

Differential Asset Valuation in the Medieval Post-Talmudic Legal Literature

Jeffrey L. Callen

The Talmud's analysis of asset valuation comprises deep insights often mixed with abstruse logic. This amalgam is likely due to religious strictures. Consider the issues of interest and capitalization. Biblical law prohibits the payment of interest on loans. According to the Talmud, even nominal interest rates are usurious and strictly forbidden by religious sanction.¹ It is hardly surprising, therefore, that Talmudic scholars do not always value assets from a purely economic perspective. This is not because the Talmud does not understand interest. On the contrary, "interest is the time value of money," declares Rabbi Nachman.² Nor is the *concept* of capitalization a problem. Indeed, when valuation involves human capital, the Talmud correctly values these assets by reference to slave markets (see Kleiman 1987). Thus, if A accidentally destroys B's arm, A must pay B the difference between the value of a slave (in the same profession as B)

Correspondence may be addressed to Jeffrey L. Callen, Rotman School of Management, University of Toronto, 105 St. George Street, Toronto, Ontario M5S 3E6, Canada; e-mail: callen@rotman.utoronto.ca. I wish to thank the anonymous referees of this journal for their insightful suggestions. I also wish to thank Professors Robert Aumann, Menachem Ben-Sasson, Mordechai Akiva Friedman, and P. V. Viswanath for helpful comments. Errors belong solely to the author.

1. Babylonian Talmud, Tractate Bava Metziah 60b.

2. Babylonian Talmud, Tractate Bava Metziah 63b. This dictum is repeated many times in the Talmud.

with and without an arm. Nevertheless, other than when human capital is involved, the Talmud often fails to value assets from a purely logical economic perspective. A good example is the valuation of land as a medium of payment for tort damages, or to pay back a loan. Based on exegeses of biblical verses, the Talmud concludes that in the case of loans, the land must be of the highest quality, whereas tort damages are paid in land of medium quality. Since quality is capitalized in the value of the land, it should make no difference whether land of a particular value is of high quality or of medium quality. But even in the case of land valuation, as indeed in the case of valuing anything that was not human capital, Talmudic scholars very likely felt ambivalent; no doubt that was because valuation involved interest, and the payment of all interest was biblically prohibited.³ In contrast, paying laborers for their services was positively commanded by the Bible, not to mention legally mandatory. Because of that, Talmudic scholars were creative in developing methods for properly valuing human capital, even if that meant resorting to slave markets (conceptually) to put a price on labor.

The purpose of this article is to show that this phenomenon of deep insights coupled with less convincing abstruse arguments regarding asset valuation continued into the medieval post-Talmudic literature's analysis of contingent claims. Contingent claims valuation in the Talmudic and post-Talmudic legal literatures finds its primary expression in the context of the *kethubah* prenuptial agreement. This agreement has been a sine qua non of Jewish marriage since at least Talmudic times (200–600 CE). The contingency aspect of the *kethubah* stems from the fact that the contractual amounts stipulated in the *kethubah* are payable to the wife (or her heirs) in the event that the husband divorces her or predeceases her.⁴ But, if the wife dies first then the contract has no value. Moreover, the *kethubah* is a fully transferable financial asset that the wife can sell at any

3. P. V. Viswanath (2006) argues that the minimization of transaction costs rationalizes land quality differentials in Talmudic law. His argument is highly speculative. The Talmud itself makes no mention of transaction costs to motivate land quality differentials nor does the minimization of transaction costs appear to be a desideratum.

4. The amounts stipulated in the *kethubah*, and the specifics of the payment mechanism, are the outcome of negotiations between the groom and the bride (and their families). Rabbinic law stipulates a minimum amount payable to the wife of 200 *zuz* (denarii) if she was previously unmarried. There is no maximum. In fact, substantial sums were promised in a few of the medieval *kethuboth* and in the *kethubah* fragments that survived in the Cairo Genizah. See Friedman 1970, 1980.

time to a third party, including the husband.⁵ By selling the *kethubah*, the wife's property rights transfer to the buyer. In particular, the buyer can claim the contractual amount stipulated in the *kethubah* provided the husband divorces his wife or predeceases her. If the wife dies first, the *kethubah* has no value. Thus, the contingent aspects of the *kethubah*'s property rights transfer to the new owner.

The valuation of the *kethubah* is discussed in the Talmud in the context of perjured witnesses (Edim Zomemim).⁶ The specific case involves witnesses who testify falsely that a husband divorced his wife and had not paid her the amount stipulated in the *kethubah* when in fact there was no divorce. Valuation is at issue since under Rabbinic law perjured witnesses must compensate the aggrieved husband for the damage that they had *intended* to cause him. By claiming that the husband divorced his wife, the witnesses are in effect forcing the husband to pay his wife the stipulated amount in the *kethubah* contract although no such payment is required since no divorce took place. Indeed, if the husband never divorces his wife and she predeceases him, no payment to the wife (i.e., her heirs) will ever take place. The question debated in the Talmud is the amount that these witnesses should have to compensate the husband where the intended damage to the husband involves a contingent claim.

