Summer 2009

New Reasons to Remember the Estate Taxation of Reversions

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NEW REASONS TO REMEMBER
THE ESTATE TAXATION OF REVERSIONS

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Editors' Synopsis: When a transfer of real property creates a future interest in a party without expressly providing whether that party must survive all others in possession prior, the common law has traditionally refused to imply such a requirement. Recently, various reform movements have proposed reversing this rule. Where such a reversal fails to likewise negate the reversion created by the change, the transferor-possessor of the reversion faces complicated tax issues as a result. In this Article, the author provides an overview of the various attempts to reverse the rule and goes through the complicated actuarial mathematics that are required to assess the tax liability of the possessor of the reversion.

I.   INTRODUCTION

In a transfer of Blackacre by "*O* to *A* for life then to *B*," *B*'s interest in Blackacre is a future interest, because *B* is not entitled to present possession.[1] The express language of the transfer fails to address whether *B* must survive *A* in order for *B* (or *B*'s successors) to take possession of Blackacre at *A*'s death. A rule of construction became necessary, and the

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[1] *See* RESTATEMENT (FIRST) OF PROP. § 153 (1936) ("[A] future interest is an interest in land, or in a thing other than land, which (a) is not, but may become a present interest; and (b) is a segment ownership measured in terms of duration; and (c) is neither inchoate dower nor curtesy initiate."); JOEL C. DOBRIS, STEWART E. STERK & MELANIE B. LESLIE, ESTATES AND TRUSTS (3rd ed. 2007) ("A future interest is one that does not become possessory immediately upon its creation."); JESSE DUKEMINIER, STANLEY M. JOHANSON, JAMES LINDGREN & ROBERT H. SITKOFF, WILLS, TRUSTS, AND ESTATES 624 (7th ed. 2005) ("[I]nterests are called *future interests* because the person who holds one of them is not entitled to present possession or enjoyment of the property but may or will become entitled to possession in the future.") (emphasis in original).

common law developed a rule that *B*'s survival is not implied.[2] We can call this default rule the no-implied-condition-of-survivorship rule or the "NICS rule."[3] Under the NICS rule, because *B* is not required to survive *A* for *B*'s successors to take possession of Blackacre at *A*'s death, *B*'s future interest is classified as an indefeasibly vested remainder.[4] As such, *B* may transfer that remainder during *B*'s life,[5] and if *B* holds that indefeasibly vested remainder at death, the remainder transfers by B's will—if *B* leaves an effective will—or by intestacy.[6]

Centuries after the common law NICS rule developed, the federal estate tax arose. The NICS rule leads to unfortunate tax results because the value of *B*'s indefeasibly vested remainder must be included in *B*'s federal gross estate when *B* dies, even though her interest never took

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[2] *See* UNIF. PROBATE CODE § 2-707 cmt., 8 U.L.A. 197 (1998). ("At common law, conditions of survivorship are not implied with respect to *future* interests (whether in trust or otherwise)."); WILLIAM H. MCGOVERN, JR. & SHELDON F. KURTZ, WILLS, TRUSTS & ESTATES 409 (3d ed. 2004) (citing *Roberts v. Roberts*, 80 Eng. Rep. 1002, 1009 (K.B. 1613)); LAWRENCE W. WAGGONER, GREGORY S. ALEXANDER, MARY LOUISE FELLOWS & THOMAS P. GALLANIS, FAMILY PROPERTY LAW 1067 (4th ed. 2006); Verner F. Chaffin, *Descendible Future Interests in Georgia: The Effect of the Preference for Early Vesting*, 7 GA. L. REV. 443 (1973) ("In Anglo-American law, there is virtual unanimity that a gift is presumed to be vested and not contingent. Moreover, this strong constructional preference for vested interests carries with it a presumption in favor of early vesting rather than a more remote vesting.").

[3] Authors have offered various reasons to support the common law's preference for vested interests. *See* MCGOVERN & KURTZ, *supra* note 2, at 411–14. *See also* Edward H. Rabin, *The Law Favors the Vesting of Estates. Why?*, 65 COLUM. L. REV. 467 (1985); Daniel M. Schuyler, *Drafting, Tax, and Other Consequences of the Rule of Early Vesting*, 46 ILL. L. REV. 407, 409–11 (1951).

[4] *See* DUKEMINIER, JOHANSON, LINDGREN & SITKOFF, *supra* note 1, at 626 ("A remainder is vested if (1) it is given to a presently ascertained person and (2) it is not subject to a condition precedent (other than the termination of the preceding estates)."). *See also* DOBRIS, STERK & LESLIE, *supra* note 1, at 788; WAGGONER, ALEXANDER, FELLOWS & GALLANIS, *supra* note 2, at 1035.

[5] *See* RESTATEMENT (THIRD) OF TRUSTS § 51, cmt. 9 (2003) (*B* may transfer her indefeasibly vested remainder during her life unless there is an effective spendthrift restraint upon transfer.).

[6] *See* Jesse Dukeminier, *The Uniform Probate Code Upends the Law of Remainders*, 94 MICH. L. REV. 148 (1995) ("Nothing is more settled in the law of remainders than that an indefeasibly vested remainder is transmissible to the remainderman's heirs or devisees upon the remainderman's death. . . . Inheritability of vested remainders was recognized in the time of Edward I, and devisability was recognized with the Statute of Wills in 1540.").

effect in possession.[7] That unfortunate result can be avoided by making *B*'s remainder contingent on *B*'s surviving *A*; nothing is included in *B*'s federal gross estate if *B* dies before the, contingent, remainder takes effect in possession.[8] Consequently, it has been said that a careful drafter never creates an inheritable future interest.[9] Not surprisingly, proponents of reversing the NICS rule justify the change as providing by default what well-drafted documents do by express provision.[10]

But, of course, when a well-drafted document makes possession under future interests contingent on survival, the document also provides alternative dispositions when any such contingencies fail.[11] If the document merely requires survival of beneficiaries, yet does not provide

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[7] *See* I.R.C. § 2033 ("The value of the gross estate shall include the value of all property to the extent of the interest therein of the decedent at the time of his death."); Rev. Rul. 67-370, 1967-2 C.B. 324 (providing that inclusion occurs when "the decedent owns any beneficial interest in a trust which survives his death"). Because *B*'s indefeasibly vested remainder passes to her successors, it is property of the decedent at the time of her death. Note that if, while *B* is alive, her contingent remainder takes effect in possession and she later dies owing Blackacre, the value of Blackacre at *B*'s death will be included in *B*'s federal gross estate; neither the NICS rule nor its reversal are of any moment in such a case. The complicated estate tax situation described in this article occurs when *B* dies before her remainder takes effect in possession; yet, her federal gross estate includes the value of the remainder even though *B* never possessed Blackacre (i.e., *B* possessed the remainder but never possessed Blackacre itself).

[8] *See* Rev. Rul. 55-438, 1955-2 C.B. 601.

[9] *See infra* note 34 and accompanying text. Recently, that is, during the last 20 years, the injunction against inheritable future interests has been softened by the 1986 enactment of the generation-skipping transfer tax, I.R.C. §§ 2601–2664. Optimal estate planning sometimes prefers estate taxation in a child's estate to GST taxation of a trust upon the child's death, when the property passes to grandchildren. One way to accomplish that is to create a vested remainder in a child; another, more flexible, technique is to create a special power of appointment in the child. With a special power of appointment, the child can choose to trigger estate taxation in the child's estate rather than having the greater GST tax apply. The child triggers estate tax inclusion by exercising her power to create yet another power that falls within I.R.C. Section 2041(a)(3), a section colloquially called "the Delaware Tax Trap" by estate planners. For much more on this issue, *see* Jonathan G. Blattmachr & Jeffrey N. Pennell, *Adventures in Generation-Skipping, or How We Learned to Love the Delaware Tax Trap* 24 REAL PROP. PROB. & TR. J. 75 (1989); James P. Spica, *A Practical Look at Springing the Delaware Tax Trap to Avert Generation Skipping Tax*, 41 REAL PROP. PROB. & TR. J. 165 (2006); James P. Spica, *A Trap for the Wary: Delaware's Anti-Delaware-Tax-Trap Statute Is Too Clever by Half (of Infinity)*, 43 REAL PROP. TR. & EST. L.J. 673 (2009).

[10] *See* Lawrence W. Waggoner, *The Uniform Probate Code Extends Antilapse-Type Protection to Poorly Drafted Trusts*, 94 MICH. L. REV. 2309 (1996).

[11] *See id.* at 2311–12.

an alternative taker if all such survival contingencies fail, the transferor thereby retains a reversion, because the property will revert to the transferor if all the survival contingencies fail.[12]

That was precisely the problem in the famous case of *Estate of Spiegel v. Commissioner*,[13] in which Spiegel's irrevocable *inter vivos* trust created remainders in his children and grandchildren contingent on such descendants surviving Spiegel, yet no trust provision addressed what would occur if Spiegel outlived all of the beneficiaries.[14] Consequently, Spiegel possessed a reversion at his death, and although its value was tiny—a mere 0.007% of the trust principal[15] (for there is evanescent probability of a grandfather surviving his children and grandchildren)— the entire trust principal was included in Spiegel's federal gross estate under then-applicable law.[16] This surprising and unfair result unleashed a maelstrom of criticism that, within months, generated legislative solutions described by Professor Bittker as a "mélange,"[17] and culminated in a 1954 legislative solution that continues unchanged to the present.[18] Were the circumstances in *Spiegel* to arise today, only the value of the

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[12] A reversion exists whenever a transferor transfers less than all she owns. *See* 1 AMERICAN LAW OF PROPERTY § 4.16 (A. James Casner ed. 1952) ("A reversion is the interest remaining in the grantor, or in the successor in interest of a testator, who transfers a vested estate of a lesser quantum than that of the vested estate which he has."); *See also* RESTATEMENT (FIRST) OF PROP.: FUTURE INTERESTS § 154 (1936) ("A reversionary interest is any future interest left in a transferor or his successor in interest; A reversion is any reversionary interest which is not subject to a condition precedent; A possibility of reverter is any reversionary interest which is subject to a condition precedent.").

[13] 335 U.S. 701 (1949).

[14] *See id.* at 703.

[15] *See id.* at 733 (Burton, J., dissenting).

[16] *See id.* at 707.

[17] Boris I. Bittker, *Church and Spiegel: The Legislative Sequel*, 59 YALE L.J. 395, at 401 (1950) [hereinafter Bittker, *Legislative Sequel*] (describing legislative solution); *see also* Boris I. Bittker, *The Church and Spiegel Cases: Section 811(c) Gets a New Lease on Life*, 58 Yale L.J. 825 (1949) [hereinafter Bittker, *Lease on Life*] (comprehensively describing *Spiegel* and its companion case, *Commissioner v. Church's Estate*, 335 U.S. 632 (1949)); Charles Looker, *Estate Taxation of Living Trusts: The Church and Spiegel Decisions*, 49 COLUM. L. REV. 437 (1949) (advocating remedial regulations or legislation to avoid the potential flood of litigation brought on by the *Church* and *Spiegel* cases).

[18] The 1949 legislative changes were made by Pub. L. No. 81-378, 63 Stat. 891 (1949), and are described in Bittker, *Legislative Sequel*, *supra* note 17, at 401–13. The Internal Revenue Code of 1954 substantially changed the 1949 law and enacted the present version of section 2037 of the Code. *See* Pub. L. No. 83-591, 68A Stat. 382 (1954).

reversion at Spiegel's death—the 0.007% amount—would be included in his federal gross estate.[19]

Cases addressing the estate taxation of reversions, which culminated in *Spiegel*, were preeminent in the early history of the federal estate tax.[20] The estate taxation of reversions generated eight major Supreme Court cases in the twenty-three years from 1927 to 1949,[21] spawned thoughtful academic commentary,[22] and produced the 1949 legislative mélange that provoked still more commentary,[23] yet section 2037 of the Internal Revenue Code of 1954 soon thereafter relegated the estate taxation of reversions to the sidelines.

> After all the sound and fury that attended its birth, § 2037 might have been expected to play a major role in the administration of the estate tax. The contrary has been true. . . . [section] 2037 has generated very few judicial or administrative rulings since its enactment. It has probably functioned primarily as a trap for the unwary, because the reversionary interests that bring it into force are usually retained more by mistake than by design.[24]

Now, however, the trap is set to spring on inartful NICS-rule reforms, and we have new reasons to remember the estate taxation of reversions. From *Spiegel*, we can observe that whenever the express

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[19] *See* Treas. Reg. § 20.2037-1(e), ex. 1 (1958).

[20] *See* BORIS I. BITTKER, ELIAS CLARK & GRAYSON M.P. MCCOUCH, FEDERAL ESTATE AND GIFT TAXATION 372 (8th ed. 2000).

[21] *See* Spiegel's Estate v. Comm'r, 335 U.S. 701 (1949); Comm'r v. Church's Estate, 335 U.S. 632 (1949); Helvering v. Hallock, 309 U.S. 106 (1940); Helvering v. St. Louis Union Trust Co., 296 U.S. 39 (1935); Klein v. United States, 283 U.S. 231 (1931); May v. Heiner, 281 U.S. 238 (1930); Reinecke v. Northern Trust Co., 278 U.S. 339 (1929); Shukert v. Allen, 273 U.S. 545 (1927).

[22] *See* Bittker, *Lease on Life*, *supra* note 17; Bittker, *Legislative Sequel*, *supra* note 17; Hewitt A. Conway, *I.R.C. § 811(c)—The* Church *and* Spiegel *Interpretation*, 34 CORNELL L.Q. 376 (1949); Louis Einstein, *Estate Taxes and the Higher Learning of the Supreme Court*, 3 TAX L. REV. 395 (1948); Samuel J. Foosaner, Church-Spiegel *Decisions, A New Bombshell to Existing Trusts*, 27 TAXES 444 (1949); Looker, *supra* note 17; William J. Schrenk, Jr. and Richard V. Wellman, *The* Church *and* Spiegel *Cases*, 47 MICH. L. REV. 655 (1949); Note, *The* Church *and* Spiegel *Cases: The Meaning of A Transfer Effective at Death*, 49 COLUM. L. REV. 533 (1949).

[23] *See* Bittker, *Legislative Sequel*, *supra* note 17.

[24] BITTKER, ELIAS & MCCOUCH, *supra* note 20, at 383.

provisions of a transfer or a rule of construction require a future interest holder to survive until that future interest takes effect in possession, the possibility of a failed survival contingency exists, and if an alternative taker is not specified, a reversion arises in the transferor. These reversions give rise to complicated estate tax issues, including life contingency actuarial mathematics.

Consequently, both well-drafted documents and well-drafted NICS-rule-reversal reforms should negate the transferor's reversion by providing for some taker other than the transferor under all contingencies. UPC section 2-707 appears to do so, that is, reverse the NICS rule *and* negate the transferor's reversion under all contingencies. However, other NICS-rule-reversal reforms do not negate the transferor's reversion resulting in thorny and even intractable estate and gift tax questions. Although commentators have extensively debated the substantive merits of reversing the NICS rule,[25] no one has comprehensively analyzed the gift and estate tax consequences that arise when the transferor's reversion is not negated as part of a NICS-rule-reversal reform.[26]

When a NICS-rule-reversal reform does not negate the transferor's reversion, an estate tax problem exists because the transferor's reversion will be taxable in the transferor's estate, and that requires use of complex life contingency actuarial mathematics.[27] Gift tax complications also

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[25] *See e.g.*, Mark L. Ascher, *The 1990 Uniform Probate Code: Older and Better, or More like the Internal Revenue Code?*, 77 MINN. L. REV. 639 (1993) (Professor Ascher does not address section 2-707's NICS-rule reversal, but does criticize the anti-lapse negation rule, which exists in UPC sections 2-603, 2-706, and 2-707.); David M. Becker, *Eroding the Common Law Paradigm for the Creation of Property Interests and the Hidden Costs of Law Reform*, 83 WASH. U. L.Q. 773 (2005); David M. Becker, *Uniform Probate Code Section 2-707 and the Experienced Estate Planner: Unexpected Disasters and How to Avoid Them*, 47 UCLA L. REV. 339 (1999); Laura E. Cunningham, *The Hazards of Tinkering with the Common Law of Future Interests: The California Experience*, 48 HASTINGS L.J. 667 (1997); Dukeminier, *supra* note 6.

