otherwise.

4 Model results and implications

I now consider the impact of changing the legal regime on the decision to divorce, to make a cooperative investment in the household asset, and to marry. I first briefly consider the impact of a change from consent to unilateral divorce before focusing on a change from a title based to an equal sharing property regime – the key results for the paper are given in section 4.2.

I follow Matouschek and Rasul (2008) in distinguishing between two effects of a change in regime on the decision to divorce – an *incentive effect* on the choices made by those married under the previous regime, and a *selection effect* on the characteristics and so choices of the new population choosing to marry. Considering the incentive effect is reasonable if the legal change is unexpected.

4.1 Consent to unilateral divorce

The impact of a change from consent to unilateral divorce on various outcomes has been investigated at length. I therefore briefly present the implications of my model to show its consistency with previous work.

4.1.1 Equal sharing property division

Under an equal sharing property division regime, a change from consent to unilateral divorce leads to an increase in the marriage rate, since the man no longer faces the prospect of being trapped in a marriage he wishes to exit, and so is more willing to marry to gain the benefits of a cooperative investment. The increase in couples marrying increases the amount of cooperative investment overall.

The incentive effect is to increase the divorce rate for couples already married since the man can now unilaterally exit marriage, and the selection effect reinforces this since the average X of newly married couples is higher.

4.1.2 Title based property regime

Under a title based property regime, a change to unilateral divorce leads to fewer marriages, as the ability to sustain cooperation within marriage but not in cohabitation disappears. Some couples will marry since both partners are indifferent between relationship types. However, none of these couples will make the cooperative investment. There will therefore be less cooperative investment.

The divorce rate increases for those already married, but the selection effect is uncertain (it depends upon the average X of those now choosing to marry relative to previously). So the overall effect on the divorce rate is ambiguous.

The implications under a title based property division regime are consistent with the conclusions of Matouschek and Rasul (2008).

4.2 Title based to equal sharing property division

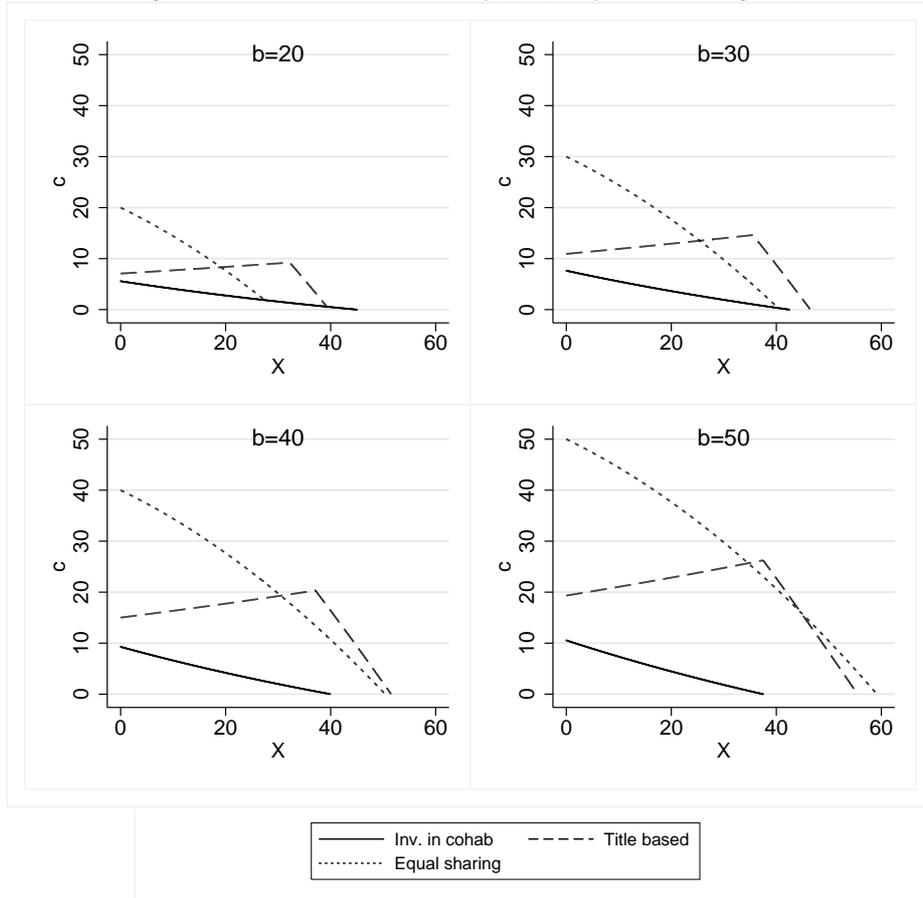
There is no existing analysis of the impact of the change from title based to equal sharing property regimes on marriage rates, and limited comment on its impact on cooperative investment or divorce rates. This paper explicitly considers these impacts holding the divorce regime (consent or unilateral) constant.