The Talmud briefly describes a tripartite disagreement among Talmudic legal scholars concerning the valuation of the potential damages to the husband.⁷ In answer to the question of how the damages are to be assessed, the following three valuation bases are given in the Talmud: (1) on the basis of the husband's claim, (2) on the basis of the wife's claim, and (3) on the basis of the wife's claim *and* the specifics of the *kethubah*. The cryptic

5. No direct historical evidence has survived regarding the actual selling of *kethuboth* during Talmudic or even medieval times, although the tenor of the discussion by post-Talmudic medieval scholars suggests that the sale of *kethuboth* occurred with some frequency. The lack of direct historical evidence is not all that surprising considering the paucity of data regarding medieval- and Talmudic-era *kethuboth* generally (Friedman 1970, 1980). Nevertheless, it is quite clear from the Talmud that the wife has well-defined property rights over the *kethubah*, including the right to sell the instrument. As will become clear further below, the husband can also sell his (intangible) property rights in the *kethubah* to a third party or to his wife.

6. See Babylonian Talmud, Tractate Makot 3a. Not all perjured witnesses fall under the rubric of Edim Zomemim. Distinctions among different types of false witnesses in Rabbinic law are ancillary to the issue of *kethubah* valuation and will not be discussed further in this essay. The interested reader should consult the *Encyclopedia Judaica*, vol. 13, p. 288.

7. The third opinion may just be an interpretation of the first, in which case the argument is bipartite.

nature of these Talmudic opinions offered post-Talmudic legal scholars extensive latitude in interpreting the nature of the potential damages and the valuation process.

This study focuses on the arguments put forward by post-Talmudic medieval scholars in their attempt to rationalize the Talmud's differential valuation of financial assets. The initial focus is on those arguments put forward to explain why the husband's valuation of the *kethubah* is potentially different from that of his spouse's. The subsequent focus is on the arguments offered by these scholars to distinguish between "the wife's claim" and "the wife's claim and the specifics of the *kethubah*." We conjecture that market imperfections lie behind the Talmud's differential valuation of the *kethubah*.⁸ The fundamental questions raised in this essay are to what extent are the valuation analyses of post-Talmudic medieval scholars predicated on market imperfections, which can truly rationalize differential asset valuation, and to what extent are their valuation analyses based on arguments whose logic is inconsistent with differential valuation?

The published academic literature on the economics of the *kethubah* is fairly sparse. Robert J. Aumann and Michael Maschler (1985) rationalize a difficult-to-understand Talmudic allocation of funds among multiple *kethuboth* (the plural of *kethubah*)—the case involves a husband with insufficient funds to satisfy the claims of his multiple wives—as the nucleolus of a game. The *kethubah* here serves only as a backdrop to the allocation game and is not fundamental to their analysis.⁹ Far more relevant for our purposes are the interesting studies by Yehoshua Liebermann (1983) and, again, by Aumann (2003). The primary purpose of the Liebermann study is to show that, in the context of the *kethubah*, medieval post-Talmudic legal scholars dealt with such economic issues as uncertainty, expectations, valuation, opportunity cost, and the value of information. Although his study touches on differential asset valuation, this issue is tangential to Liebermann's primary interests. By contrast, the issue of differential asset valuation is central to this study. Aumann analyzes the Talmud's differential valuation of the *kethubah* from a utility theory perspective, without reference to markets or market imperfections. Since the Aumann study is directly related to a number of issues addressed in this essay, we will refer more extensively to it further below.

8. As is well known from the finance literature, market imperfections cause markets to be incomplete, yielding differential valuations. On incomplete markets and differential valuation, see LeRoy and Werner 2001, for example.

9. The same analysis goes through in the case of partnership dissolution, for example.

Valuation of the *Kethubah* and Transaction Costs

To simplify the analysis of the differential valuation case, we first solve for the correct compensation in a frictionless environment and then extend the analysis to a world of transaction costs. Under Talmudic law, the compensation paid to the husband is a function of the damages that the perjured witnesses *intend* to cause the husband rather than actual damages. Most of the discussion by post-Talmudic medieval legal scholars concerns the valuation of the intended damages for the case of a generic *kethubah*, that is, without clearly specifying the particular contractual features and stipulations of the *kethubah*. The latter are obviously relevant and we will have more to say about them below. For now, we maintain the simplifying assumption that the *kethubah* stipulates only that the wife is to receive 200 *zuz* (the minimum mandated by Rabbinic law) from the husband or his heirs if she is divorced or is predeceased by her husband.

The Talmud maintains that the assessment of the potential damages by the perjured witnesses depends upon the valuation of the *kethubah* at the time that the false testimony is given. Call this period 0. In order to value the *kethubah*, we assume initially a simple frictionless three-period benchmark environment. In period 1, the husband predeceases his wife with probability q or she predeceases him with probability u . If both spouses survive to the end of the period (with probability $= 1 - q - u$), the husband either divorces his wife with probability p or remains married to her with probability $(1 - p)$. Both spouses die in the second period, and the husband predeceases his wife with probability z . All parties are risk-neutral.¹⁰ The risk-free interest rate is denoted by r .