[26] The thorny estate and gift tax consequences exist only if the transfer is both irrevocable and made while the transferor is living. If the transfer is made in the transferor's will or is otherwise effective only at the transferor's death, the estate tax consequences will be identical whether the NICS rule is applied or not, and no gift tax issue will arise because there will have been no lifetime gift. However, to say that the problem is limited to irrevocable *inter vivos* transfers does not significantly diminish its importance. Persons whose estates are potentially subject to the estate tax are the most likely to make irrevocable *inter vivos* transfers, and likely to do so with significant amounts of property.

[27] Whether the transferor's reversion is taxable under Code sections 2033 or 2037 will depend on whether the NICS rule reversal reverses the NICS rule as applied to the reversion. *See infra* Section III.E.

arise for the same reason; complex life contingency mathematics become relevant because the gift tax value is reduced by the value of the reversion, except when, as often will be the case, the transferor and transferee are members of the same family.[28]

This Article first addresses whether UPC section 2-707 both reverses the NICS rule and negates the transferor's reversion and concludes that it does, although it cites some well-known trusts and estates commentators who seem to read it otherwise. The Article then examines NICS-rule-reversal reforms that have not negated the transferor's reversion and explains that those reforms create complicated transfer tax problems. The Article comprehensively demonstrates the nature of the transfer tax problems by discussing the estate taxation of reversions under Code sections 2033 and 2037. Section 2037 is particularly difficult to understand, and surprisingly little explanation of its operation can be found in case law, administrative pronouncements, or commentary. This Article seeks to cure that by using a series of hypothetical cases to demonstrate its application. Lastly, this Article argues that any reform reversing the NICS rule should also negate the transferor's reversion.

II.   THE NICS RULE AND ITS NEGATION BY UPC SECTION 2-707

The NICS rule is a part of a sub-rule of the broader "rule of early vesting" (REV), which is a rule of construction that promotes the earliest indefeasible vesting of future interests. The REV consists of three sub-rules: (1) conditions are not implied; (2) when the first sub-rule yields because conditions are expressly stated in a transfer, those conditions are construed as divesting conditions subsequent (creating vested remainders subject to divestment) rather than conditions precedent (creating contingent remainders);[29] and (3) all time-defined conditions, whether subse-

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[28] Code section 2702 provides special rules to determine the value of a gift when an individual makes a transfer in trust to or for the benefit of a member of the individual's family and the individual or an applicable family member retains an interest in the trust. Unless the retained interest is a "qualified interest" (generally limited to annuities), Code section 2702 requires that the retained interest be valued at zero. Consequently, because a reversion arising from the reversal of the NICS rule never would be such a "qualified interest," such reversions would be valued at zero when the transferor and transferees are family members. *See* I.R.C. § 2702(a).

[29] This preference for vested interests (subject to divestment) rather than contingent interests may have originated in a desire to escape the early common law rules that caused the destruction (sometimes strategic) of contingent remainders and restricted the alienability or devisability of contingent interests. *See* Schuyler, *supra* note 3. *But see*

quent or precedent, are evaluated at the earliest possible time to create vesting.[30] The second sub-rule is largely irrelevant, for virtually all jurisdictions have abrogated rules that subjected only contingent interests—but not vested interests subject to divestment—to destruction and to limits on transfer.[31] The third sub-rule—evaluating temporal conditions at the earliest time to create vesting—also has been abrogated by most jurisdictions.[32]

Thus, commentary highly critical of the REV and recommending its reform, made between 1951 and 1973, has largely been successful because the second and third sub-rules of the REV are either entirely or almost entirely abrogated.[33] That, of course, leaves open the first sub-rule—that conditions are not implied. The NICS rule is a particular application of that first sub-rule because the NICS rule means that the specific condition of a beneficiary's survival is not implied.

Rabin, *supra* note 3. Professor Rabin was not convinced that the rule favoring early vesting arose primarily in response to the destructibility rule.

[30] Rabin described the rule of early vesting as consisting of three "sub-rules or corollaries:" "(1) future interests are construed to become indefeasibly vested at the earliest possible time; (2) conditions are not readily implied and are construed as narrowly as possible; [and] (3) future interests are characterized as defeasibly vested rather than contingent." Rabin, *supra* note 3, at 469–70. Chaffin identified two parts: (1) a gift is presumed vested and not contingent, and (2) early vesting is presumed rather than more remote vesting. *See* Chaffin, *supra* note 2, at 443–44.

[31] *See* T.P Gallanis, *The Future of Future Interests*, 60 WASH. & LEE L. REV. 513, 515–20 (2003).

[32] Consider a devise of property in testator's will to "*A* for life, remainder to *A*'s surviving children." Must *A*'s children survive the testator (*T*) or *A*? The third sub-rule— any condition is evaluated at the earliest possible time—would conclude that *A*'s children need only survive *T*. Early common law cases so concluded. *See* Rabin, *supra* note 3, at 474 n.49. But by the time Rabin wrote in 1965, he indicated that only four or five American jurisdictions continued to apply that rule. *See id.* at 474 (noting Georgia, Hawaii, Nebraska, and possibly Michigan and Pennsylvania). Virginia should be added to that list. *See* Coleman v. Coleman, 500 S.E.2d 507 (Va. 1998).

[33] The principal criticisms are those of Chaffin, *supra* note 2, Rabin, *supra* note 3, and Schuyler, *supra* note 3. Rabin, writing in 1965, identified Schuyler as the only work criticizing the rule of early vesting at length. Rabin, *supra* note 3, at 467 n.5. But Rabin also noted that "many authorities have voiced doubts concerning the rule." *Id.* (citing 6 AMERICAN LAW OF PROPERTY § 24.19 (James A. Casner ed. 1952); J.H.C. MORRIS & W. BARTON LEACH, THE RULE AGAINST PERPETUITIES 40 (2d ed. 1962); Edward C. Halbach, Jr., *Future Interests: Express and Implied Conditions of Survival* (pts. 1 & 2), 49 CAL. L. REV. 297, 49 CAL. L. REV. 431 (1961) (noted as criticizing some applications of the rule, but concluding that on the whole it is desirable); W. Lewis Roberts, *Statutory and Common Law Definitions of Contingent Remainders*, 30 KY. L.J. 61, 71 (1941–1942).).

The question then arises: Having set aside the second and third sub-rules of the rule of early vesting, why not set aside the first sub-rule, particularly as to the NICS rule? Why not abrogate the NICS rule and require, by default, that all future interest holders survive until possession? A drafter should never create an inheritable future interest.[34] Even fiction writers agree.[35] Why not create a default rule that mirrors a well-drafted document? Indeed, that is the principal argument made by the drafters of UPC section 2-707.[36]

Surprisingly, commentators near uniformly have disliked section 2-707.[37] Only Professor Waggoner, its principal drafter,[38] and Professor Halbach, co-Reporter for the UPC,[39] write in its favor. Although the commentary regarding section 2-707 has been nearly uniformly negative, the pre-section 2-707 commentary had been nearly uniformly against the rule of early vesting.[40] The difference was that the earlier writers concentrated on the second and third sub-rules of the rule of early vesting—that conditions are construed as divesting conditions subsequent (rather than conditions precedent) and that any temporal condition is evaluated at the earliest possible time. Reversing the second and third sub-rules of the rule of early vesting has won wide, but not universal, acceptance. Reversing the NICS rule has not.

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[34] *See* Chaffin, *supra* note 2, at 448–49 (noting that Professor Leach categorically warned draftsmen to never create an inheritable interest).

[35] *See* Rabin, *supra* note 3, at 479 n.81 ("In Louis Auchincloss' touching short story 'The Power of Appointment,' an 'expert' in will drafting had a recurrent nightmare. 'At night he often lay awake and tried to visualize the different ways in which disaster might strike. . . . It would be a trust where the remainder vested in a dead person.' AUCHINCLOSS, POWERS OF ATTORNEY 172 (1963).").

[36] *See* UNIF. PROBATE CODE § 2-707 cmt. (amended 1993), 8 U.L.A. 197 (Supp. 2008).

[37] *See* the sources cited *supra* note 25, all of which conclude that section 2-707 is misguided.

[38] *See* Waggoner, *supra* note 10.

[39] *See* Edward C. Halbach, Jr., *Uniform Acts, Restatements, and Trends in American Trust Law at Century's End*, 88 CAL. L. REV. 1877, 1903–04 (2000); Edward C. Halbach, Jr. and Lawrence W. Waggoner, *The UPC's New Survivorship and Antilapse Provisions*, 55 ALB. L. REV. 1091 (1992). *See also* Mary Louise Fellows & Gregory S. Alexander, *Forty Years of Codification of Estates and Trusts Law: Lessons for the Next Generation*, 40 GA. L. REV. 1049, 1065–71 (2006) (discussing debate and generally sympathetic to UPC section 2-707).

[40] *See* Schuyler, *supra* note 3; Rabin, *supra* note 3; Chaffin, *supra* note 2. In 1973, Professor Chaffin collected the existing literature on the subject in 1973. *See* Chaffin, *supra* note 2, at 445 n. 12.

UPC section 2-707(b) reverses the NICS rule with respect to trusts, but not legal life estates, creating a condition of survival by providing that "[a] future interest under the terms of a trust is contingent on the beneficiary's surviving the distribution date."[41] The "distribution date . . . means the time when the future interest takes effect in possession or enjoyment."[42] When a future interest so fails, subsection (b) creates a substitute gift to the pre-deceased beneficiary's descendants who survive the distribution date, but no substitute gift is created for multigenerational class gifts to "'issue,' 'descendants,' . . . 'heirs,' . . . or a class described by language of similar import."[43] A substitute gift in multigenerational class gifts is not necessary because "these types of class gifts have their own internal systems of representation."[44]

But making all future interests (including all substitute gifts) contingent on the beneficiary's surviving to the distribution date creates the possibility that all of these conditions will fail, and subsection (d) addresses that situation:

> If, after application of subsections (b) and (c), there is no surviving taker, the property passes in the following order: (1) if the trust was created in a nonresiduary devise in the transferor's will or in a codicil to the transferor's will, the property passes under the residuary clause in the transferor's will; for purposes of this section, the residuary clause is treated as creating a future interest under the terms of a trust; (2) if no taker is produced by the application of paragraph (1), the property passes to the transferor's heirs under section 2‑711.[45]

Consequently, it appears that when UPC section 2-707 applies, the transferor cannot have a reversion unless the transfer expressly creates it. However, as discussed below, some commentators have read it otherwise.[46]

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[41] UNIF. PROBATE CODE § 2-707(b) (amended 1993), 8 U.L.A. 195 (Supp. 2008).

[42] *Id.* § 2-707(a)(4). The requirement of survival of the distribution date means survival of the 120-hour period following the distribution date. *Id.* § 2-702(a), 2-707 cmt., 8 U.L.A. at 197.

[43] *Id.* § 2-707(b)(1) and (2), 8 U.L.A. at 195.

[44] *Id.* § 2-707 cmt., 8 U.L.A. 198.

[45] *Id.* § 2-707(d), 8 U.L.A. at 196.

[46] *See infra* notes 58–61 and accompanying text.

III. AN EXPLANATION OF SECTION 2037

A. The Curious Case of Example 3 of UPC Section 2-707

The comment to UPC section 2-707 contains examples. Here is one:

> *Example 3*. *G* created an irrevocable *inter vivos* trust, income to *A* for life, remainder in corpus to *B* if *B* survives *A*. *B* predeceased *A*. At *A*'s death, *G* and *X*, *B*'s child, are living.
>
> Solution: *X* takes the trust property. Because *B*'s future interest is not in the form of a class gift, subsection (b)(1) applies, not (b)(2). Subsection (b)(1) creates a substitute gift with respect to *B*'s future interest; the substitute gift is to *B*'s child, *X*. Under subsection (b)(3), the words of survivorship ("to *B* if *B* survives *A*") do not indicate an intent contrary to the creation of that substitute gift. Nor, under subsection (b)(4), is the substitute gift superseded by an alternative future interest; *G*'s reversion is not an alternative future interest as defined in subsection (a)(1) because it was not *expressly* created.[47]

The last sentence of the solution appears self-contradictory. Under the common law, in a transfer "by *G* to *A* for life, remainder to *B* if *B* survives *A*," *A* would have a life estate, *B* would have a contingent remainder, and *G* would have a reversion. But UPC section 2-707 creates a contingent remainder in *B*, a contingent remainder in *B*'s descendants who survive *A*, and a contingent remainder in *G*'s heirs (not in *G*). Thus, the explanation in the comment that "*G*'s reversion is not an alternative future interest as defined in subsection (a)(1) because it was not expressly created"[48] is odd. If *G* does not have a reversion because none was expressly created, why mention that a nonexistent interest does not qualify as an "alternative future interest?" A nonexistent interest does not exist, and its nonexistence means that it lacks all qualities, so pointing out one quality that it lacks is curious. Or, does the comment mean to suggest that we construe the transfer under the common law rule long enough to discern a common law reversion, but then immediately declare that no reversion exists because it was not expressly created? Apparently

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[47] *Id.* § 2-707 cmt. ex. 3, 8 U.L.A. at 199 (emphasis altered).

[48] *Id.* § 2-707 cmt. ex. 3, 8 U.L.A. 200. A reversion will qualify as an "alternative future interest" only if "expressly created." *Id.* § 2-707(a)(1), 8 U.L.A. at 194.

so, but it is odd to call something a reversion simply to be able to say that it is not a reversion. Example 3 arguably leaves open whether *G* owns a reversion when it says that *G*'s reversion, which should not exist, is not an alternative future interest.[49]

B. Conflicting Views on Whether UPC Section 2-707 Negates the Transferor's Reversion

A few years after the adoption of UPC section 2-707, Professor Waggoner, its principal drafter,[50] and Professor Dukeminier, its principal antagonist,[51] hotly debated the merits of section 2-707. Mostly they debated the wisdom of reversing the NICS rule—Waggoner favored it,[52] and Dukeminier did not, principally because the predeceased remainderman lost the ability to direct property to a spouse.[53] Dukeminier favored the position held by Professor French, namely, that if the NICS rule is reversed, and the remainderman's future interest is made contingent on her survival, the substitute gift arising at the remainderman's death should be a broad special power of appointment in the remainderman rather than an automatic gift to the remainderman's descendants.[54]

In addition to disagreeing on the wisdom of keeping the NICS rule, Dukeminier and Waggoner also disagreed on whether section 2-707 negates the settlor's reversion. Dukeminier argued that UPC section 2-707 did not negate the settlor's reversion; Waggoner argued that it did. If section 2-707 does not negate the settlor's reversion, there may be negative estate tax results. Dukeminier explained:

> Under section 2-707 of the UPC, which substitutes heirs for the reversioner, the reversion is included in the settlor's federal gross estate according to section 2037 of the Internal Revenue Code if the reversion is worth more than five percent of the value of the property at the settlor's death. Indeed, inasmuch as *Section 2-707 creates a*

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[49] Because oral trusts are permitted, UNIF. TRUST CODE § 407 (amended 2005), 7C U.L.A. 489 (2006), a case might involve whether an oral reversion was expressly created.

[50] *See* Waggoner, *supra* note 10, at 2309.

[51] *See* Dukeminier, *supra* note 6, at 148.

[52] *See* Waggoner, *supra* note 10, at 2313.

[53] *See* Dukeminier, *supra* note 6, at 151–52.