4.2.1 Consent divorce

I first consider the impact on marriage rates. Figure 3 shows a series of diagrams indicating the range of X at which couples choose to marry in title based and equal sharing property division regimes. The horizontal axis shows the values of X , whilst the vertical axis allows the cost of the investment, c to vary. Each graph is drawn for a different value of the benefit of the investment, b . At combinations of X , c and b below the solid lines, couples are able to make the cooperative investment in cohabitation, and so none marry. The area below the dotted line gives combinations of variables at which couples marry under an equal sharing property division regime (ie. couples marry if they are below the dotted line but above the solid line). The dotted line is downward sloping – as X increases, the net benefit of cooperating must be higher (and so its cost lower) to offset the man’s lower payoff in the case of divorce for marriage to occur. The dashed line encloses the region in which couples marry under a title based regime – the upward sloping part of this line reflects that as X increases the divorce risk falls (since the woman makes the divorce decision) and so the woman is more likely to make the cooperative investment. To the right of the downward sloping section of the line, the gain to marriage is not sufficiently large to compensate the man for his loss of flexibility.

The diagrams show that whilst there are some couples who no longer marry in an equal sharing regime because of the risk to the wealthier partner’s assets, there are also parameter combinations at which couples switch from cohabitation to marriage. This is because all efficient investments can be made within marriage and so its value has increased for some couples who previously could not invest. The effect on the aggregate marriage rate is therefore ambiguous, but couples with larger gains from cooperative investments are now more likely to marry.

Figure 3: Marriage and cohabitation choice by property division regime, consent divorce



Diagrams show parameter values (X, b, c) at which couples marry under different property division regimes. All couples with parameter combinations below the solid line can make the cooperative investment in cohabitation, so these couples do not marry. Those couples with parameter combinations below the dashed line and above the solid line will marry in a title based property regime. Couples with parameter combinations below the dotted line and above the solid line will marry in an equal sharing property division regime.

For those who are already married, there is an increase in the probability of divorce when we move to an equal sharing regime. This is because the woman has an incentive to opportunistically divorce her partner since she would no longer lose the benefit of her investment and shoulder the full cost of it. This incentive effect suggests an increase in the divorce rate. However, since there is also the ambiguous change in the composition of those entering into marriage, the average divorce probability of the new married population is uncertain. Hence the selection effect is ambiguous. So, after this change, under a consent regime the divorce rate is expected to initially increase, and in the long run could be higher or lower.

4.2.2 Unilateral divorce

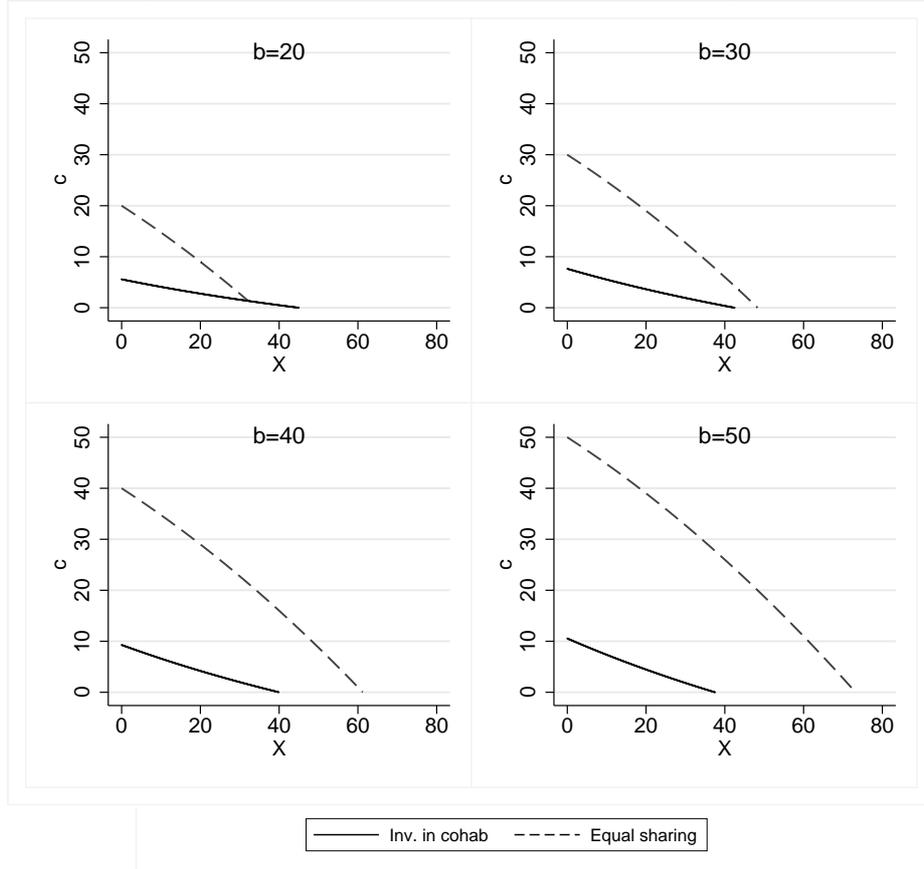
Since there are multiple equilibria when marriage is governed by a unilateral, title based property division regime (as explained in section 3.3), some couples do choose marriage under the title based property division regime. I assume that the equilibrium a couple chooses is unrelated to their parameter values. Married couples will only make the cooperative investment if they would also have done when cohabiting. Figure 4 shows which couples marry under an equal sharing regime, where couples with parameter values below the dashed line but above the solid line choose to marry. There is no equivalent line showing who marries under a title based regime as then choosing marriage is unrelated to parameters.