Under the above stated assumptions, the contingent cash flows that accrue to the wife are as follows:

200 zuz in period 2 with probability $(1 - q - u)(1 - p)z$.

200 zuz in period 1 with probability $q + (1 - q - u)p$.

0 zuz with probability $u + (1 - q - u)(1 - p)(1 - z)$.

Therefore, the value of the *kethubah* at time period 0 when the witnesses bear false testimony is

10. More generally, we could assume a risk-neutral probability measure where expected cash flows are risk-adjusted and the appropriate discount factor is the risk-free rate.

$$V = 200[q + (1 - q - u)p]/(1 + r) + 200[(1 - q - u)(1 - p)z]/(1 + r)^2.$$

Should the wife wish to sell her *kethubah* to a third party, V is the minimum price that she would rationally demand and the price she would receive in frictionless competitive markets. It is fairly obvious from the valuation equation (and also straightforward to prove) that the value of the *kethubah* is an increasing function of the probability of divorce (p) and of the probabilities that the husband predeceases the wife in the first and second periods (q and z , respectively) and a decreasing function of the rate of interest (r).

Given the value of the *kethubah*, the intended damage that the witnesses inflict upon the husband (at time period 0) is $200 - V$, since by claiming the husband divorced his wife, the witnesses are forcing the husband to pay 200 zuz to the wife when her claim is only worth $V \text{ zuz}$.

The major problem with the baseline frictionless model is that it cannot explain the tripartite argument about valuation bases among Talmudic scholars. By assuming frictionless competitive markets, the model cannot distinguish between “the basis of the husband’s claim” and “the basis of the wife’s claim.” The value of the *kethubah* (V) in this model is independent of the claimant. Therefore, the assumption of frictionless markets needs to be relaxed. Specifically, let us assume that if the husband predeceases his wife, she will have to substantiate her claim to the *kethubah* in court against the husband’s heirs and pay court costs of $T \text{ zuz}$ (where $0 < T < 200$).¹¹ The husband or his heirs do not incur court costs. However, if the husband divorces his wife, she obtains the 200 zuz without having to incur any further expenses.¹² In this case, the contingent cash flows that accrue to the wife are as follows:

$(200 - T) \text{ zuz}$ in period 2 with probability $(1 - q - u)(1 - p)z$.

$(200 - T) \text{ zuz}$ in period 1 with probability q .

200 zuz in period 1 with probability $(1 - q - u)p$.

0 zuz with probability $u + (1 - q - u)(1 - p)(1 - z)$.

11. The assumption that the wife pays court costs instead of the husband (or his heirs) is consistent with Talmudic law, since she is making the claim, and it also underlies the arguments of at least one post-Talmudic scholar, as we shall see below.

12. We could also have posited that the wife incurs court costs when she is divorced with no essential effect on the analysis.

Therefore, the value of the *kethubah to the wife* at period 0 when the witnesses bear false testimony is

$$\begin{aligned}
 V_T &= [200(1 - q - u)p + (200 - T)q]/(1 + r) + \\
 &\quad (200 - T)[(1 - q - u)(1 - p)z]/(1 + r)^2 \\
 &= 200[(1 - q - u)p + q]/(1 + r) + \\
 &\quad 200[(1 - q - u)(1 - p)z]/(1 + r)^2 - \\
 &\quad T[q/(1 + r) + (1 - q - u)(1 - p)z/(1 + r)^2] \\
 &= V - T[q/(1 + r) + (1 - q - u)(1 - p)z/(1 + r)^2] \\
 &= V - \{\text{Expected Court Costs}\}.
 \end{aligned}$$

Since the husband suffers no additional costs, the value of the *kethubah* liability to the husband remains V where clearly $V > V_T$. Thus, the husband values the *kethubah* more than the wife, the difference reflecting the wife's expected court costs. The actual market price of a generic *kethubah* is indeterminate and depends upon the extent of market competition. Nevertheless, the market price necessarily lies between V_T and V , the lower bound and upper bound values, respectively.

The differential valuation of the *kethubah* arising out of transactions (court) costs yields, in turn, two different potential damage valuation amounts (at time 0), the husband's basis of $(200 - V)$ and the wife's basis of $(200 - V_T)$. Ironically, the perjured witnesses have to pay the husband more under the wife's basis than under the husband's basis because the husband's valuation of his *kethubah* liability is greater than the wife's valuation of her *kethuba* asset given her expected court costs.

In the next section, we analyze the extent to which various post-Talmudic medieval scholars recognize that market imperfections are crucial for differential *kethubah* valuations between the wife and the husband.