[54] *See* Dukeminier, *supra* note 6, at 165 (citing Susan F. French, *Imposing a General Survival Requirement on Beneficiaries of Future Interests: Solving the Problems Caused by the Death of a Beneficiary Before the Time Set for Distribution*, 27 ARIZ. L. REV. 801, 835–36 (1985)).

> *reversion in the settlor in every case of an irrevocable inter vivos trust*, unless a contrary intent is shown, there is a risk that the settlor's reversion implied by law will be taxable in his estate under Section 2037 of the Internal Revenue Code.[55]

Waggoner responded:

> His [Dukeminier's] error occurs when he says that "the settlor has a reversion. . . ." *Section 2-707 does not give the settlor a reversion in that instance or in any other circumstance.* In effect, what Section 2-707 does is to transform the remainder interest [in a transfer by settlor in trust for *A* for life, then to *B*] from one that is indefeasibly vested in *B* into one in favor of *B* if *B* survives *A*, but if not to *B*'s descendants surviving *A*, and if none to those persons who would be the settlor's heirs if the settlor died when *A* dies. Under Section 2-707, the property would not revert to the settlor even if the settlor survived *A*. . . . Dukeminier is quite wrong when he says that the property is included in the settlors's gross estate under Section 2037 if the settlor dies before *A*.[56]

Waggoner's interpretation is a straightforward reading of section 2-707, and a casebook for which Dukeminier was an author subsequently adopted the Waggoner view.[57] However, other commentators have adopted Dukeminier's first view that section 2-707 does not negate the settlor's reversion. Professors Pennell and Newman wrote that if the predeceased future interest holder is not survived by descendants, "there [is] a reversion in the transferor."[58] Professors Featherston and Hatfield wrote a problem and a solution that conclude that the settlor of an *inter vivos* trust has a reversion under section 2-707.[59] In their answer, Profes-

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[55] Dukeminier, *supra* note 6, at 157 (footnote omitted) (emphasis added).

[56] Waggoner, *supra* note 10, at 2343–44 (emphasis added) (footnotes omitted).

[57] *See* DUKEMINIER, JOHANSON, LINDGREN & SITKOFF, *supra* note 1, at 647 ("[s]ection 2-707 does not permit reversion to the settlor . . . .").

[58] JEFFERY N. PENNELL & ALAN NEWMAN, PENNELL AND NEWMAN'S SUM & SUBSTANCE QUICK REVIEW OF WILLS, TRUSTS & ESTATES 283 (2007).

[59] *See* THOMAS M. FEATHERSTON, JR. & MICHAEL HATFIELD, QUESTIONS AND ANSWERS: WILLS, TRUSTS & ESTATES 65, 171 (2d ed. 2008). Problem 164 on page 65 involves a transfer by Joe in trust for Cindi for life, remainder to Alice and Sam. Alice predeceases Cindi. The answer on page 171 says that Sam and Joe are entitled to the trust

sors Featherston and Hatfield cited to Professor Averill,[60] but Averill does not specifically address the issue. Professor Averill's section 2-707 discussion cross-references his discussion regarding lapses in wills, which cannot completely cover UPC section 2-707 because, as Averill's text notes, UPC section 2-707 "applies both to irrevocable *inter vivos* trusts and to trusts that are created at death."[61]

Dukeminier's discussion of the estate tax consequences of a reversion in a settlor of an *inter vivos* trust was a bit imprecise. Dukeminier stated, and Waggoner perhaps assumed, that section 2037 would govern if section 2-707 did not negate the transferor's reversion. As later discussion will make clear,[62] section 2037 would govern only if the settlor's reversion is contingent on the settlor's surviving until the reversion took effect in possession (that is, the reversion, like other future interests, is subject to the NICS rule reversal). If the settlor's reversion is not contingent on the settlor's surviving until possession, section 2033 would govern and it does not have a 5% *de minimis* rule.[63]

IV. NICS RULE REVERSALS NOT NEGATING THE TRANSFEROR'S REVERSION

A. California

Between 1994 and 2002, California had a statutory regime in place that reversed the NICS rule, yet did not negate the transferor's reversion. A 1994 statute reversed the NICS rule by providing that "a transferee who fails to survive the transferor or until any future time required by the instrument does not take under the instrument."[64] "Instrument" included

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estate upon Cindi's death (when Alice has no then-surviving descendants). That is not correct—under UNIF. PROBATE CODE § 2-707(d)(2), the trust estate would belong to Sam and Joe's heirs as determined at Cindi's death. UNIF. PROBATE CODE § 2-707(b) cmt. ex. 10, 8 U.L.A. 202. A different problem and answer seemingly adopts the Waggoner view; that is, problem 145 on page 59 and answer on page 164.

[60] *See id*. at 171 (citing LAWRENCE H. AVERILL, JR., UNIFORM PROBATE CODE IN A NUTSHELL § 11.05, at 253 (5th ed. 2001).).

[61] LAWRENCE H. AVERILL, JR., UNIFORM PROBATE CODE IN A NUTSHELL § 11.05, at 253 (5th ed. 2001).

[62] *See infra* Section III.E.

[63] *See* Treas. Reg. § 20.2037-1(e), ex. 1 (1958).

[64] CAL. PROB. CODE § 21109(a), 187 (West Supp. 2009) (added by 1994 Cal. Stat. ch. 806, § 41); *amended by* 2002 Cal. Stat., ch. 138, § 18 (quoting statute as originally enacted).

an *inter vivos* declaration of trust.[65] Another statute provided that the descendants of such a predeceased transferee would take a substitute gift, provided the transferor and transferee were kin either by blood or marriage.[66] But no statute addressed to whom the property would pass when the transferee predeceased the transferor and no substitute gift arose, either because (1) the transferor and transferee were not kin; or (2) if kin, the transferee was not survived by descendants. Consequently, after the 1994 statute became effective, the transferor of a California irrevocable *inter vivos* trust always owned a reversion unless the instrument (1) overrode the default rule by eliminating the requirement that transferees survive until possession, or (2) expressly negated the reversion by providing alternate takers upon failed contingencies.

In 2002, for reasons unrelated to the transfer taxation of reversions,[67] California limited its NICS rule reversal to transfers taking effect at death;[68] consequently, irrevocable, *inter vivos* transfers immediately taking effect regained the NICS rule. Thus, after the 2002 amendment took effect, California returned to the NICS rule for irrevocable, *inter vivos* transfers.

By statute, California made all irrevocable, *inter vivos* trusts created between the effective dates of the 1994 and 2002 enactments into *Spiegel* trusts, which meant that the actuarial value of settlor's reversion at his death is included in his federal gross estate under Code section 2033.[69] Consequently, although the included amount might be small, particularly when, as is usually the case, the beneficiaries are younger than the settlor

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[65] CAL. PROB. CODE § 21101 ("[T]his part applies to a will, trust, deed, and any other instrument").

[66] *See id.* § 21110.

[67] As enacted in 1994, the statute not only reversed the NICS rule, it arguably rescinded completed transfers of property when the beneficiary predeceased the donor. Professor Cunningham pointed out this anomaly in a 1997 article. *See* Cunningham, *supra* note 25, at 690–91. The California Law Revision Commission agreed and recommended that the statute be amended to limit it to "gifts that remain revocable during the lifetime of the donor." CAL. LAW REVISION COMM'N, RULES OF CONSTRUCTION FOR TRUSTS AND OTHER INSTRUMENTS, 31 CAL. L. REV. COMM'N REP. 167, 178 (2001), *available at* http://clrc.ca.gov/pub/Printed-Reports/REC-RulesConstrTrust.pdf.

[68] Section 21109 now provides, "[a] transferee who fails to survive the transferor *of an at-death transfer* or until any future time required by the instrument does not take under the instrument." CAL. PROB. CODE § 21109(a) (West Supp. 2009) (emphasis added). The 2002 amendment added the italicized words. *See* 2002 Cal. Stat. ch. 138, § 18.

[69] *See* Treas. Reg. § 20.2037-1(e), ex. 1 (1958).

and there are multiple beneficiaries, the fact of inclusion and its complicated mathematics exist. As well, the gift tax value would be the net of the value of the reversion. Negating the settlor's reversion would have cured both problems.

B. Restatement (Third) of Property: Wills and Other Donative Transfers § 11

The *Restatement of Property* has long included preferences for early vesting and early indefeasibility[70] within its multiple rules of construction and constructional preferences.[71] Both constructional preferences were dropped from the *Restatement (Third) of Property: Wills and Other Donative Transfers*. Instead, the *Restatement* substitutes a construction that "favors family members over non-family members, . . . favors close family members over more remote family members, and . . . that does not disinherit a line of descent."[72] The Reporter's Notes make clear that these preferences can be achieved by negating the NICS rule, and thereby encourages its negation.[73]

While the Comments and Reporter's Notes in the *Restatement (Third) of Property* encourage courts to abandon the NICS rule,[74] and identify adverse estate tax consequences as a reason to do so, nothing alerts a reform-minded court to the difficult transfer tax consequences arising when the transferor's reversion is not negated. Thus, a court reversing the NICS rule by common law decision runs the risk of solving

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[70] *See* 3 RESTATEMENT (FIRST) OF PROP. § 243 cmts. i-j (1940).

[71] The *Restatement (Third) of Property: Wills and Other Donative Transfers* distinguishes rules of construction and constructional preferences. Rules of construction are specific and provide guidance for resolving specific situations or construing specific terms. Constructional preferences are general, may overlap, and sometimes conflict. A rule of construction is not a mandatory rule of law, but is a default rule designed to carry out presumed intent. A rule of construction yields to a finding of a contrary intent. *See* RESTATEMENT (THIRD) OF PROP.: WILLS AND OTHER DONATIVE TRANSFERS § 11.3(a)–(b) cmt. a (2003).

[72] RESTATEMENT (THIRD) OF PROP.: WILLS AND OTHER DONATIVE TRANSFERS § 11.3(c)(3) (2003).

[73] *See* RESTATEMENT (THIRD) OF PROP.: WILLS AND OTHER DONATIVE TRANSFERS § 11.3 reporter's note 6 (2003).

[74] Professor Waggoner, the principal drafter of Uniform Probate Code section 2-707, identifies these developments as creating momentum for section 2-707. *See* Waggoner, *supra* note 10, at 2321–26.

the transferee's estate tax problem at the expense of the transferor's. Indeed, that occurred in *Harris Trust & Savings Bank v. Beach*.[75]

C. Harris Trust & Savings Bank v. Beach

In *Harris Trust & Savings Bank v. Beach*, husband created two *inter vivos* trusts providing income for wife for life, remainder to husband's heirs.[76] The Supreme Court of Illinois—citing the critique of the rule of early vesting made by Professor Schuyler and calling him an "eminent scholar in the field of Illinois future interest law"[77]—held that the donor's "heirs" were to be determined as of the time of income beneficiary's death, not earlier at the donor's death,[78] as would be the case under the third sub-rule of the traditional rule of early vesting.[79]

The matter of the husband's reversion and its transfer tax consequences were not at issue. If they had been, because the future interest was in husband's heirs, husband would not be regarded to have a reversion. A future interest in "heirs" always will have a taker in possession, because everyone has heirs, to the point of an escheat if no other exists.

However, if the future interest after wife's life estate were in husband's "descendants," then the reversion issue would arise. The court's reasoning for reversing the NICS rule in *Beach* applies equally to interests in descendants:

> The result of delaying a gift to the heirs is not dramatic. The fear that a contingent remainder could be prematurely destroyed no longer exists. Further, should a predeceased member of the class be excluded from the gift, the result is not drastic. If the predeceased "heir" leaves issue, as is the case here, the settlor's own blood still enjoys the gift. If, on the other hand, a predeceased member fails to leave issue, as also occurred here, the gift is prevented from falling into the hands of strangers. In sum, by altering the degree of proof necessary to de-

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[75] 513 N.E.2d 833, 838–39 (Ill. 1987).

[76] *See id.* at 834–36. The settlor actually created two trusts, but they were, in relevant part, identical. "The parties agree that both the 1921 trust and the 1926 trust should be distributed in identical manners." *Id.* at 835.

[77] *Id.* at 838.

[78] *See id.* at 840.

[79] *See supra* notes 29–32 and accompanying text.

> lay the vesting of a gift to the heirs, we do no harm. In-
> stead, we further the ordinary grantor's intent, which is
> exactly what a proper rule of construction ought to do.[80]

While the property law result of delaying a gift to heirs (or even to descendants) is not dramatic, the effect on the transferor's tax consequences is. In *Beach*, if husband had created the future interest in descendants, the court's NICS-rule reversal would have caused husband's estate to include the value of his reversion in his federal gross estate.[81]

D. Future Interests that are Single-Generation Class Gifts

UPC section 2-707 reverses the NICS rule for all future interests in trusts. It makes substitute gifts to the descendants of all pre-deceased beneficiaries except beneficiaries of multi-generational class gifts. It also negates the transferor's reversion by making the transferor's heirs, rather than the transferor, the ultimate taker in default.[82] Thus, under the UPC, the NICS rule is reversed for single-generation class gifts.

Not so for the *Restatement (Second)* and *Restatement (Third) of Property*; they retain the NICS rule for single-generation class gifts. In so doing, the *Restatement (Second)* takes the odd position of disparaging its rule. The *Restatement (Third)* takes a more nuanced view by recognizing the limits of a common law reversal of the NICS rule.

1. Restatement (Second) of Property: Wills and Donative Transfers § 27.3

Section 27.3 of the *Restatement (Second) of Property: Wills and Donative Transfers* provides default rules of construction when a member under a single-generation class gift dies after the effective date of the dispositive instrument but before the date of distribution.[83]

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[80] *Beach*, 513 N.E.2d at 840.

[81] Had the gift in *Beach* been to *descendants* rather than *heirs*, *Beach* would be identical to *Spiegel*. Thus, in *Beach*, the Illinois Supreme Court created by common law presumption the exact unfortunate result that drafting inadvertence had created in *Spiegel*.

[82] *See supra* notes 41–45 and accompanying text.

[83] *See* RESTATEMENT (SECOND) OF PROP.: DONATIVE TRANSFERS § 27.3(1) (1988) ("[A] person within the primary meaning of the class gift term who dies after the dispositive instrument takes effect but before such class member is entitled to distribution of his or her share is not excluded from the class by reason of such death, if such death does not make impossible the fulfillment of a condition, unless additional language or circumstances indicate otherwise, or an applicable statute provides otherwise.").

Generally, the NICS rule applies, and the predeceased class member's future interest does not terminate on her death, but passes through her estate. However, the commentary describing the rule twice disparages it, and argues for its reversal. Comment i recommends statutes that "provide that the share of a class member who dies after the date a dispositive instrument takes effect and before the date of distribution to the class shall go to some specified substitute taker,"[84] but of course if such a statute did not negate the transferor's reversion, complicated transfer tax issues would arise. The Reporter's Tax Note to section 27.3 again speaks against the NICS rule—by identifying the possibility of estate taxation—and states "[i]t is undesirable from an estate tax standpoint to allow the rule of § 27.3 to apply."[85]

However, while the comment and note recommend reversal of the NICS rule, they do not speak to the other half of an effective NICS rule reversal—negating the transferor's reversion. It is undesirable from a gift and estate tax standpoint to reverse the NICS rule, but not negate the transferor's reversion.

2. Restatement (Third) of Property: Wills and Other Donative Transfers § 15.4

Section 15.4 of the *Restatement (Third) of Property: Wills and Other Donative Transfers* retains the NICS rule for beneficiaries of single-generation class gifts, although that position was opposed by many of the reporters, advisers, Consultative Group members, and Council members of the American Law Institute.[86]

The substantive merit of the NICS rule in this context was debated extensively and then voted upon.[87] The Reporter and Associate Reporter presented the Institute with a choice between two options: (1) retaining the common law NICS, or (2) requiring beneficiary survival coupled with a substitute gift to the descendants of the predeceased donee.[88] They did not mention a need to negate the transferor's reversion. The American Law Institute voted to adopt the traditional option, but by a close

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[84] RESTATEMENT (SECOND) OF PROP.: DONATIVE TRANSFERS § 27.3 cmt. i (1988). Not addressed is the potential undesirability of a GST tax if the NICS rule is reversed. *See supra* note 9.