As in a consent divorce regime, some couples (who would have randomly chosen marriage previously) no longer marry due to the new risk for the man's assets in the event of divorce. However, there is an unambiguous increase in the range of parameter values at which the cooperative investment can be made within marriage. This creates a benefit to marriage and so counteracts the reduction in the marriage rate.

Existing married couples would be less likely to divorce. This is because the man now has a lower divorce payoff. The change in the marriage rate and so the parameter distribution of the newly married population is ambiguous and so the selection effect on the divorce rate is uncertain. Similarly, the selection effect on the separation rate of cohabitants would be ambiguous.

Under unilateral divorce, the change from title based to equal sharing property division will have an ambiguous effect on marriage and divorce choices, but an unambiguous increase in the amount of cooperative investment undertaken. Equal sharing increases the value of marriage by enabling cooperative investments – couples with larger potential gains from cooperating become more likely to marry.

Figure 4: Marriage and cohabitation choice by property division regime, unilateral divorce



Diagrams show parameter values (X, b, c) at which couples marry under an equal sharing property division regime. All couples with parameter combinations below the solid line can make the cooperative investment in cohabitation, so these couples do not marry. Those couples with parameter combinations below the dashed line and above the solid line will marry in an equal sharing property regime.

5 Application to recent legal developments in England and Wales

The legal regime governing property division on divorce in England and Wales has been affected by a series of recent court rulings.¹³ These changes can be considered in the context of the model.

I first determine which version of the model to apply. In England and Wales, unilateral divorce is possible, but only after a five year separation period. Whether this qualifies as true unilateral divorce is a moot point. Many studies of the impact of a change from consent to unilateral divorce do not consider unilateral divorce with a substantial separation period to be truly unilateral (for example Peters (1986)). Later work suggests that results are robust to the classification of such jurisdictions as either consent or unilateral. The structure of my model suggests that I should assume a unilateral divorce regime. This is because my benefit to partnership drawn by Nature (s) is based upon an idea of match quality and economies of scale. It should be possible for one partner to unilaterally destroy this benefit by living independently, which would induce divorce.

The property division regime applying to unmarried cohabitants should also be clarified. *Stack v Dowden*¹⁴ is a recent contribution to the case law. Here, the beneficial ownership of a house legally owned in joint names was disputed. Miss Stack had a more successful career and so claimed to have made a higher financial contribution. The House of Lords awarded Miss Stack a 65% share of the property. Her superior financial contributions were deemed a valid reason to depart from the implications of the legal title (Probert 2007). This implies that cohabitation should be viewed as a relationship in which there is title based property division – even if a physical asset is conveyed into joint names, differing financial contributions may affect beneficial ownership.

Prior to 2001, property settlements on divorce provided a claiming spouse with their ‘reasonable requirements’. Such arrangements generally left the claimant with a small proportion of the total assets (Probert 2006, 8-027). *White v White*¹⁵ introduced equal division as a yardstick for divorce settlements.

Mr and Mrs White worked in partnership as farmers throughout their long marriage, amassing assets of £4.6m. On appeal, Mrs White was awarded a lump sum of £1.5m. In upholding this appeal the House of Lords stated that there should be no discrimination between spouses and no bias against a homemaker in divorce settlements (Probert 2007). This yardstick of equal division has been reinforced as an appropriate starting point in *Charman v Charman*,¹⁶ subject to adjustments for ‘stellar contributions’ (Miles 2008).

So, there has been a significant change to the basis of property division on divorce. This covers physical and financial assets. The model predicts that the legal change should affect incentives to marry,

¹³See Miles and Harris-Short (2009) for a detailed description of these changes and their consequences.

¹⁴[2007] UKHL 17

¹⁵[2001] 1 AC 596.