Differential Valuation and the Basis of the Husband's Claim

With a few exceptions, most prominently Rif (1013–1103),¹³ it is fair to say that most post-Talmudic medieval legal scholars who deal with *kethubah*

13. See Talmud Bavli, Makot 3a, glosses of Rif. It is common for the Rabbinic legal literature to refer to the various post-Talmudic legal scholars by their mnemonic name rather than their formal name. For example, Rif is a mnemonic for Rabbi Issac Alfasi.

valuation issues conclude that “the basis of the wife’s claim” translates into a claim for damages by the husband against the perjured witnesses of $(200 - V)$ *zuz*.¹⁴ Moreover, although they do not formally posit a valuation model of the *kethubah*, these scholars recognize that the market value of the *kethubah* depends upon factors that affect the probabilities of divorce (p) and the earlier demise of the husband (q and z) such as the relative ages of the couple, their relative health, and their propensity to quarrel with one another. What remains unclear is their rationale for the differential valuation and, in particular, how they analyze “the basis of the husband’s claim.”

Nachmanides’ Solution

Nachmanides (1194–1270) for one argues that the difference between the husband’s and wife’s valuation bases is related to the couple’s potential hedging activities.¹⁵ Nachmanides argues that the wife’s basis means the sum of $200 - V$. This is the wife’s basis according to Nachmanides because V is what the wife would obtain were she to sell her *kethubah* rights to her husband (or a third party) in order to hedge her risk (or, more exactly, those of her heirs) of receiving nothing if she predeceases her husband. More interestingly, the husband’s basis according to Nachmanides is the price the husband would demand were he to sell a hedge for *his* rights in the *kethubah* to his wife (or to a third party), thereby insuring against the risk that she will predecease him.¹⁶ Nachmanides argues that the value of this hedge is in fact the damage intended by the perjured witnesses since by testifying that the husband divorced his wife, the witnesses are precluding the husband from selling this hedge to his wife (or to a third party). Nachmanides also states that the damage assessed using the husband’s valuation basis is less than the damage assessed using the wife’s valuation basis.

Nachmanides’ analysis of the differential valuation of the *kethubah* is conceptually problematic from the perspective of modern contingent

14. The first to make this argument was Rashi (1040–1105). See also the Baal Hamaor (c. twelfth century), Nachmanides (1194–1270), Ritva (1250–1330), and Meiri (1249–1316). Rif’s analysis was attacked by a number of the latter. For an in-depth analysis of Rif’s position and the objections to it, see Liebermann 1983.

15. See Nachmanides, Tractate Makot 3a. The same analysis is presented by Meiri (1249–1316), Tractate Makot 3a.

16. The husband pays out 200 *zuz* in the event that his wife predeceases him.

claims analysis since the hedge argument is ostensibly unrelated to any market imperfections. Moreover, his analysis does not yield the correct solution even in frictionless competitive markets. To see this, note that the price the husband demands for providing insurance against the risk that his wife will predecease him is

$$V^* = 200u/(1+r) + 200[(1-q-u)(1-p)(1-z)]/(1+r)^2.$$

According to Nachmanides, V^* is also the damage intended by the perjured witnesses since by claiming the husband divorced his wife, the husband is unable to sell this hedge to his wife (or to a third party). This argument is problematic because with zero interest rates, $V^* = 200 - V$; in that case, there is no difference between the wife's and the husband's bases. On the other hand, when interest rates are positive, it is true that $200 - V > V^*$ (as claimed by Nachmanides), but V^* is no longer the damage suffered by the husband. To see this, suppose that the *kethubah* stipulates that the wife is to receive 200 *zuz* even if she predeceases her husband. In this case, there is no hedge that the husband can sell and, according to Nachmanides, no potential damage. Yet, in fact, the testimony of the perjured witnesses is still damaging to the husband since their testimony forces the husband to pay 200 *zuz* now rather than wait and pay the 200 *zuz* when either party dies in period 1 or when he divorces her in period 1 or, absent a divorce, when either party dies in period 2.¹⁷ In short, with zero interest rates, there is no differential valuation. With positive interest rates, $200 - V$ is the only correct assessment of the potential damage and V^* is irrelevant.

Rashi's Solution

Rashi (1040–1105) argues that the husband's claim refers to his rights in real property.¹⁸ Specifically, it was common in Talmudic times, as part of the contractual *kethubah* agreement, for a husband who owned land to mortgage a specific property to his wife in order to guarantee the potential payment of future *kethubah* claims.¹⁹ The husband was still deemed to

17. The correct assessed damage in this case is $\{200 - 200[(u+q) + p(1-u-q)]/(1+r) - 200(1-p)(1-u-q)/(1+r)^2\}$.

18. See Babylonian Talmud, Tractate Makot 3a, glosses of Rashi.

19. In Talmudic times, the wife was deemed to have a general lien on all of her husband's real property with respect to her *kethubah*, thereby mitigating the asymmetric information between the husband and wife regarding the husband's credit quality. However, the husband

own the property in that he could use it to produce crops or rent it to others or even sell the land to a third party (albeit encumbered by the wife's lien). By claiming that the husband divorced his wife, the perjured witnesses prevent the husband from selling the mortgaged property or using it for agriculture or renting it out or, for that matter, retaining the property if his wife predeceases him. It would appear that this is the husband's valuation basis according to Rashi.²⁰