[85] RESTATEMENT (SECOND) OF PROP.: DONATIVE TRANSFERS § 27.3 reporter's tax note (1988).

[86] *See* 81 A.L.I. PROC. 186 (2004).

[87] *See id.* 159–93.

[88] *See id.* at 186–92.

vote of fifty-seven to fifty.[89] Professor Waggoner explained the position of the Reporters:

> The Reporters favored the traditional option because they were concerned that courts would be unwilling to adopt the antilapse-type option. Doing so would require the court to insert a substitute gift based on likely preferences lacking any foundation in the language of the instrument of transfer. The traditional technique of the common law is *construction*, not *insertion* of a gift that does not appear in the language of the document or that cannot be implied from the language of the document.[90]

The debate encapsulates the difficulties in creating a well-formed common law reversal of the NICS rule. Switching a default rule from not requiring survival to requiring survival is well within common law development. However, addressing collateral consequences is not. To fix the first collateral consequence, as noted by Professor Waggoner, a court must insert a gift—to a predeceased donee's descendants—that lacks any foundation in the text of the document.[91] Yet, if such a substitute gift is not implied, then a line of descent is disinherited. The second collateral consequence—the reversion arising in the transferor—is even harder to correct by traditional common law rules of construction. If beneficiary survival is implied by default, a reversion in the transferor necessarily arises to take effect in possession if the newly-implied condition of survival fails. To negate the reversion, a court would have to imply a second substitute gift. The first substitute gift—to a predeceased transferee's descendants—at least has a tight connection to the transferee expressly designated by the transferor and correlates with the traditional rule of antilapse that applies to present gifts under wills. The second substitute gift—arising to negate the transferor's reversion—has neither a connection to an expressly designated transferee nor a well-known analog. Thus, as demonstrated earlier in this article, if the NICS rule is reversed for an *inter vivos* transfer, a reversion arises. If that reversion is not negated, then the transferor has complicated transfer tax conse-

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[89] *See id.* at 192.

[90] Lawrence W. Waggoner, *Class Gifts Under the* Restatement (Third) of Property, 33 Oꜱɪᴏ N.U. L. Rᴇᴠ. 993, 1008 (2007) (emphasis added).

[91] *See id.*

quences, both in valuing the gift and in valuing the reversion at the transferor's death.

E. Summary of NICS-Rule–Reversal Reforms

The NICS-rule–reversal reforms enacted by statute in California, made by judicial decision in Illinois, and suggested by the second and third *Restatements of Property* all fail to negate the transferor's reversion. This reversion will solve the transferee's estate tax problem at the expense of the transferor, who will now face thorny gift tax and estate tax consequences.

V. DEMONSTRATING THE TRANSFER TAX CONSEQUENCES OF REVERSIONS: I.R.C. SECTIONS 2033, 2037, & 2702

A. NICS Rule Property Law Consequence: No Reversion

Under the NICS rule, in the transfer by O "to A for life, remainder to B," B has an indefeasibly vested remainder. Because B's remainder is indefeasibly vested, O, the transferor, does not have any interest in the property after the transfer is made because no possibility exists that the property can ever return to O. At A's death, the property is transferred to B, to B's designee, or to the person indicated by the relevant intestacy statute (if B predeceased and made no express designation).

B. NICS Rule Gift Tax Consequence: Completed Gift of Entire Property

The creation of future interests nearly always occurs in transfers that are gifts rather than sales. Transfers by O to "A for life, remainder to B" rarely involve consideration paid by A or B to O. Typically, O transfers the property without consideration; that is, O makes a gift. Gifts are subject to an excise tax upon the privilege of giving property away.[92] "[T]he tax is a primary and personal liability of the donor, is an excise upon his act of making the transfer, is measured by the value of the property passing from the donor, and attaches regardless of the fact that the identity of the donee may not then be known or ascertainable."[93] The value of the gift is the fair market value of the property at the time of the gift.[94] If the donor gives away less than his entire interest in property, that is, he gives away part and retains part, the value of the gift will equal

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[92] *See* I.R.C. § 2501; Treas. Reg. § 25.0-1.

[93] Treas. Reg. § 25.2511-2(a).

[94] *See* I.R.C. § 2512.

the value of the property less the value of the part retained.[95] When the default NICS rule applies, the transferor does not retain any interest in the property. The gift tax value will thus be the fair market value of the property at the time of the gift, and no issue arises regarding the valuation of the retained part, for none is retained.[96]

C. NICS Rule Reversed Property Law Consequence: Reversion?

In a transfer "to *A* for life then to *B*," the express language does not address whether *B* must survive *A* in order to take the property at *A*'s death. Section 2-707 of the UPC, adopted in 1990, creates a rule of construction that requires *B* to survive until the future interest takes effect in possession.[97] Multiple consequences flow from that requirement of survival.

One, *B*'s remainder now is classified as a contingent remainder.[98] Two, as a contingent remainder, it becomes subject to being invalidated by the Rule Against Perpetuities. Three, as a contingent remainder, it necessarily creates other property interests that will take effect in possession if the survival contingency is not satisfied. If the NICS rule simply is reversed, and the reform does no more, then the new interest

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[95] *See* Treas. Reg. § 25.2511-1(e) ("If a donor transfers by gift less than his entire interest in property, the gift tax is applicable to the interest transferred.").

[96] If the transfer "to *A* for life remainder to *B*" was in *O*'s will, the transfer tax consequences would be identical, whether or not a contingency of survival is imposed on *B*. For property to be transferred under *O*'s will, *O* must own the property at his death. Any such property owned by *O* at his death is included in his federal gross estate. *See* IRC §§ 2031, 2033. Thus, the entire value is included in *O*'s federal gross estate whether or not the particular transfer makes a complete disposition. If a particular transfer in a will is not a complete disposition, *O* does not retain a reversion that is subtracted from the estate valuation—the estate owns the entire property and it is valued as such. Conversely, with a lifetime gift, when a particular gift is not a complete disposition, *O*'s reversion is subtracted from the gift valuation (but Code section 2702 often will make that subtracted value zero). *See id.* § 2702.

[97] *See* UNIF. PROBATE CODE § 2-707(b) (amended 1993), 8 U.L.A. 195 (1998) ("[A] future interest under a trust is contingent on the beneficiary's surviving the distribution date."). Section 2-707(a) defines "distribution date" with respect to a future interest to mean the time when "the future interest is to take effect in possession or enjoyment." *Id.* § 2-707(a)(4), 8 U.L.A. at 194. Section 2-702(a) adds 120 hours. *See id.* § 2-702(a), 8 U.L.A. at 182.

[98] *See id.* § 2-707 cmt., 8 U.L.A. at 198 ("Subsection (b) renders a future interest 'contingent' on the beneficiary's survival of the distribution date. As a result, future interests are 'nonvested' and subject to the Rule Against Perpetuities. To prevent an injustice from resulting because of this, the Uniform Statutory Rule Against Perpetuities, which has a wait-and-see element, is incorporated into the Code as Part 9.").

created is a reversion in *O*, the transferor. Thus, if *B* is not alive at *A*'s death, the property would revert to *O*. Some versions of the NICS reform do just that—they imply a condition of survival and no more.

The UPC, on the other hand, does two things in addition to requiring survival by *B*. First, it creates a taker if *B*'s survival contingency is not met—a substitute gift is created in *B*'s surviving descendants.[99] Second, it provides that if both the survival contingency and the descendants-existence contingency are not met, then the property passes to *O*'s heirs as determined at *A*'s death (unless *B*'s interest was created in a nonresiduary devise in *O*'s will, in which case the property passes under the will's residuary clause).[100] Thus, the UPC's reversal of the NICS rule negates the transferor's reversion because the property never will revert to *O*.[101]

D. NICS Rule Reversed Federal Gift Tax Consequence: Possible Incomplete Gift

The reform of section 2-707 consisted of three elements: (1) reversing the NICS rule, (2) creating a substitute gift in a predeceased taker's descendants, and (3) creating a backstop gift in *O*'s heirs. A consequence of the third element is that when UPC section 2-707 applies, *O* should not be regarded to have a reversion. Thus, the federal transfer tax consequences of a transfer "to *A* for life, remainder to *B*" should be identical whether construed under the common law NICS rule or under section 2-707. That is, the gift tax value will be the fair market value of the property, and no issue regarding the valuation of the retained part arises, for none is retained.

However, two points need to be made. If a particular reform of the NICS rule omits the third element of section 2-707, then *O* will have a reversion. When *O* retains a reversion, the value of the gift will equal the value of the property minus the value of the part retained.[102] That will cause two separate, but related, transfer tax issues. First, valuing the reversion will be complicated by complex survival contingency probabilities and survival time requirements.[103] Second, the existence of a

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[99] *See id.* § 2-707(b)(1), 8 U.L.A. at 195.

[100] *See id.* § 2-707(d), 8 U.L.A. at 196.

[101] *See id.* § 2-707(d)(2), 8 U.L.A. at 196–197; *id.* § 2-711, 8 U.L.A. at 205.

[102] *See* Treas. Reg. § 25.2511-1(e).

[103] *See* UNIF. PROBATE CODE § 2-702 (amended 1993), 8 U.L.A. 182 (1998).

reversion in *O* may cause the property to be included in *O*'s federal gross estate at *O*'s death.

E. NICS Rule Reversed Federal Estate Tax Consequence: Reversion Surviving Settlor's Death (Section 2033) or Reversion Terminating at Settlor's Death (Section 2037)

Whether *O*'s reversion is taxable under Code section 2033 or 2037 will depend on whether the reversion exists beyond or terminates upon *O*'s death.[104] That can be thought of as a question of whether the NICS rule reversal also reverses the NICS rule as applied to the reversion. If the reversion is subject to the NICS rule reversal (that is, *O*'s reversion extinguishes at her death unless it earlier became possessory), Code section 2037 provides the parameters for inclusion in *O*'s estate (including its 5% *de minimis* rule). If the reversion is not subject to the NICS rule reversal (that is, *O*'s reversion survives her own death), then Code section 2033 governs inclusion (and does not have a 5% *de minimis* rule).[105]

Authorities construing Code section 2037 are scant, and none comprehensively describe its operation. The Internal Revenue Service's (the "Service's") most comprehensive ruling unhelpfully alludes to "secret knowledge."[106] Understanding Code section 2037 requires understanding multiple difficult areas: (1) the property law of future interests; (2) the property law related to reversions, which are a particular type of future interest; (3) time-value-of-money concepts as applied to calculating the

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[104] *See* Rev. Rul. 55-438, 1955-2 C.B. 601 (providing that possibility of reverter obliterated at decedent's death not included by predecessor of Code section 2033). The requirement for Code section 2037 to apply "may be restated a different way that is a bit more understandable: Does death terminate the grantor's reversion? Neither the Code nor Regulations phrase this requirement in this manner, but is has the same effect." IRA MARK BLOOM, F. LADSON BOYLE, JOHN T. GAUBATZ & LEWIS D. SOLOMON, FEDERAL TAXATION OF ESTATES, TRUSTS AND GIFTS 371 (rev. 3d ed. 2003).

[105] *See* Rev. Rul. 67-370, 1967-2 C.B. 324 (Inclusion under Code section 2033 occurs if "the decedent owns any beneficial interest in a trust which survives his death . . . .").

[106] Rev. Rul. 76-178, 1976-1 C.B. 273; *see infra* note 127. The treatises are not much help either, beyond suggesting the hiring of actuaries. *See* 5 RICHARD R. POWELL, POWELL ON REAL PROPERTY § 524.6 [2], at 41C76 (Michael Allan Wolf ed. 2000) ("Unless the attorney is comfortable with actuarial computations, it may be worthwhile to engage the services of an actuary in estimating the value of the reversionary interest."). Few secondary materials exist to help attorneys become comfortable with actuarial computations.

present value of future interests; (4) the elements of probability theory; and (5) life contingency actuarial mathematics.

VI.   AN EXPLANATION OF CODE SECTION 2037

Code section 2037, reduced to its operative minimum, provides as follows: the value of the gross estate shall include the value of all property of which the decedent has made a transfer if (1) possession of the property can be obtained only by surviving the decedent, (2) the decedent retained a reversionary interest in the property, and (3) the value of that reversionary interest exceeds five percent of the value of the property to which the reversionary interest relates immediately before the death of the decedent.[107]

Code section 2037 is triggered when decedent has transferred *an interest* in property to another and possession under *that transferred interest* can be obtained *only* by surviving the decedent.[108] We can call that interest the "Section-2037-triggering interest." Thus, the first step in a section 2037 analysis is to examine all transfers made by a decedent prior to her death; classify all interests created by those transfers; and ask with respect to each interest: Can *possession* under that interest be obtained *only* by surviving the decedent? Any interest for which the answer is yes triggers a further analysis under Code section 2037.

In classifying property interests as section-2037-triggering interests, we necessarily must consider when property interests might take effect in possession, which places us squarely within the property law of future interests. Whenever a person owns an interest in property, yet that interest does not include the right to present possession, we call that property interest a future interest.[109]

A few examples help clarify this analysis:

> *Case 1. O*, while living, transfers $750,000 to an irrevocable trust, to pay income to *W* for her life, remainder to *O* or *O*'s estate. At *O*'s death at age seventy-eight, the trust principal is worth $1 million, and *W* is age eighty-one.

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[107] *See* I.R.C. § 2037.

[108] *See id.*

[109] *See supra* note 1. Interestingly, the Uniform Probate Code comprehensively addresses future interests without defining them. UNIF. PROBATE CODE § 2-707(a)(5) (amended 1993), 8 U.L.A. (1998) ("'Future interest' includes an alternative future interest and a future interest in the form of a class gift.").

At the time of the grant, the only interest transferred by *O* was the life estate to *W*. Can *W* obtain *W*'s life estate only by surviving *O*? No, *W* could, and did, possess *W*'s life estate while *O* was alive. Consequently, there is no section-2037-triggering interest, and Code section 2037 does not apply.

However, because *O*'s reversion extends beyond *O*'s death, the reversion is property "of the decedent at the time of his death,"[110] and is included in *O*'s federal gross estate.[111] The amount included is the value of the remainder after *W*'s life estate,[112] which, given *W*'s age of eighty-one and assuming a 6% rate of interest, is 0.66[113] times $1,000,000, which equals $660,000.

> *Case 2*. *O*, while living, transfers $750,000 to an irrevocable trust, to pay income to *W* for her life, remainder to *O* if *O* is living, and if not, to Daughter or Daughter's estate. At *O*'s death at age seventy-eight, the trust principal is worth $1 million, *W* is age eighty-one, and Daughter is age sixty.

At the time of the grant, *O* transferred (1) a life estate to *W*, and (2) a contingent remainder to Daughter.[114] For each interest, we ask: Can

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[110] I.R.C. § 2033.

[111] *See* Treas. Reg. § 20.2037-1(e), ex. 1 (1958).

[112] *See* Treas. Reg. § 20.2031-7(d)(2)(ii) ("If the interest to be valued is to take effect after a definite number of years or after the death of one individual, the present value of the interest is computed by multiplying the value of the property by the appropriate remainder interest actuarial factor (that corresponds to the applicable section 7520 interest rate and remainder interest period) in Table B (for a term certain) or the appropriate Table S (for one measuring life), as the case may be."); Treas. Reg. § 20.2031-7(d)(5), ex. 1.

[113] Code section 7520 states:

> [T]he value of any annuity, any interest for life or a term of years, or any remainder or reversionary interest shall be determined—(1) under tables prescribed by the Secretary [of the Treasury], and (2) by using an interest rate (rounded to the nearest 2/10ths of 1 percent) equal to 120 percent of the Federal midterm rate in effect under section 1274(d)(1) for the month in which the valuation date falls.