¹⁶[2007] EWCA Civ 503.

divorce and make cooperative investments in a relationship. Under a unilateral divorce regime the central prediction is that it becomes easier to make relationship-specific cooperative investments in marriage. This increases the value of marriage. Any increase in marriage will be offset since couples with a large difference in endowments and little to gain from cooperative investments in physical and financial assets will not marry.

Couples who are already married should be less likely to divorce according to this model as the man's divorce payoff has fallen. This is in contrast with the common perception of England as the 'divorce capital of the world' (Welstead 2008). My prediction is partly driven by the absence of remarriage opportunities, which combined with a unilateral divorce regime means that the man makes the divorce decision.

The long-run consequences for the divorce rate are uncertain in the model since it is not clear how the characteristics of the new married population will differ from those of the old married population.

*Miller v Miller; McFarlane v McFarlane*¹⁷ had further implications for property division on divorce. The *Miller* ruling established limits to the application of equal sharing of assets in short marriages with vast premarital assets. *McFarlane*, which I focus on, introduced the basis of compensation for disadvantageous decisions taken within marriage.

Mr and Mrs McFarlane were married for 16 years. Mrs McFarlane gave up her career as a city solicitor to look after their home and children whilst her husband continued to focus on market work. Whilst they had agreed to divide their assets equally, there was disagreement over the level and duration of periodical payments. The House of Lords ruled that Mrs McFarlane was entitled to an ongoing payment of £250,000 per annum as compensation for her sacrifice during the marriage (Probert 2007).

So, *Miller, McFarlane* established a principle of compensation and suggested a possible application to human capital. Consider the model with combined human capital as the household asset. *Miller, McFarlane* indicates a shift from title based to equal sharing division of this asset. So, the model predicts that the legal change should encourage cooperative investments in human capital – specialisation within marriage should be encouraged. This increases the value of marriage and so should lead to some couples formalising their relationships. Offsetting this would be some couples no longer marrying due to the man's lower divorce payoff. The impact on the divorce rate would be as discussed for the *White* case.

Whilst these key House of Lords and Appeal Court judgements affect the framework in which divorce property division decisions are taken, their wider use and development is not assured. The yardstick of equal division introduced in *White* has strongly influenced divorce outcomes subsequently. However, the principle of compensation introduced in *Miller, McFarlane* has not been developed and applied more widely. This means that there is differing treatment of financial and human capital on divorce. Marriage

¹⁷[2006] UKHL 24.

is more valuable to couples looking to make noncontractible cooperative investments in physical capital than it is for couples wishing to make similar investments in human capital. Since human capital is often the most valuable asset possessed by a couple there is potential to popularise marriage by fully developing this principle of compensation. The additional differentiation between marriage and cohabitation could provide strong incentives to marry.

However, this implication is unlikely satisfy those campaigning for a return to marriage and traditional family values since this mechanism would work precisely because couples are able to separate unilaterally. Under a consent divorce regime the change to equal sharing property division causes the value of marriage for couples with some parameter values to fall – they no longer get married or make a cooperative investment. The long term divorce rate could increase, so marriage becomes more popular but less stable. Also, in the absence of substantial assets, it is likely to cause ongoing financial obligations between separating couples.

6 Conclusion

This paper has proposed a model to explore the impact of divorce property division laws on couples' decisions to marry, make cooperative investments, and divorce, in an environment where prenuptial contracting is not possible.

My analysis shows that an equal sharing property division regime allows all efficient cooperative investments to be made within marriage. This increases the value of marriage relative to cohabitation. The effect is strongest in a unilateral divorce regime where previously couples were indifferent between marriage and cohabitation. After the move to equal sharing property division, all couples who were unable to make cooperative investments can now do so, creating a benefit to marriage. There will be unambiguously more cooperative investments in a unilateral divorce regime after the change to equal sharing property division.

Opposing this incentive to marry, some wealthy individuals will become unwilling to marry due to the risk to their personal contributions to household assets. Overall, the impact on the marriage rate is ambiguous. However, the marriage rate is more likely to increase in a unilateral divorce regime (with most Western jurisdictions having moved to such a regime) and where couples have more similar characteristics (with a steady increase in positive assortative matching observed (Kalmijn 1991)).

My analysis also shows that the class of assets subject to the divorce property division regime matters. If the regime is limited to physical and financial capital, then couples who can potentially gain from specialisation (traditionally an important benefit of forming a household) will not be able to do so. Extending coverage to include human capital would align incentives and so increase the value of marriage

to such couples.

This paper highlights the fact that changes in these property division laws made in good faith to address fairness concerns for those divorcing can have wider consequences on decisions to divorce, to marry, and so to make cooperative investments. It is important that such effects are considered by lawmakers when contemplating reform of marital property laws.

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