Rashi's solution is quite problematic. The fact that payment of 200 *zuz* is insured via a mortgaged property is irrelevant.²¹ What matters is that the perjured witnesses are forcing the husband to pay the *kethubah* now although the couple is still married. The intended damage is the same whether the husband pays the 200 in cash or in land. The intentions of the perjured witnesses in preventing the husband from selling or utilizing the mortgaged land are fully equivalent to their intentions to have the husband transfer the 200 *zuz* cash to his wife. These are not independent events. Another way to see this is to note that if the witnesses had been successful, the husband would either have to pay the wife 200 *zuz* in cash and the land would no longer be mortgaged or the husband would have to give the wife 200 *zuz* of mortgaged land in order to satisfy her claims. Thus, there is no difference between the wife's basis and the husband's basis. In both cases, the intended damage is $(200 - V)$ *zuz*.

One might be tempted to argue that Rashi is driving at another solution, namely, that the *kethubah* is worth more, now that it is secured by mortgaged property. Therefore, the damage that devolves on the husband from his inability to sell the mortgaged land because of false testimony differs from the wife's basis. However, this argument is equally problematic because it disregards the impact of the mortgage on the value of the land. Certainly, the mortgage increases the value of the *kethubah* because of the insurance provided the wife against her husband's potential inability to pay her *kethubah* claims at some future date. However, by the same token the value of the land will have decreased because of the wife's lien. In fact,

could pay off his *kethubah* obligation with land of the poorest agricultural quality. If the wife wanted to ensure better quality land (perhaps because of transaction costs as detailed below), she could demand that the husband mortgage a specific piece of land to her in the *kethubah*. In medieval times, Jewish land ownership became the exception and payment of the *kethubah* obligation was almost always in cash or kind, which likely exacerbated the asymmetry of information regarding the husband's credit quality.

20. We write "would appear," since Rashi is very terse on this issue. Our interpretation of Rashi follows that of Rashash (1794–1872) and others.

21. Land could be relevant as surety insofar as it helps to minimize bankruptcy costs. Bankruptcy costs are not an issue for medieval Talmudic legal scholars.

the increased value of the *kethubah* will just be equal to the decreased value of the land to a third party (or to the husband) because of the wife's lien. Thus, the intended damage by the perjured witnesses is $D + 200 - (V + D)$, where D is the increase (decrease) in the value of the *kethubah* (land) due to the mortgage. By forcing the husband to pay 200 now, the value of land unencumbered by the lien increases by D and the intended damage once again is $(200 - V)$ *zuz*.²² Once again, there is no difference between the wife's and husband's valuation bases.

Rashi also appears to argue that the husband's valuation of his rights in the *kethubah* differs from his wife's rights in the *kethubah* because of potential legal costs.²³ If she is predeceased by her husband, her claim will still have to be collected via the courts either by herself or a third party (if she sells the *kethubah*). On the other hand, the husband has no such transaction costs if she predeceases him. He just does not pay the amount stipulated in the *kethubah* and keeps the mortgaged land. If the husband sells this right to a third party (the land encumbered by the wife's lien), that party may have to go to court to collect. However, since the husband is the one to have sold his rights to the third party, presumably the husband is less likely to contest the third party's claim if the wife predeceases him than if he or his heirs have to deal with a third party that acquired his wife's *kethubah* (because he ends up divorcing her or dying before her). Rashi argues correctly—see the model above—that, because of these differential transaction costs, the husband's valuation of the *kethubah* is greater than his wife's. Hence, the intended damage from the false testimony is greater using the wife's valuation basis than the husband's valuation basis.

Rashbam's (1085–1174) Solution

Rashbam argues that a husband would pay more to buy his wife's *kethubah* than would a third party because under Talmudic law, the husband controls the potential divorce whereas the wife is a passive participant.²⁴ The wife's

22. In the absence of perjured witnesses, the insurance effect of the mortgaged land increases the value of the *kethubah* asset to the wife and the *kethubah* liability to the husband by the same amount so that both participants value the *kethubah* at $V + D$.

23. In Rashi's words, unlike the husband who possesses and controls the *kethubah* funds, the wife's claim "requires collection." Interestingly, the parallel Rashi glosses on Rif cite only this legal cost argument. Could it be that Rashi changed his mind about the property rights argument?

24. This is not quite correct. Although the wife cannot initiate a divorce, she could of course make the husband's life sufficiently miserable that he is induced to divorce her, as pointed out by Ritva. Rashbam's solution is cited by Ritva, Tractate Makot 3a.

basis refers to valuing the *kethubah* on the basis of what a third party would pay whereas the husband's basis refers to valuing the *kethubah* on the basis of what the husband would pay. In both cases, the assessed damage is $200 - V$, but the husband's valuation of the *kethubah* (V) is greater than the wife's and so the assessed damages are less under the husband's basis.