I.R.C. § 7520. The referenced rate is called the "Section 7520 rate" and is published monthly by the Service. The Treasury Regulations publish Table S "Single Life Remainder Factors." *See* Treas. Reg. § 20.2031-7(d). For age eighty-one and 6%, Table S provides a remainder factor of .65933. *See id.* For all valuations made in this article, a section 7520 rate of 6% was used.

[114] *See* DOBRIS, STERK & LESLIE, *supra* note 1, at 788 (citing JOHN CHIPMAN GRAY, THE RULE AGAINST PERPETUITIES § 108 (4th ed. 1942)).

possession of the property be obtained *only* by surviving *O*? First, can *W* obtain possession under *W*'s life estate only by surviving *O*? No. Second, can Daughter obtain possession under Daughter's contingent remainder only by surviving *O*? Yes. Therefore, Daughter's contingent remainder is a section-2037-triggering interest. Next, we value *O*'s reversion as of the moment immediately before his death and without regard to the fact of the decedent's death.[115] If that value exceeds five percent of the value of the trust corpus,[116] then the value of Daughter's contingent remainder as of the moment immediately after *O*'s death is includible in *O*'s federal gross estate.[117] That "immediately after" value is the value of the trust corpus less the value of *W*'s life estate, both valued as of the moment immediately after *O*'s death.[118]

Case 2 is taken from example 3 of Treasury Regulation section 20.2037-l(e), and the paragraph above includes the entire analysis set forth in the Regulation.[119] Missing is any description of how to value the decedent's reversionary interest immediately before his death. We are only told that if such value exceeds 5%, then Code section 2037 causes an inclusion in decedent's federal gross estate. To fill in the details, and particularly to decide how to value *O*'s reversion, we must employ elements of probability theory.

Examining the property interests created in Case 2, we see that when *W*'s life estate ends (at *W*'s death), one of two possibilities will occur: the property will pass to *O* if *O* is living or to Daughter or Daughter's

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[115] *See* I.R.C. § 2037(b)(2). *See* Treas. Reg. § 20.2037-1(c)(3) (1958) ("The value is ascertained in accordance with recognized valuation principles for determining the value for estate tax purposes of future or conditional interests in property. (*See* § 20.2031–1, 20.2031–7, and 20.2031–9)."). The noted Code-section-2031-valuation provisions reference IRS PUBLICATION 1457, ACTUARIAL VALUES, BOOK ALEPH (July 1999), *available at* http://www.irs.gov/pub/irs-pdf/p1457_99.pdf. *See* Treas. Reg. § 20-2031-7(d)(4) (2000).

[116] *See* Treas. Reg. § 20.2037-1(c)(4) (1958) ("For example, assume that the decedent, *A*, transferred property in trust with the income payable to *B* for life and with the remainder payable to *C* if *A* predeceases *B*, but with the property to revert to *A* if *B* predeceases *A*. Assume further that *A* does, in fact, predecease *B*. The value of *A*'s reversionary interest immediately before his death is compared with the value of the trust corpus, without deduction of the value of B's outstanding life estate.").

[117] *See id.* § 20.2037-1(e), ex. 4 (1958).

[118] As determined in Case 1, the value of the remainder after *W*'s life estate is $660,000, so Code section 2037 includes $660,000 in *O*'s federal gross estate in Case 2.

[119] *See* Treas. Reg. § 20.2037-1(e), ex. 4 (1958).

successors if *O* does not survive *W*.[120] Numerous points become clear:
First, from case 1 we know that when *W* is age eighty-one, the value of a
remainder in $1 million of property after *W*'s life estate is $660,000.
Second, when *W* is alive and *O* is alive, ownership of the remainder is
split between *O* and Daughter. Third, when *O* is alive and *W* is alive, the
value of *O*'s interest in the remainder equals the remainder's value
($660,000) multiplied by the probability that *O* will survive *W*, and the
value of Daughter's interest equals the remainder's value multiplied by
the probability that *O* will not survive *W*. Fourth, we can calculate the
probability that *O* will survive *W* using life contingency actuarial
mathematics and mortality data published by the Service.[121] Using those
mathematics and that data, the probability that *O*, age seventy-eight, will
survive *W*, age eighty-one, equals 0.57.[122] Fifth, the value of the dece-
dent's reversionary interest immediately before his death equals the
remainder value times the probability that *O* will survive *W*, or, as we
now know those figures, $660,000 multiplied by 0.57, which equals
$376,200. Sixth, the value of *O*'s reversion immediately before his death
($376,200) exceeds 5% of the value of the property at *O*'s death
($50,000 = $1,000,000 times 0.05). Seventh, because the 5% amount has
been exceeded, Code section 2037 includes the value of the section-
2037-triggering interest determined immediately after *O*'s death.[123] The
section-2037-triggering interest is Daughter's contingent remainder, and
after *O*'s death, Daughter's contingent remainder becomes an indefeasi-
bly vested remainder worth $660,000.

The amount included under Code section 2037 is the value of the
section-2037-triggering interest valued immediately after *O*'s death

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[120] That, of course, assumes the inapplicability of the doctrine of destructibility of
contingent remainders, which is true of virtually all states in the United States. *See*
Gallanis, *supra* note 31, at 530–32. If the destructibility doctrine applied, we would have
to consider a third possibility—that Daughter's contingent remainder was destroyed in
the period between the grant and *W*'s death, in which case, *O*'s reversion would take
effect in possession.

[121] *See* IRS PUBLICATION 1457, ACTUARIAL VALUES, BOOK ALEPH 866 (July 1999),
available at http://www.irs.gov/pub/irs-pdf/p1457_99.pdf, which includes a mortality
table labeled "Table 90CM." Using that table and life contingency actuarial mathematics,
we can calculate the probability that one individual will survive another. Appendix A of
this article describes the method.

[122] Using the method described in Appendix A, the probability that *y* age 81
survives *x* age 78 is .43, rounded to two significant figures. The probability that *x* age 78
survives *y* age 81 is 1 -.43 = .57. *See infra* Appendix A.

[123] *See* Treas. Reg. § 20.2037-1(e), ex. 4 (1958).

($660,000); it is not the value of *O*'s *reversion* immediately before *O*'s death ($376,200), as the latter value is relevant only in applying the 5% threshold test. Code section 2037 therefore always includes an amount greater than the value of *O*'s reversion immediately before *O*'s death.[124] Note that in Case 2, Code section 2037 includes $660,000 in *O*'s federal gross estate, which is identical to the amount that Code section 2033 includes in *O*'s federal gross estate in Case 1.

Comparing Cases 1 and 2 shows that the amount included in *O*'s federal gross estate is identical in both cases ($660,000), which demonstrates that Code section 2037 is, at its core, an anti-avoidance provision. In Case 1, when *O* retains a reversion that is a remainder following his wife's life estate, and *O* dies while *W* is alive, *O*'s federal gross estate includes the value of the remainder (calculated based on *W*'s age at *O*'s death). If *O* merely adds the words "if living" to his reversion, and thereby makes his possession under the reversion contingent upon *O*'s surviving *W*, Code section 2033 would include nothing in *O*'s estate;[125]

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[124] To calculate the value of *O*'s reversion immediately before *O*'s death, we calculate the present value of the *thing* that *O* will receive if he survives and multiply it by the probability that *O* survives. A probability always is less than 1. Thus, the before-*O*'s-death value of *O*'s reversion always is less than the value of *thing*, because the value of *thing* has been multiplied by a number less than one.

The section-2037-triggering interest names who takes *thing* if *O* does *not* survive. Before *O*'s death the value of the section-2037-triggering interest equals the value of *thing* times the probability that *O* will *not* survive. *After* *O*'s death, the value of the section-2037-triggering interest is the value of *thing* (undiminished by survival probabilities because we now know that *O* did not survive). Hence, the value of *thing*, which is the section 2037 inclusion amount, always exceeds the value of *O*'s reversion— calculated immediately before *O*'s death—because that value is the value of *thing* times a number less than one. Therefore, when section 2037 causes an inclusion, section 2037 always includes an amount greater than the value of *O*'s reversion immediately before *O*'s death.

To put it another way, when both are valued before *O*'s death, the value of *O*'s reversion plus the value of the triggering interest equals the value of *thing* (the proportion between them being precisely the probability of *O*'s survival). After *O*'s death, the value of *O*'s reversion is zero and the value of the triggering interest is the value of *thing*. The value of *O*'s reversion before death is always less than the value of *thing*; the section 2037 inclusion amount always is the value of *thing*; the former always is less than the latter.

[125] *See* Rev. Rul. 55-438, 1955-2 C.B. 601.

Code section 2037 obviates this obvious estate tax avoidance technique by rendering identical results in Cases 1 and 2.[126]

From a non-estate-tax perspective, Cases 1 and 2 are identical. In Case 2, *O* has described in one conveyance—the trust—who will possess his reversion if he fails to survive *W*; in Case 1, *O* has described in two documents—the trust instrument creating his reversion and a will devising it—to whom his reversion goes. Cases 1 and 2 ought to be taxed identically, and they are, subject to the five percent *de minimis* rule in Code section 2037.

A. A Four-Step Method to Analyze Section-2037 Situations

Observations from Cases 1 and 2 permit the development of a four-step method to analyze section-2037 situations:

Step One. Examine all transfers made by decedent (O) and classify all interests created by such transfers.

Step Two. With respect to each interest, determine whether possession of the property to which the interest relates can be obtained only by surviving O. Any such interest triggers application of Code section 2037 and can be called a section-2037-triggering interest. Multiple section-2037-triggering interests can exist within a single transfer.

Step Three. If section 2037 is triggered, value O's reversion as it existed immediately before O's death and determine if that value exceeds five percent of the value of the trust corpus immediately before O's death. Remember that *O*'s reversion is a separate property interest from the section-2037-triggering interest. Probability theory must be used because *O*'s reversionary interest immediately before *O*'s death necessarily will be contingent on *O*'s survival, for that is what triggers Code section 2037. In addition, time value of money concepts nearly always will be required. If the value of *O*'s reversionary interest exceeds five percent of the value of the trust corpus immediately before *O*'s death, go to Step Four; if not, stop, for there is no section-2037 inclusion.

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[126] Note that the results in Cases 1 and 2 would *not* be identical if the value of *O*'s reversionary interest immediately before his death was less than 5% of the trust corpus. In that case, nothing would be included in *O*'s federal gross estate pursuant to section 2037. The comparison illustrates that while Code section 2037 has a 5% *de minimis* rule, Code section 2033 does not. Case 5 *infra* illustrates a situation in which the value of a reversionary interest valued immediately before death is less than 5% of the trust corpus.

Step Four. Value the section-2037-triggering interests as they exist immediately after O's death and include that value in O's federal gross estate. The section-2037-triggering interest(s) were determined in Step Two.

While probability theory must be considered in Step Four, as it must in Step Three, one probability term will drop out of the valuation process in Step Four as compared to Step Three. In Step Three, the value of O's reversion immediately before O's death will necessarily reflect the probability of O's survival; however, in Step Four, when valuing the section-2037-triggering interests immediately after O's death, O's death has occurred so the value of those triggering interests at that time no longer is reduced by the possibility that O might survive and thereby cause the triggering interests to fail.

For instance, in Case 2 the 57% probability that O would survive W (calculated immediately before O's death) is used to value O's reversion immediately before O's death and to value the contingent remainder in Daughter immediately before O's death. Thus, while Daughter's future interest was worth 43% of the remainder immediately before O's death, it is worth 100% of the remainder when valued after O's death, and it is the after-death amount that is included in O's gross estate. That is, after O's death, the divesting condition to which Daughter's future interest was subject has ended. After O's death, the remainder in Daughter is indefeasibly vested, and its value then is the full value of the remainder following W's life estate.

Case 2 illustrates that probability theory and life contingency actuarial mathematics are central to the calculations required under Code sections 2033 and 2037. Surprisingly, no case law, administrative pronouncement, or commentary instructs people how to make such calculations. This Article fills that gap, and begins by generally explaining probability theory and life contingency actuarial mathematics.

B.	Probability Theory and Life Contingency Actuarial Mathematics

This Article focuses on inclusion of the value of a reversion in a decedent's federal gross estate, both when the decedent's reversion extinguishes at death and passes under the instrument creating the reversion (Code section 2037), and when the reversion remains extant at death and passes under the decedent's will or intestacy (Code section 2033). The valuation of a reversion under Code section 2033 nearly always depends upon calculating the probability that persons survive each other, and the valuation of a reversion under Code section 2037 valuations always

depend upon the probability that the decedent survives another person. Thus, determining the probability that one person will survive another is vital to valuations required under these two sections. Existing administrative pronouncements treat the matter as opaque—determinable only by special request to the Service.[127]

Determining how to value interests conditioned on survival, while perhaps not obvious, is not opaque. The estate valuation provisions of the Treasury Regulations require use of Table 90CM to value all interests dependent upon the termination of a life interest.[128] Table 90CM is published in the Treasury Regulations and is a life table based on the 1990 United States Census.[129] The Treasury Regulations also refer the

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[127] Rev. Rul. 76-178, 1976-1 C.B. 273, squarely addresses valuation of a reversion under Code section 2037 and summarily concludes:

> The decedent's reversionary interest is described as the present worth of the right of the decedent (a male aged 88) to receive $100,000 upon the death of *A* (a female aged 88), provided the decedent survives. The actuarial factor representing this described reversionary interest is 0.43194. (This factor cannot be found in the tables contained in section 20.2031-10(f) of the regulations. Rather, it is a special factor that will be computed by the National Office upon submission of the information specified in section 20.2031-10(f) of the regulations.)

The examples in the Treasury Regulations under Code section 2037 are even less helpful. They merely restate the rule of the statute, without an explanation of how to make the calculation. *See* Treas. Reg. § 20.2037-1(e), ex. 3 (1958) ("[i]f the decedent's reversionary interest immediately before his death exceeded 5 percent of the value of the property, the value of the property, less the value of the wife's outstanding life estate, is includible in the decedent's gross estate.").

[128] Treas. Reg. § 20.2031-7(d)(7) (2000). During the printing of this Article, the Treasury Regulations were amended "to reflect the most recent mortality experience available," as required by 26 U.S.C. § 7520(d)(3), and such mortality data now is contained in Table 2000 CM. Treas. Reg. § 20.2031-7T(d)(7) (2009); s*ee* T.D. 9448, 2009-20 I.R.B. 942 (May 7, 2009), which is the Treasury Decision publishing the amendments to the regulations. The Table 2000 CM data is effective for valuation dates on or after May 1, 2009. *See* Treas. Reg. § 20-2031-7T(c) (2009). While the May 2009 amendments make changes to factors in tables, they make no substantive change to the examples or to the valuation mechanisms. Consequently, the examples in the text refer to Table 90 CM data; however, all valuation mechanisms remain valid. For later valuation dates on or after May 1, 2009, simply substitute the values from the revised tables.

[129] *See* Treas. Reg. 20.7520-1(b)(2) (2000); *see* Treas. Reg. § 20.7520-1T(b)(2) (2009) (requiring Table 2000 CM for valuation dates on or after May 1, 2009). A life table is not constructed by observing 100,000 babies until the last survivor dies. Rather, it is based on estimates of death rates derived from the experience of the entire United States population in the years around the 1990 census. *See* NEWTON L. BOWERS, JR.,

reader to Internal Revenue Service Publication 1457 (which includes hundreds of pages of remainder factors), and those regulations indicate that Publication 1457 includes examples illustrating how to compute "many special factors for more unusual situations."[130] Among other things, the examples in Publication 1457 demonstrate how to use Table 90CM to calculate the probability that a person will survive a period of time,[131] but no example in Publication 1457 shows how to calculate the probability that one person will survive another person.

The Treasury Regulations state that when the Regulations are silent as to an actuarial method, the reader should contact the Service:

> If a special factor is required in the case of an actual decedent, the Internal Revenue Service may furnish the factor to the executor upon a request for a ruling. The request for a ruling must be accompanied by a recitation of the facts including a statement of the date of birth for each measuring life, the date of the decedent's death, any other applicable dates, and a copy of the will, trust, or other relevant documents. A request for a ruling must comply with the instructions for requesting a ruling published periodically in the Internal Revenue Bulletin (see §§ 601.201 and 601.601(d)(2)(ii)(b) of this chapter) and include payment of the required user fee.[132]

Obviously, in planning situations—those not involving an actual decedent—a request to the Service is not possible. Opacity is unwelcome here, and the planning lawyer should be able to resort to something other than hiring experts or waiting for an "actual decedent" before requesting a ruling from the Service.

HANS U. GERBER, JAMES C. HICKMAN, DONALD A. JONES, CECIL J. NESBITT, ACTUARIAL MATHEMATICS 59 (2d ed. 1997).

[130] Treas. Reg. § 20.2031-7(d)(4) (2000); Treas. Reg. § 20.2031-7T(d)(4) (2009).

[131] *See* IRS Publication 1457 *Actuarial Values Book Aleph* at vii, example 13 (Rev. 7-1999). "The probability that a person age 21 will be alive at age 30 is 0.988261 [sic], determined as follows: l_x value, Table 90CM, page 866, age 30 = 97070[;] l_x value, Table 90CM, age 21 = 98113[;] Required probability = 97070 ÷ 98113 = 0.98937." You will note the typographical error: 0.988261 should be 0.98937. Publication 1457 was updated in May 2009 to reflect Table 2000 CM data. The valuation mechanism remained identical. The typographical error was not repeated. *See* IRS Publication 1457 *Actuarial Valuations Version 3A* at 10, example 13 (Rev. 5-2009).

[132] Treas. Reg. § 20.2031-7(d)(4) (2000); *See* Treas. Reg. § 20.2031-7T(d)(4) (2009).

Fortunately, actuarial mathematics are available to provide a formula for the solution, notwithstanding the absence of discussion of actuarial mathematics in the relevant bodies of law and legal literature. The algorithm for the solution involves thousands of multiplications of five digit numbers, which at one time was tedious. Today, readily available spreadsheet programs can easily make the calculations. The precise procedure for calculating the probability that *y* survives *x* is provided in Appendix A to this article.

C. Cases to Demonstrate the Four-Step Method to Analyze Section-2037-Situations

> *Case 3*. The decedent transferred property in trust with the income payable to his wife for life and with the remainder payable to his son or, if the son is not living at the wife's death, to the decedent or, if the decedent is not then living, to *X* or *X*'s estate. Assume that the decedent was survived by his wife, his son, and *X*.[133]

Case 3 is example 4 of Treasury Regulations Section 20.2037-1(e). The Regulation provides the following answer:

> Only *X* cannot obtain possession or enjoyment of the property without surviving the decedent. Therefore, *if* the decedent's reversion immediately before his death exceeded 5 percent of the value of the property, the value of *X*'s remainder interest (with reference to the time immediately after the decedent's death) is includible in the decedent's gross estate.[134]

The Regulation does not attempt to describe in words, much less in calculations, how one calculates either the "immediately before" value of the reversion or the "immediately after" value of the section-2037-triggering interest. I will analyze Case 3 using the four-step method developed in this article, adding some property values and ages to permit numeric calculations, and call it Case 4:

> Case 4. *O*, while living, transfers $750,000 to an irrevocable trust to pay income to *W* for life, remainder to Son, if living, and if not, to *O*, if living, and if not, to *X*

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[133] Treas. Reg. § 20.2037-1(e), ex. 4 (1958).

[134] *Id.* (emphasis added).

or *X*'s estate. At *O*'s death at age seventy-eight, the trust
property is worth $1 million, *W* is age eighty-one, and
Son is age sixty.

Step One. Examine all transfers made by a decedent (O) and classify all interests created by such transfers.

At the grant, *O* created a life estate in *W*, a contingent remainder in Son, and a contingent remainder in *X*.

Step Two. With respect to each interest, determine whether possession of the property to which the interest relates can be obtained only by surviving O.

Can *W* obtain possession under her life estate only by surviving the decedent? No, *W* obtained possession upon the transfer.

Can Son obtain possession under his contingent remainder only by surviving the decedent? No, Son's contingent remainder can take effect in possession while *O* is alive. If Son survives *W*, and *O* is alive, Son's contingent remainder nonetheless takes effect in possession.

Can *X* obtain possession under *X*'s contingent remainder only by surviving the decedent? Yes. There is no way for *X*'s contingent remainder to take effect in possession other than by surviving *O*. Therefore, *X*'s contingent remainder is a section-2037-triggering interest.

Step Three. If section 2037 is triggered, value O's reversion as it existed immediately before O's death and determine if that value exceeds five percent of the value of the trust corpus immediately before O's death.

Immediately before *O*'s death, the remainder is worth $660,000 (because *W* is age eighty-one) and that remainder is split into three pieces. On *W*'s death, (i) Son takes if living, (ii) *O* takes if Son is dead and *O* is living, and (iii) *X* takes if Son is dead and *O* is dead.

We can value each piece as follows: (Note that the only value relevant to Code section 2037's application is *O*'s reversion; however, for completeness, all three are valued.)

Piece One: Immediately before *O*'s death, Son's contingent remainder is worth $660,000 multiplied by the probability that Son survives *W*. That probability is 0.86,[135] so Son's remainder is worth $567,600.

Piece Two: Immediately before *O*'s, death *O*'s reversion is worth $660,000 multiplied by the probability that *W* survives Son multiplied by

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[135] Under the method described in Appendix A, the probability that a person age sixty survives a person age eighty-one is 0.86.

the probability that O survives W.[136] The first probability is 0.14 and the second probability is 0.57.[137] Thus, O's reversion is worth $52,668 ($660,000 times 0.14 times 0.57).

Piece Three: Immediately before O's death, X's contingent remainder is worth $660,000 multiplied by the probability that W survives Son multiplied by the probability that W survives O, or $39,732 ($660,000 times 0.14 times 0.43).[138]

The value of the trust property at O's death is $1 million, and 5% of that amount is $50,000. Accordingly, the value of O's reversion ($52,668) exceeds the 5% threshold, and an inclusion under Code section 2037 will occur.

Step Four. Value the section-2037-triggering interests as they exist immediately after O's death and include that value in O's federal gross estate.

The only section-2037-triggering interest is X's contingent remainder interest. Immediately after O's death, X's remainder is contingent only on W surviving Son. (Prior to O's death, X's remainder was contingent on W surviving both Son and O. The latter contingency was removed by O's death). After O's death, the value of X's contingent remainder equals the value of the remainder after W's life estate multiplied by the probability that W will survive Son. That probability is 0.14, and the amount included in O's federal gross estate under section 2037 is $92,400 ($660,000 times 0.14).

Some observations on the valuation mechanism in Case 4.

For the values determined with reference to the time immediately before O's death, the $660,000 remainder value is split into three pieces with values of $567,600; $52,668; and $39,732. Because piece two (O's reversion) exceeds 5% of the value of the trust at O's death, Step Four

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[136] *See* ALLAN G. BLUMAN, PROBABILITY DEMYSTIFIED 58 (2005) (Multiplication Rule I).

[137] Under the method described in Appendix A, the probability that a person age eighty-one survives a person age sixty is 0.14; and the probability that a person age seventy-eight survives a person age eighty-one is 0.57.

[138] Careful observation reveals that the amount included in Step Four is identical to the amount calculated in the first step of Step Three. That is, immediately before O's death, O's reversion is worth what he would get—a remainder after W's life estate— multiplied by the probability that he would get it. In Step Four, that probability is eliminated, so the value passing under the section-2037-triggering interest is the value of the remainder. Simply put, Step Three discounts O's reversion by the probability of O's surviving; Step Four does not consider it because we are valuing the section-2037-triggering interest after O has died.

provides that Code section 2037 includes the value of pieces *two* and *three*. That again shows that when Code section 2037 applies, it includes an amount greater than the value of *O*'s reversion immediately before death, but the amount included is identical to what Code section 2033 would have included had *O*'s reversion not been contingent on *O*'s survival. Thus, the equality of treatment of identical transactions is preserved (provided, of course, the value of piece two exceeds the 5% threshold).

One final case to demonstrate all the points of a Code-section-2037 analysis:

> Case 5. *O*, while living, transfers $750,000 to an irrevocable trust to pay income to *W* for life, remainder to Son, if living, and if not, to Nephew, if living, and if not, to *O*, if living, and if not, to *X* or *X*'s estate. At *O*'s death at age seventy-eight, the trust property is worth $1 million. *W* is age eighty-one, Son is age sixty, and Nephew is age fifty.

Step One. Examine all transfers made by decedent (O) and classify all interests created by such transfers.

At the grant, *O* created a life estate in *W*, a contingent remainder in Son, a contingent remainder in Nephew, and a contingent remainder in *X*.

Step Two. With respect to each interest, determine whether possession of the property to which the interest relates can be obtained only by surviving O.

X's contingent remainder is a section-2037-triggering interest because possession under that interest can be obtained only by surviving *O*. The same is not true with respect to the other interests. *W*'s life estate, Son's contingent remainder, and Nephew's contingent remainder can generate a right to present possession of the trust property while *O* is alive.

Step Three. If section 2037 is triggered, value O's reversion as it existed immediately before O's death and determine if that value exceeds five percent of the value of the trust corpus immediately before O's death.

Immediately before *O*'s death, the remainder is worth $660,000 and that remainder is split into four pieces because on *W*'s death: (i) Son takes if living; (ii) Nephew takes if Son is dead, and Nephew is living; (iii) *O* takes if Son is dead, Nephew is dead, and *O* is living; and (iv) *X* takes if Son is dead, Nephew is dead, and *O* is dead.

Piece One: Immediately before *O*'s death, Son's contingent remainder is worth $660,000 multiplied by the probability that Son, age sixty, survives *W*, age eighty-one. Son's remainder is worth $567,600 ($660,000 times 0.86).

Piece Two: Immediately before *O*'s death, Nephew's contingent remainder is worth $660,000 multiplied by the probability that *W*, age eighty-one, survives Son, age sixty, multiplied by the probability that Nephew, age fifty, survives *W*, age eighty-one. Nephew's remainder is worth $86,856 ($660,000 times 0.14 times 0.94).

Piece Three: Immediately before *O*'s death, *O*'s reversion is worth $660,000 multiplied by the probability that *W*, age eighty-one, survives Son, age sixty, multiplied by the probability that *W*, age eighty-one, survives Nephew, age fifty, multiplied by the probability that *O*, age seventy-eight, survives *W*, age eighty-one. *O*'s reversion is worth $3,160 ($660,000 times 0.14 times 0.06 times 0.57).

Piece Four. Immediately before *O*'s death, *X*'s contingent remainder is worth $660,000 multiplied by the probability that *W*, age eighty-one survives Son, age sixty, multiplied by the probability that *W*, age eighty-one, survives Nephew, age fifty, multiplied by the probability that *W*, age eighty-one, survives *O*, age seventy-eight. *O*'s reversion is worth $2,384 ($660,000 times 0.14 times 0.06 times 0.43).

The value of the trust property at *O*'s death is $1 million, and 5% of that amount is $50,000. The 5% value is not exceeded, and no inclusion under Code section 2037 occurs.

Step Four. Value the section-2037-triggering interests as they exist immediately after O's death and include that value in O's federal gross estate.

Step Four is not necessary because the 5% threshold was not exceeded.

Observations on Case 5.

Here is a tabular summary of the values of the future interests immediately before *O*'s death:

Piece Number	Future Interest Owner	Multiplication Terms for Valuing the Future Interest	Future Interest Value
One	Son	$660,000 * 0.86	$567,600
Two	Nephew	$660,000 * 0.14 * 0.94	$86,856
Three	*O*	$660,000 * 0.14 * 0.06 * 0.57	$3,160
Four	*X*	$660,000 * 0.14 * 0.06 * 0.43	$2,384

Probability theory divides the interests in a manner akin to the flow of liquid in a pipe or of sap in a tree, and such a division often is called a probability tree.[139] Piece one has an 86% probability of capturing the total remainder, and the remaining 14% probability continues on. Piece two has a 94% probability of capturing that remaining 14% piece (a 13.2% probability of capturing the total remainder), and the remaining 6% probability of capturing that 14% piece continues on (0.84% of the total remainder). Piece three has a 57% chance of capturing that 0.84% and piece four has a 43% chance. Thus, piece three is 0.48% of the total remainder and piece four is 0.36% of the total remainder.

Notice that if the 5% threshold for Code section 2037 had been exceeded in Case 5, the amount included under Code section 2037 would have been $5,544, which is the value of X's contingent remainder valued after O's death ($660,000 * 0.14 * .06$), and is the value of pieces three *and* four. $5,544 is also the amount that would have been included under Code section 2033 if O had not made his reversion contingent on his survival. Thus, we see that Code section 2037 includes zero while the analogous Code-section-2033 transaction would have included $5,544. Thus, the 5% rule of Code section 2037 breaks the equality of treatment.

Lastly, suppose Case 5 were an irrevocable transfer to trust by O to pay income to W for life, remainder to Son if living, and if not, to Nephew. Next, suppose that a NICS-rule–reversal reform occurs that requires Nephew to survive to take possession, but the reform does not negate the transferor's reversion. When O dies under the same assumed facts—on O's death at age seventy-eight, the trust property is worth $1 million, W is age eighty-one, Son is age sixty, and Nephew is age fifty— $5,544 must be included in O's federal gross estate under Code section 2033, calculated as above. This result demonstrates that inartful NICS-rule–reversal reforms lay a trap for the unwary. While such dispositions no longer result in a draconian inclusion amount as in *Spiegel*; they do

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[139] When a liquid flows in a pipe or sap in a tree, whenever a branch occurs, the flow divides into parts that are not necessarily equal. Further branching similarly divides the already divided flow. Thus, for any branch the aggregate sum of downstream flows equals the amount coming from that branch, assuming that the liquid is neither created, destroyed, nor added. Such is the case here. Future interests are divided and then divided again, and the aggregate value of downstream divisions equals the upstream value. Probability analysis diagrams these as probability trees. *See, e.g.*, CHARLES M. GRINSTEAD & J. LAURIE SNELL, INTRODUCTION TO PROBABILITY 24-25 (2d. rev. ed. 2006), *available at* http://math.dartmouth.edu/~prob/prob/prob.pdf.

result in some inclusion and they require complicated actuarial computations.[140]

D. How Does the Four-Step Method to Analyze Section-2037 Situations Comport with Published Authorities?

In its only meaningful ruling on the question, the Service describes in words how Code-section-2037 operates, but does not show the calculations. In Revenue Ruling 76-178,[141] *D* transferred Blackacre to *A* for life, remainder to *D* if living, and if not, then to *C* or *C*'s estate. (This is the same scenario as our Case 2.) At *D*'s death, Blackacre was worth $100,000, *D* was male and age eighty-eight, *A* was female and age eighty-eight, and *C* was alive. The ruling describes the valuation as follows:

> The decedent's [*D*'s] reversionary interest is described as the present worth of the right of the decedent (a male aged 88) to receive $100,000 upon the death of *A* (a female aged 88), provided the decedent survives. The actuarial factor representing this described reversionary interest is 0.43194. (This factor cannot be found in the tables contained in section 20.2031-10(f) of the regulations. Rather, it is a special factor that will be computed by the National Office upon submission of the information specified in section 20.2031-10(f) of the regulations.)[142]

Revenue Ruling 76-178 makes Code-section-2037 calculations opaque. A Code-section-2037 calculation will always involve the probability that the decedent survive some person, event, or time period but the published materials account only for the last of those three situations—the probability that decedent will survive for some period.[143] Opacity is unwelcome here. To illustrate Code section 2037's application to situations in which the decedent must survive some person, the four-step section-2037 evaluation method developed herein is applied to Revenue Ruling 76-178 below.