Unfortunately, Rashbam does not provide the reasoning behind his supposition that the husband is willing to pay more for the *kethubah* than would a third party just because he, the husband, controls the divorce. Liebermann (1983) suggests that what the Rashbam means to say is that because the husband controls the divorce, he has more information about the contingencies (in particular the probability p) than would an outside party—hence the differential valuation.²⁵

The argument that asymmetric information is likely to lead to differential valuation is correct. Nevertheless, it is problematic to fit an asymmetric information argument into the Rashbam's words (or into the Talmud's for that matter, as pointed out by Ritva). After all, in general the husband will have more information than a third party, for example, about his own health. Indeed, by comparison to the husband, a third party faces a severe "lemons" problem.²⁶ Why does the Rashbam relate only to the husband's control of the divorce proceedings rather than other sources of information asymmetry? One could argue, perhaps, that control over the divorce proceedings is the ultimate source of information asymmetry in that even the wife is likely to have less information about the probability of divorce than the husband since the latter controls the divorce process. Second, and far more problematic, the additional information that the husband has relative to third parties (or his wife) may lead him to value the *kethubah* less rather than more, contrary to the claim of the Rashbam. For example, if the couple is publicly quarrelsome but the husband is personally and

25. It has been suggested to me in private correspondence that perhaps what Rashbam means is that the husband is able to economize on information search costs. But again, it is difficult to see how the latter argument fits into Rashbam's own words. There is a tenuous relationship at best between controlling the divorce and economizing on information search costs. It was also suggested that Ritva's statement "that every buyer in any deal that he makes looks into all possible details of that deal" refers to information search. A careful reading shows that Ritva is not concerned with information search but rather with correcting the mistaken notion that, in valuing the *kethubah*, the probability that the husband divorces his wife can be determined independently of the probability that the wife will cause the husband to divorce her.

26. An outsider is likely to assume that the wife is selling her *kethubah* precisely because she "knows" that her husband is unlikely to divorce her or to predecease her. Thus, the outsider is unwilling to pay a decent price for the contingent liability by comparison to the husband (or even to a relative), who is likely to be far better informed about these issues.

unknowingly averse to divorcing his wife, then the husband would put a lower value on the *kethubah* than would outsiders.

The Woman's Basis and the Specifics of the *Kethubah*

The third opinion in the Talmud is that intended damages should be assessed in terms of “the woman's basis and the specifics of the *kethubah*.” What is meant by “the specifics of the *kethubah*” and how does it relate to valuation? There are a number of opinions among medieval post-Talmudic legal scholars. However, rather than categorizing the various opinions by the specific scholar, it is more useful in this case to categorize them by the underlying concept.

Transaction Costs versus Wealth-Risk Effects

Maimonides (1138–1204) assumes that valuation of “the specifics of the *kethubah*” refers to the nominal payment stipulated in the *kethubah*.²⁷ Following Rif, Maimonides maintains that the value of a *kethubah* is a concave function of the nominal payment stipulated in the *kethubah* (in our previous example, the nominal amount was 200 *zuz*). He argues by example that a *kethubah* with a nominal value of 1,000 *zuz* might be valued at 100 *zuz* in the market (presumably the woman's basis), whereas a *kethubah* with a nominal value of 100 *zuz* would be valued by the market at less than 10 *zuz*. Although Maimonides does not explicitly say so, his hypothesis might be due to economies of scale, arising presumably from the costs of going to court in order to enforce the contract. Enforcing one large contract is probably no more costly than enforcing a contract of lesser nominal value.²⁸

Interestingly, Radvaz (1479–1573), following Ramah (died c. 1315), counterargues that the value of the *kethubah* is a convex function of the nominal amount because of wealth effects.²⁹ There are proportionally many more individuals willing to buy a *kethubah* with a nominal value of 100 *zuz* than one with a nominal value of 1,000 *zuz* because of the wealth required and the risks entailed in acquiring the latter. In addition

27. Maimonides, *Laws of Evidence*, chapter 21, paragraph 1.

28. Alternatively, Maimonides may feel that there is more competition for a larger nominal *kethubah* because the sum is substantive relative to the risks.

29. See Maimonides, *Laws of Evidence*, chapter 21, paragraph 1, glosses of the Radvaz.

to the wealth-risk argument, a husband is more likely to divorce his wife when the nominal value is small—so a third party that bought the *kethubah* is more likely to collect—than when it is large. Radvaz also argues that perhaps this is what Maimonides meant when after his example of economies of scale he added the phrase “according to the estimation of the judges,” meaning that perhaps in some cases economies of scale predominate whereas in others wealth-risk effects predominate. It is up to the courts to make that determination if for some reason there is a dispute over the valuation.