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[140] *See Estate of Speigel v. Comm'r*, 355 U.S. 701 (1949); *supra* text accompanying notes 12–22.

[141] 1976-1 C.B. 273.

[142] *Id.* at 274.

[143] *See supra* note 131.

Step One. Examine all transfers made by decedent (O) and classify all interests created by such transfers.

   D created a life estate in *A* and a contingent remainder in *C* or *C*'s estate and a reversion in *D*.

Step Two. With respect to each interest, determine whether possession of the property to which the interest relates can be obtained only by surviving O.

   The section-2037-triggering interest is the contingent remainder in *C* or *C*'s estate.

Step Three. If section 2037 is triggered, value O's reversion as it existed immediately before O's death and determine if that value exceeds five percent of the value of the trust corpus immediately before O's death.

   Immediately before *D*'s death, *D* owned a remainder if he survived *A*. The remainder factor for a remainder following a female life tenant age eighty-eight was 0.81569.[144] Thus, at *D*'s death the remainder was worth $81,569,[145] but we must multiply that value by the probability that a male age eighty-eight would survive a female age eighty-eight. The ruling does not provide the probability or any description of the manner of calculating the value of *D*'s reversion, but merely states "[t]he actuarial factor representing this described reversionary interest is

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[144] *See* Rev. Rul. 76–178, 1976-1 C.B. 274. "[I]f the valuation date of the decedent's gross estate is after December 31, 1970, and before December 1, 1983, the present value of annuities, life estates, terms of years, remainders, and reversions is their present value determined under [Treasury Regulations Section 20.2031-7A (2000)]". *See* Treas. Reg. § 20.2031-7A(c) (as amended 2000):

> If the valuation of the interest involved is dependent upon the continuation of or termination of one or more lives or upon a term certain concurrent with one or more lives, the factor for the present value is computed on the basis of interest at the rate of 6 percent a year, compounded annually, and life contingencies are determined as to each male and female life involved, from values that are set forth in Table LN. Table LN contains values that are taken from the life table for total males and the life table for total females appearing as Tables 2 and 3, respectively, in United States Life Tables: 1959–1960, published by the Department of Health and Human Services, Public Health Service. Table LN and related factors are set forth in former § 20.2031–10 (as contained in the 26 CFR part 20 edition revised as of April 1, 1994).

[145] *See* Rev. Rul. 76–178, 1976–1 C.B. 274.

0.43194."[146] Analytically, this actuarial factor should be the remainder factor multiplied by the probability that *D* survives *A*.

Because the value of *D*'s reversion exceeds 43% of the trust principal, that value exceeds 5%, and we proceed to Step Four.

Step Four. Value the section-2037-triggering interests as they exist immediately after O's death and include that value in O's federal gross estate.

Code section 2037 includes the value of remainder, which the ruling tells us is 0.81569 times $100,000, or $81,569.[147] (But we already know that—we can read it from Table S in effect for 1976.)

Notice that the result of Step Three is equal to the remainder value multiplied by a probability, and the result of Step Four is the remainder value. The ruling gives us the result of Step Three as 0.43194,[148] and from that we can infer the probability. The probability a male age eighty-eight would survive a female age eighty-eight is equal to Step Three divided by Step Four, or 0.43194 ÷ 0.81569, or 53%. Thus, we infer from Revenue Ruling 76-178 that under mortality data used for actuarial valuations in 1976, the probability that a male age eighty-eight would survive a female age eighty-eight is 53%. That seems odd. With sexed mortality tables, as were apparently used in 1976, one would expect that the probability that a male of one age would survive a female of same age would be less than 50%. Today, with unsexed mortality tables, the probability that one eighty-eight year old would survive another is 50%.

Thus, the Four-Step Method to Analyze Section-2037 Situations developed in this Article is consistent with Revenue Ruling 76-178, with the possible exception of the unknown manner in which the survival probability was determined in Step Three. Again opacity here is unwelcome, and the Service ought to have indicated how it determined the factor in Step Three and how it determined the probability that a male age eighty-eight would survive a female age eighty-eight. The fact that my four-step method to analyze section-2037 situations might not precisely comport with Revenue Ruling 76-178 does not especially trouble me. I have explained mine by reference to probability theory and life contingency actuarial mathematics. The Service has not. In addition, in a federal district court case the probability that one person survives

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[146] *Id.*

[147] *See id.*

[148] *See id.*

another was relevant in determining rights in a tax foreclosure action.[149] An expert from the Service first filed a declaration stating a probability, but did not show a calculation method.[150] Later, the agent filed another declaration providing a calculation method that the federal district judge described as "indecipherable."[151] In this Article, I have explained life contingency actuarial mathematics and provided a calculation method that is decipherable.

VII.   CONCLUSION

Let us return to the first future interest presented in this Article: *O*'s transfer of Blackacre to *A* for life then to *B*. Because a trust is not involved, the NICS rule applies virtually everywhere (even in jurisdictions adopting UPC section 2-707); *O* has made a competed gift of *O*'s entire interest in Blackacre to which a gift tax applies; *A* has a life estate; *B* has an indefeasibly vested remainder; *O* does not have a reversion, and when *O* dies nothing is included in *O*'s federal gross estate.[152]

Now suppose *O* transfers Blackacre to *T* as trustee to pay income to *A* for life, and then pay the trust property to *B*. In a jurisdiction in which the NICS rule continues to apply, the results are the same as in the prior paragraph.

In a jurisdiction in which UPC section 2-707 applies, *O* has made a completed gift of her entire interest in Blackacre to which a gift tax applies; *A* has a life estate; *B* has a contingent remainder (*B* takes if *B* survives *A*); *B*'s descendants have a contingent remainder (*B*'s descendants who survive *A* take if *B* predeceases *A*); and *O*'s heirs have a contingent remainder (*O*'s heirs determined at *A*'s death take if *B* predeceases *A* and none of *B*'s descendants survive *A*); *O* does not have a reversion, and when *O* dies nothing is included in *O*'s federal gross estate.

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[149] *See* United States v. Ryan, No. 04-0531-CV-W-GAF, 2005 WL 1429760, at *4 (W.D. Mo. June 16, 2005).

[150] *See id.*

[151] *Id.* A month later, the court obviated the probability determination issue (the probability that husband would survive wife) by deciding that for purposes of foreclosing a tax lien against one spouse, while both spouses are alive, the spouses had equal rights in tenants-by-the-entireties property regardless of their probabilities of surviving each other. *See* United States v. Ryan, No. 04-0531-CV-W-GAF, 2005 WL 6153137, at *3 (W.D. Mo. July 19, 2005).

[152] Code section 2035(b) would include in *O*'s federal gross estate the gift tax paid on the transfer if *O* dies less than three years after making the gift. *See* I.R.C. § 2035(b).

In a jurisdiction that, by common law decision or by statute, has reversed the NICS rule, but does not create a substitute gift or apply the NICS rule reversal to *O*'s reversion, *O*'s gift is partially incomplete. *A* has a life estate; *B* has a contingent remainder (*B* takes if *B* survives *A*); *O* has a reversion, and if *O* dies while *A* is alive, the value of *O*'s reversion is included in *O*'s federal gross estate. This is our Case 2. The value of *O*'s gift equals the value of Blackacre at the time of transfer to trust minus the value of *A*'s life estate minus the value of *B*'s contingent remainder. The value of *B*'s contingent remainder for the gift tax calculation is the value of the remainder after *A*'s life estate multiplied by the probability that *B* survives *A*, with both determined at the time of the gift. When *O* dies, the actuarial value of *O*'s reversion is included in his federal gross estate under Code section 2033, and the value equals the value of the remainder after *A*'s life estate multiplied by the probability that *A* survives *B*, with both determined at the time of the *O*'s death.[153]

In a jurisdiction that, by common law decision or by statute, has reversed the NICS, does not create a substitute gift in descendants of a predeceased donee, and does apply the NICS rule reversal to *O*'s reversion,[154] *O*'s gift is partially incomplete. *A* has a life estate, *B* has a contingent remainder (*B* takes if *B* survives *A*), *O* has a reversion, and whoever the law designates to take if *O*'s reversion failed has a contingent remainder. This situation is our Case 3. The value of *O*'s gift equals the value of Blackacre minus the value of *A*'s life estate minus the value of *B*'s contingent remainder minus the value of *X*'s contingent remainder. The value of *B*'s contingent remainder is the value of the remainder multiplied by the probability that *B* survives *A*, as determined at the time of the gift, and the value of *X*'s contingent remainder is the value of the

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[153] When valuing under Code section 2033, unlike section 2037, whether the valuation is made immediately before or immediately after *O*'s death is of no moment because the value of *O*'s reversion does not change when he dies; that value remains a function of the probability that *A* survives *B*, which does not markedly change on the day of *O*'s death. Conversely, when valuing under Code section 2037 (in Step Four), we value the triggering interest, the value of which changes dramatically on *O*'s death, because that section-2037-triggering interest no longer is discounted by the possibility that *O* might survive and cause the triggering interest to fail. *See supra* note 118.

[154] This situation might arise if a jurisdiction simply announced that all future interests are contingent on the holder's surviving to the distribution. A reversion is a future interest and would come within that rule. Of course, who takes on the failure of a reversion would have to be decided. Perhaps a court would adopt a rule like UPC section 2-707(d) and place the interest in the decedent's heirs as determined on the distribution date.

remainder multiplied by the probability that *A* survives *B* multiplied by the probability *A* survives *O*, all determined at the time of the gift. When *O* dies, estate inclusion will occur, if at all, under Code section 2037. The value of *O*'s reversion immediately before death is the value of the remainder, based on *A*'s age at *O*'s death, multiplied by the probability that *A* survives *B* multiplied by the probability that *X* survives *O*, all determined at the time of the *O*'s death.[155]

To summarize, if *O* transfers property and has no reversion, then the full value of the property is subject to a gift tax, but no part of the property will be subject to an estate tax. If *O* retains a reversion, either expressly or by operation of an inartful NICS rule reversal, then the value of the reversion will be subtracted in valuing the gift (although the subtracted amount often will be zero), and upon *O*'s death one must determine whether Code sections 2033 or 2037 require estate tax inclusion of the reversion. Both Code sections 2033 and 2037 require a determination of the probability of *O* surviving some person. Hence, the calculation method in Appendix A will always be relevant. In addition, if *O*'s reversion itself is subject to a condition that *O* survive until her reversion takes effect in possession, Code section 2037 controls, and the situation will likely involve multiple determinations of the probability of persons surviving each other.

Whatever the merits of reversing the NICS rule, the UPC at least does it in a way that obviates difficult transfer tax determinations. In a NICS rule reversal, the transferor's reversion should always be negated. If the reversion is not negated, then the analytical methods explained herein will be necessary if the transferor expressly retains a reversion lasting beyond his death (Code section 2033) or one terminating with his death (Code section 2037).

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[155] *See supra* note 153.

APPENDIX A

Calculating the Probability That y Will Survive x Using Table 90CM

By definition, the following two probabilities are identical: (1) *y* will survive *x*; and (2) *x* will die and *y* will be alive at the moment of *x*'s death.

The second probability is easier to calculate using data required by the Treasury Regulations. The Treasury Regulations require use of Table 90CM to value interests dependent upon the termination of a life interest.[156] Table 90CM is a life table based on the experience of the entire United States population in the years around the 1990 United States Census.[157] A life table is a device for exhibiting mortality data, and "is an indispensable component of many models in actuarial science."[158]

Table 90CM is published in Treasury Regulations Section 20.2031-7(d)(7), and for ease of reference, is reproduced at the end of this appendix. Table 90CM consists of two columns: (1) a column containing ages between 0 and 110; and (2) a column headed "l_x" containing the "l value" (the letter *ell* and not the number *one*) for each age in the first column.[159]

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[156] *See* Treas. Reg. § 20.2031-7(d)(7) (2000). In addition to Table 90CM, for valuation dates after April 30, 1999, Treas. Reg. § 20.2031-7(d)(6) (2000) publishes Actuarial Table B, Term Certain Remainder Factors and Treas. Reg. § 20.2031-7(d)(7) (2000) publishes Table S, Single Life Remainder Factors. Neither Table B nor Table S addresses valuations dependent upon one person surviving another.

[157] Table 90CM is published in Treas. Reg. § 20.2031-7(d)(7) (2000) and in I.R.S. Publication 1457, Actuarial Factors, Book Aleph (July 1999), *available at* http://www.irs.gov/pub/irs-pdf/p1457_99.pdf. Publication 1457 describes Table 90CM as "taken from the Life Table for the Total Population appearing as Table 1, in 'U.S. Decennial Life Tables for 1989-1991' published by the U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics." *Id.* at iii.

[158] NEWTON L. BOWERS, JR., HANS U. GERBER, JAMES C. HICKMAN, DONALD A. JONES & CECIL J. NESBITT, ACTUARIAL MATHEMATICS 51 (2d. ed. 1997). "In fact some scholars fix the date of the beginning of actuarial science as 1693. In that year, Edmund Halley published 'An Estimate of the Degrees of the Mortality of Mankind, Drawn from Various Tables of Births and Funerals at the City of Breslau.'" *Id.* at 51–52.

[159] *See* NATIONAL CENTER FOR HEALTH STATISTICS, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, U.S. DECENNIAL LIFE TABLES FOR 1989-91, VOLUME 1, NUMBER 1, UNITED STATES LIFE TABLES 3 (1997), *available at* http://www.cdc.gov/nchs/data/lifetables/life89_1_1.pdf. The "[n]umber surviving (l_x) column shows the number of persons, starting with a cohort of 100,000 live births, who will survive to the exact age marking the beginning of the indicated age interval." *Id.* Column 3 of the United States Life Tables (l_x) is column 2 of Table 90CM.

The *l* value is the number of persons, starting with a cohort of 100,000 live births, who will survive to the beginning of the indicated age interval.[160] Table 90CM starts at age 0 when 100,000 persons are born, and ends at age 110 when all are dead.[161] The *l* values for intermediate ages indicate the number alive at the exact beginning of the interval. For instance, the *l* value for age 79, denoted l_{79}, is 49943, which indicates that 49,943 (nearly 50,000) of the 100,000 lives will live to attain at least age 79, which demonstrates that the median length of life under Table 90CM is about 79 years.[162]

Probabilities of death and of survival can be obtained using the *l* values from Table 90CM and elementary probability concepts.[163] The following probability concepts are relevant:

Concept 1. The probability that a life age *x* will survive at least *n* years, from age *x* until age *x+n* equals $\frac{l_{x+n}}{l_x}$[164]

Concept 2. The probability that a life age *x* will die between ages *x+n* and *x+n+m* equals $\frac{l_{x+n}}{l_x} - \frac{l_{x+n+m}}{l_x} = \frac{l_{x+n} - l_{x+n+m}}{l_x}$ [165]

Concept 2 also can be described as the probability that a life, age *x*, will live at least *n* years ($\frac{l_{x+n}}{l_x}$) minus the probability that a life, age *x*, will live at least *n+m* years ($\frac{l_{x+n+m}}{l_x}$). For instance, the probability that *x*, presently age 50, will live at least 3 years to age $53 = \frac{l_{53}}{l_{50}} = \frac{90885}{92370} = 0.98392$; the probability that *x*, presently age 50, will live at least 4

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[160] *See id.* The actuarial scholars note that under the life table method of actuarial calculations, the interpretation of l_x as the number of persons living at age *x* is a "convenient aid"; however, l_x is a "continuous function of *x*, and the tabulated values appear in mortality tables only for integral values of *x*." CHESTER WALLACE JORDAN, SOCIETY OF ACTUARIES' TEXTBOOK ON LIFE CONTINGENCIES 8 (2d ed. 1975). The matter is of little practical import with regard to tax calculations, as the Treasury Regulations require use of Table 90CM, rather than a continuous function.