Tzon-Barzel Property versus Mloog Property

Often, the woman brings property with her into the marriage. The Talmud offers her two options as to the property rights she retains vis-à-vis her husband. She can declare some or all of the property to be Tzon-Barzel, in which case the husband benefits from the property as if it were his own, including selling it if he so wishes. However, in the event that he divorces her or he predeceases her, the husband (or his heirs) must recompense the wife for the value of the property as valued at the time of marriage. This type of property was considered dowry (from the wife to the husband) and oftentimes written into the *kethubah* contract.³⁰ Alternatively, the wife could declare some or all of the real property to be Mloog, in which case the husband only has rights to the usufruct of the property—the legal right to use and derive profit from the property—but otherwise the property is considered to belong entirely to the wife. The latter property was not ordinarily written into the *kethubah* contract.

Rashi among others suggests that the phrase “the specifics of the *kethubah*” comes to exclude Mloog property. Thus, in our example, the perjured witnesses are deemed to have intended to damage the husband both with respect to the nominal sum of 200 *zuz* and the guaranteed (by the husband) value of the Tzon-Barzel property, since both are part of the contractual stipulations of the *kethubah*. On the other hand, since the Mloog property is not part of the *kethubah*, the perjured witnesses are not deemed to be responsible for the damage caused by their testimony, namely, forcing the husband to give up the annual usufruct from the Mloog property.

30. Whether the dowry is in fact part of the *kethubah* is debated by medieval Talmudic scholars. Maimonides for one does not consider the dowry to be part of the *kethubah* and so he is unlikely to agree with the arguments cited in the present section of the article.

Rashi appears to recognize that not including the Mloog property in the *kethubah* is somewhat arbitrary. Consequently, he also argues that it was a rare occurrence for the woman to bring Mloog property into the marriage. Therefore, the perjured witnesses could argue that they had not intended to damage the husband regarding the Mloog property, being unaware of any such property in the *kethubah*. However, if it is well known by outsiders that the wife brought Mloog property into the marriage, then the witnesses would be responsible for the intended damage of the Mloog property despite the fact that the latter is not ordinarily written into the *kethubah* contract. Ritva extends Rashi's argument. He argues that the perjured witnesses (as well as the community at large) are likely to be aware of the Tzon-Barzel property because it is declared in the *kethubah*, but they are unlikely to be aware of the Mloog property, because it is not normally declared there.³¹

Land Quality

Rosh (1250–1327) argues that the phrase “the specifics of the *kethubah*” refers to the quality of the specific property mortgaged by the husband to his wife (and, thus, to a third party that acquires the *kethubah*) in order to satisfy future *kethubah* claims.³² The higher the quality of the property, the greater is the valuation of the *kethubah* by a potential third party and the smaller is the intended damage ($200 - V$).

This argument is problematic in the absence of transaction costs because the land is assumed to have a value of 200 *zuz* in order to satisfy future *kethubah* claims. Therefore, it should not make a difference to a third party if the land is of superior or inferior quality as long as the land's market value is 200 *zuz*. With transaction costs, the argument has potential merit. Suppose it is less costly to sell superior quality land than the equivalent (gross) value of poor quality land. Market prices and relative land sizes will equilibrate so that x hectares of superior quality land and y hectares of inferior quality land ($x < y$) that produce the same yield will have the equivalent value of 200 *zuz* net of transaction costs. However, the *kethubah* contract does not compensate the wife (or a third party) for transaction costs. She simply receives 200 *zuz* of property. As

31. One should add that it is customary to read the *kethubah* contract out loud at the marriage ceremony so that its contractual features are public knowledge.

32. See Talmud Bavli, Tractate Makot 3a, glosses of Rosh.

a consequence, 200 *zuz* of high quality land will have a greater production value net of transaction costs than 200 *zuz* of poor quality land. Therefore, depending upon the wife's proclivity to sell the property, there may be a difference between the "wife's claims" and "the wife's claim and the specifics of the *kethuba*" provided the payment of *kethubah* is insured by a mortgaged property.³³

Aumann's Analysis of the Differential Valuation of the *Kethubah*

This study conjectures that market imperfections lie behind the Talmud's differential valuation of the *kethubah* and tries to understand the medieval post-Talmudic legal scholarship in light of this conjecture. In a recent study, Aumann (2003) analyzes the Talmud's differential valuation of the *kethubah* from an alternative utility theory perspective, without reference to markets or market imperfections.³⁴ The literature by medieval legal scholars is mentioned only briefly and is of secondary concern in Aumann's study.

Aumann conjectures that both husband and wife are risk-averse; they both have concave utility functions. He shows that the husband's evaluation of the potential loss from the perjured witnesses is greater than wife's evaluation of her potential gain, the asymmetry being due to the concavity of the utility functions. Basically, his result follows from the fact that although the husband's expected loss equals the wife's expected gain, the marginal disutility of a loss is greater than the marginal utility of gain as long as the individual is risk-averse. The interesting aspect of Aumann's result is that it holds quite generally, even when the husband and wife have different arbitrary (but concave) utility functions.

Aumann attempts to rationalize a subjective utility approach by reference to the wording of the Mishnah when discussing the case of the perjured witnesses.³⁵ He points out that the writers of the Mishnah generally use two expressions for "valuation": *shumah* and *omdan*. Aumann claims

33. On the selling of real property by women in Talmudic times, see Viswanath 2006.

34. Although published fairly recently, Aumann's 2003 study was initially presented in 1981 at a Stanford University seminar and subsequently appeared in the January 2002 Research Bulletin Series on Jewish Law and Economics, Department of Economics, Bar-Ilan University.

35. The Talmud divides into the earlier Mishnaic portion (200–400 ACE) and the Gemara portion (400–600 ACE).

that when the writers of the Mishnah use the expression *omdan*, they mean subjective evaluation by the courts, whereas *shumah* refers to the courts' valuation with reference to market prices. When discussing the case of the perjured witnesses, the Mishnah uses the term *omdan*, implying, according to Aumann, subjective valuation.

Despite the potential merit of this claim, it is certainly not correct as a general rule. What can realistically be claimed is that the term *shumah* is used far more often by tannaitic sources than *omdan*, about 80 percent of the time versus 20 percent. Moreover, *shumah* is used more often in what appears to be market-oriented contexts, while *omdan* is used more often in what appears to be subjective valuation contexts. Nevertheless, both words are used interchangeably in market contexts as well. For example, the third Tosephta of the ninth chapter of tractate "Bava Kama" deals with the valuation of prolonged damages. The relevant portion states, "In all these [damages to the body's limbs], we evaluate [*shumah*] them and compensate [the one damaged] immediately; therefore if the damaged limb remains useless even say over a five year period, his only compensation is what he was evaluated [*omdan*] originally." In this tannaitic source, the terms *shumah* and *omdan* are used interchangeably to describe the same valuation situation.

Perhaps most problematic from a linguistic point of view is that Aumann refers only to the language in the Mishnah. But the tripartite differential valuation argument does not take place in the Mishnah but in the Gemara portion of the Talmud instead. In the latter portion, the Talmud uses the term *shumah* to describe the valuation and not the subjective term *omdan*. Even if Aumann is correct that *omdan* in the Mishnah means subjective valuation, the portion of the Talmud that discusses the tripartite argument uses the term *shumah*, implying market valuation.

Whatever the linguistic merits of Aumann's solution, there are a number of economic reasons why his solution is problematic. First, how are the courts to elicit the "true" subjective valuations of the participants in order to impose the appropriate penalty on the perjured witnesses? Second, neither the husband's nor the wife's subjective valuations have much credibility. The husband has an incentive to decrease his valuation of the *kethubah* so that he gets compensated more whereas the wife likely instigated the perjury (after all, she is the one to gain), so why would the courts accept her valuation at all? Third, the analysis of differential valuation by medieval post-Talmudic legal scholars is not couched by and large in subjective terms nor based on subjective arguments.

Conclusion

This article evaluates arguments put forward by medieval post-Talmudic legal scholars concerning the Talmud's differential valuation of the same asset. It is conjectured that the Talmud's differential valuation bases are predicated on market imperfections. It is shown that many of the arguments posited by medieval post-Talmudic legal scholars are incapable of rationalizing differential valuation bases. Although one can interpret some of these scholars—notably Rashi, Rashbam, and Rosh—as raising transaction costs and asymmetric information lines of reasoning to rationalize differential valuation, the latter are typically not raised *sui generis* but as part of a broader, less convincing set of arguments. This mixture of insightful and less insightful economic reasoning in the context of contingent claims assets suggests that the Talmud's ambivalence regarding the valuation of non-human capital—induced undoubtedly by the biblical prohibition on interest—may have carried over to the medieval post-Talmudic legal literature. As a consequence, these scholars found it difficult to develop a conceptual framework for the valuation of contingent claims that is fully consistent with modern thinking on market imperfections.

References

- Aumann, R. J. 2003. Risk Aversion in the Talmud. *Economic Theory* 21:233–39.
- Aumann, R. J., and M. Maschler. 1985. Game Theoretic Analysis of a Bankruptcy Problem from the Talmud. *Journal of Economic Theory* 36:195–213.
- Friedman, M. A. 1970. *Geniza Studies in Jewish Marriage Law*. Tel-Aviv University Press.
- . 1980. *Jewish Marriage in Palestine: A Cairo Geniza Study*. Tel-Aviv University Press.
- Kleiman, E. 1987. Opportunity Cost, Human Capital, and Some Related Economic Concepts in Talmudic Literature. *HOPE* 19.2:261–87.
- LeRoy, S. F., and J. Werner. 2001. *Principles of Financial Economics*. Cambridge: Cambridge University Press.
- Liebermann, Y. 1983. The Economics of *Kethubah* Valuation. *HOPE* 15.4:519–28.
- Viswanath, P. V. 2006. The Use of Real Estate for the Settlement of Claims in Roman Palestine. Working paper, Lubin School of Business, Pace University.