[161] The manner of life table construction requires that there be an end year. Assigning such a year is a bit arbitrary, because some evidence exists of persons living past age 110. However, the number is so small that the table can be ended at age 110. In any event, we do not need to know why Table 90CM terminates at age 110, only that it does.

[162] *See supra* note 159, at 7, tbl. 1.

[163] *See* JORDAN, *supra* note 160, at 9.

[164] *See* JORDAN, *supra* note 160, at 9, equation 1.4. *See also* I.R.S. Publ'n 1457, *supra* note 131.

[165] *See* JORDAN, *supra* note 160, at 9, equation 1.8.

years to age $54 = \frac{l_{54}}{l_{50}} = \frac{90297}{92370} = 0.97756$; and the probability that x, presently age 50, will die between ages 53 and $54 = \frac{l_{53}}{l_{50}} - \frac{l_{54}}{l_{50}} = 0.98392 - 0.97756 = 0.00636$.

Concept 3. In a life table, all deaths are assumed to occur uniformly throughout the year.[166]

Concept 4. To calculate the probability that a life, age y, survives a life, age x, we observe that the condition that y survive x is satisfied in any year in which x dies and y survives. The condition that y survive x in any given year can occur by either of two independent events: (1) x dies and y lives that entire year, or (2) x dies that year and y dies that year and x dies first.[167]

Concept 5. Events 1 and 2 described in Concept 4 are mutually exclusive (sometimes called disjoint), because they cannot occur at the same time.[168] Event 1 requires that y live an entire year, while event 2 requires that y die within that year; thus events 1 and 2 cannot both occur within any given year.[169] When events are mutually exclusive, the probability that either event occurs is the arithmetic sum of the two probabilities.[170] For example, the weekend consists of two days: Saturday and Sunday. Any given day has a 1/7 probability of being either a Saturday or a Sunday. Because the condition of a weekend day can be satisfied by a day being a Saturday or a Sunday, the probability that any given day is a weekend day is 1/7 plus 1/7, or 2/7.

Concept 6. The component events within events 1 and 2 are independent events; that is, the occurrence of one component event does not affect the probability that another component event will occur.[171] Given indepen-

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[166] Under the life table method, a uniform distribution of deaths throughout each year of age is assumed. *See* JORDAN, *supra* note 160, at 19; GEORGE KING, INSTITUTE OF ACTUARIES' TEXT BOOK OF THE PRINCIPLES OF INTEREST, LIFE ANNUITIES, AND ASSURANCES, AND THEIR PRACTICAL APPLICATION: LIFE CONTINGENCIES 42 (2d ed. 1902); *available at* http://www.archive.org/download/p2textbookofprin00instuoft/p2textbookofprin00instuoft.pdf; M.A. MACKENZIE AND N.E. SHEPPARD, AN INTRODUCTION TO THE THEORY OF LIFE CONTINGENCIES 22 (1931).

[167] *See* KING, *supra* note 166, at 42; MACKENZIE AND SHEPPARD, *supra* note 166, at 22.

[168] *See* BLUMAN, *supra* note 136, at 44 (Addition Rule I); Introduction to Probability 8, http://swd.ucsd.edu/Lecture2.pdf (last visited May 26, 2009); for a more traditional treatment of discrete probability, *see* GRINSTEAD & SNELL, *supra* note 139, at 1–35.

[169] *See* BLUMAN, *supra* note 136, at 45.

[170] *See* BLUMAN, *supra* note 168, at 45.

[171] *See* BLUMAN, *supra* note 168, at 57 (Multiplication Rule I).

dent events, if a condition can be satisfied only by events simultaneously occurring, the probabilities of each event are multiplied together to calculate the probability of the condition occurring.[172] For instance, any given day has a 0.2430 probability of being in a leap year[173] and any given day has a 2/7 chance of being a weekend day. The probability that any given day is both in a leap year and a weekend day is 0.2430 multiplied by 2/7, or 0.06943.

Concept 7. The probability that y will survive x is the sum of all of the annual probabilities defined in Concept 4.[174]

Using these probability concepts and the l values of Table 90CM, we will calculate the probability that y, age 70, will survive x, age 50.

To calculate the probability that y, presently age 70, will survive x, presently age 50, we first consider the first year from the present and calculate the probability that x dies in the first year and that y survives him. That "first annual probability" is composed of the sum of two partial probabilities: (1) the probability that x dies during the first year and y survives to the end of the first year, and (2) the probability that both die in the first year, but x dies first. (Concept 4.) Because either event 1 or event 2 will satisfy the condition that x dies in the first year and y survives him, the partial probabilities 1 and 2 are added. (Concept 5.)

Next, we will consider the second year from the present and calculate the probability that x dies in the second year and that y survives him. That "second annual probability" is composed of the sum of two partial probabilities: (1) the probability that x dies during the second year and y survives to the end of the second year, and (2) the probability that both

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[172] *See* BLUMAN, *supra* note 168, at 58.

[173] The probability that any given day is in a leap year is calculated as follows: First, a leap year has 366 days, while a non-leap year has 365. Second, 1 of every 4 years is a leap year, except only 1 out of every 4 century years is a leap year; century years are leap years only if evenly divisible by 400. For example, year 2000 was a leap year, but year 1900 was not. *See* Nat'l Inst. of Standards and Tech., Physics Lab., Time & Frequency Div., *Frequently Asked Questions*, http://tf.nist.gov/timefreq/general/leaps.htm (last visited May 20, 2009). Thus, there are 97 leap years per 400 years (rather than 100), and 303 non-leap years; each leap year has 366 days, and each non-leap year has 365. Thus, the probability that any given day is a day in a leap year is $\frac{97*366}{(303*365)+(97*366)} = 0.2430$. For other interesting calculations relating to the 400-year leap cycle, *see* The Volokh Conspiracy, *Some (I Hope Midly Interesting) Pedantry About Day of Week Frequency*, http://volokh.com/posts/1225300002.shtml (last visited May 20, 2009).

[174] *See* KING, *supra* note 166, at 43, 48–50; MACKENZIE AND SHEPPARD, *supra* note 166, at 22–23.

die in the second year, but *x* dies first. The partial probabilities 1 and 2 are added. (Concepts 4 and 5.)

We will continue the series of annual probability calculations until we run out of years on Table 90CM. We then will sum all the annual probabilities, and that sum will be the probability that *y*, presently age 70, will survive *x*, presently age 50. (Concept 7.) Along the way, we will develop a general solution that we can automate by using a spreadsheet. These concepts are applied below:

I.   Calculate the First Annual Probability: The condition that *y* survive *x* in any given year can occur by either of two mutually exclusive, disjoint events: (1) *x* dies and *y* lives that entire year, OR (2) *x* dies that year and *y* dies that year and *x* dies first.

     A.   Calculate Partial Probability 1: the probability that (a) *x*, presently age 50, dies between ages 50 and 51 and (b) *y*, presently age 70, survives the entire year to age 71.

         1.   Partial Probability 1(a) is the probability that *x* dies between ages 50 and 51. Under Concept 2, that probability is as follows:

$$\text{Partial Probability 1(a)} = \frac{l_{50}}{l_{50}} - \frac{l_{51}}{l_{50}} = \frac{92370}{92370} - \frac{91918}{92370} =$$

$$1 - 0.99511 = A = 0.00489^{175}$$

         2.   Partial Probability 1(b) is the probability that y will live from age 70 to at least age 71. It is l_{71} divided by l_{70}. (Concept 1.)

$$\text{Partial Probability 1(b)} = \frac{l_{71}}{l_{70}} = \frac{69411}{71357} = 0.97273$$

         3.   Partial Probability 1 is calculated by multiplying Partial Probability 1(a) by Partial Probability 1(b), because (a) and (b) are independent events. (Concept 6.)
Partial Probability 1 = 0.00489 * 0.97273 = 0.00476

     B.   Calculate Partial Probability 2 is the probability that (a) *x*, presently age 50, dies between age 50 and 51 and (b) *y*, presently age 70, dies between age 70 and 71 and (c) *x* dies first in that year.

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[175] The values in Table 90CM are five figures. Consequently, all calculations are presented at five significant figures.

1. Partial Probability 2(a) is the probability that x, presently age 50, dies between ages 50 and 51, was calculated above as Partial Probability 1(a), and is 0.00489.

2. Partial Probability 2(b) is the probability that y dies between ages 70 and 71. Under Concept 2, that probability is as follows: Partial Probability 2(b) =
    $$\frac{l_{70}}{l_{70}} - \frac{l_{71}}{l_{70}} = \frac{71357}{71357} - \frac{69411}{71357} = 0.02727$$

3. Partial Probability 2(c) is the probability that x dies first in a year in which both x and y die. The life table method assumes a uniform distribution of deaths (Concept 3), so there is an equal chance of each dying first in a year in which both die.
    Partial Probability 2(c) is equal to 0.5.

4. Partial Probability 2 is calculated by multiplying Partial Probability 2(a) by Partial Probability 2(b) and by Partial Probability 2(c) because they are "and" events. (Concept 6.) Partial Probability 2 =
    0.0048934 * 0.97273 * 0.5 = 0.0023800

C. The First Annual Probability is the sum of Partial Probability 1 and Partial Probability 2
    = 0.0047599 + 0.000066724 = 0.0071399

II. Calculate the Second Annual Probability

A. Calculate Partial Probability 1: the probability that (a) x, presently age 50, dies between ages 51 and 52 and (b) y, presently age 70, survives to at least age 72.

1. Partial Probability 1(a) is the probability that x, presently age 50, dies between ages 51 and 52. Under Concept 2, that probability is as follows:
    Partial Probability 1(a) =
    $$\frac{l_{51}}{l_{50}} - \frac{l_{52}}{l_{50}} = \frac{91918}{92370} - \frac{91424}{92370} = 0.0053481$$

2. Partial Probability 1(b) is the probability that y, presently age 70, lives to at least age 72. It is l_{72} divided by l_{70}. (Concept 1.)
    Partial Probability 1(b) $= \frac{l_{72}}{l_{70}} = \frac{67344}{71357} = 0.94376$

3. Partial Probability 1 is calculated by multiplying Partial Probability 1(a) by Partial Probability 1(b), because (a) and (b) are "and" events. (Concept 6.)
Partial Probability 1 =
0.0053481 * 0.94376 = 0.0050473

B. Calculate Partial Probability 2, the probability that (a) *x*, presently age 50, dies between ages 51 and 52 and (b) *y*, presently age 70, dies between ages 71 and 72 and (c) *x* dies first in that year.

   1. Partial Probability 2(a) is the probability that *x* dies between ages 51 and 52. It was calculated above as Partial Probability 1(a), and is 0.0053481.

   2. Partial Probability 2(b) is the probability that *y* dies between ages 71 and 72. Under Concept 2, that probability is as follows:
   Partial Probability 2(b) =
   $$\frac{l_{71}}{l_{70}} - \frac{l_{72}}{l_{70}} = \frac{69411}{71357} - \frac{67344}{71357} = 0.028967$$

   3. Partial Probability 2(c) is the probability that *x* dies first in a year in which both *x* and *y* die. Partial Probability 2(c) is equal to 0.5.

   4. Partial Probability 2 is calculated by multiplying Partial Probability 2(a) by Partial Probability 2(b) and by Partial Probability 2(c) because they are "and" events. (Concept 6.) Partial Probability 2 =
   0.0053481 * 0.028967 * 0.5 = 0.000077459

C. The Second Annual Probability is the sum of Partial Probability 1 and Partial Probability 2
Second Annual Probability
= 0.0050473 + 0.000077459 = 0.0051247.

III.   Calculate The Third Annual Probability

A. The Third Annual Probability is the probability that (a) *x*, presently age 50, dies between ages 52 and 53 and (b) *y*, presently age 70, survives to at least age 73. Thus, *l* values are those for the next higher year; obviously, *l* values for the initial conditions of age 50 and age 70 remain the same.

B. Important probabilities are:

1. x dies between ages 52 and 53, which equals $\frac{l_{52}}{l_{50}}$ - $\frac{l_{53}}{l_{50}}$ = $\frac{91424}{92370}$ - $\frac{90885}{92370}$ = 0.0058352

2. y dies between ages 72 and 73, which equals $\frac{l_{72}}{l_{70}}$ - $\frac{l_{73}}{l_{70}}$ = $\frac{67344}{71357}$ - $\frac{65154}{71357}$ = 0.030691

3. y will live from age 70 to at least age 73, which equals $\frac{l_{73}}{l_{70}} = \frac{65154}{71357}$ = 0.91307

C. The Third Annual Probability demonstrates that a general solution can be generated. Probability 1 of each annual probability equals B1 multiplied by B3. Probability 2 of each annual probability equals B1 multiplied by B2 multiplied by ½. Thus, for each year, the annual probability = (B1 times B3) plus (B1 times B2 times ½).

D. The general solution expressed in C is intuitive. Each annual probability is an equation in which two terms are added. The first term is the probability that x dies during the relevant year and y survives to its end. The second term is the one-half of the probability that both will die in the relevant year.

E. The Third Annual Probability = (B1 * B3) plus (B1 * B2 times ½) = (0.0058352 * 0.91307) + (0.0058352 * 0.030691*0.5) = 0.0054175.

IV.   Calculate the Fourth Annual Probability

A. The Fourth Annual Probability is the probability that (a) x, presently age 50, dies between ages 53 and 54 and (b) y, presently age 70, survives to at least age 74.

B. Important probabilities are:

1. x dies between ages 53 and 54, which equals $\frac{l_{53}}{l_{50}} - \frac{l_{54}}{l_{50}}$ = $\frac{90885}{92370} - \frac{90297}{92370}$ = 0.0063567

2. y *dies* between ages 73 and 74, which equals $\frac{l_{73}}{l_{70}}$ - $\frac{l_{74}}{l_{70}}$ = $\frac{65154}{71357}$ - $\frac{62852}{71357}$ = 0.032260

3. *y will* live from age 70 to at least age 74, which equals
$$\frac{l_{74}}{l_{70}} = \frac{62852}{71357} = 0.88081$$

C. The general solution shows that the Fourth Annual Probability
$$= \left\{ \left[\frac{l_{53}}{l_{50}} - \frac{l_{54}}{l_{50}} \right] * \frac{l_{74}}{l_{70}} \right\} + \left\{ \left[\frac{l_{53}}{l_{50}} - \frac{l_{54}}{l_{50}} \right] * \left[\frac{l_{73}}{l_{70}} - \frac{l_{74}}{l_{70}} \right] * 0.5 \right\}$$
$$= (0.0063657*0.88081)+(0.0063657*0.032260*0.5)$$
$$= 0.0057097$$

V. For a more general solution, we can further generalize the formula in IV. C above.

A. For two persons, age x and y, the annual probability for the nth year that y survives x is:
$$= \left\{ \left[\frac{l_{x+n-1}}{l_x} - \frac{l_{x+n}}{l_x} \right] * \frac{l_{y+n}}{l_y} \right\} + \left\{ \left[\frac{l_{x+n-1}}{l_x} - \frac{l_{x+n}}{l_x} \right] * \left[\frac{l_{y+n-1}}{l_y} - \frac{l_{y+n}}{l_y} \right] * 0.5 \right\}$$
For instance, n=1 for the First Annual Probability, and n=2 for the Second Annual Probability.

B. How Long Does the Series Continue?
Under Table 90CM, all lives fail by age 110.[176] Thus, annual probability calculations are made until the oldest of the lives reaches 110, because at that point, it is certain that the probability of future survival by that person is zero.
For our example, where y is age 70 and x is age 50, forty annual probabilities must be calculated, one for each year until y reaches age 110.
For any problem, the number of Annual Probabilities to be calculated will equal 110 minus the oldest age of x and y.

C. The most general solution for two persons, age x and y, where y is the greater of the two ages, the probability that y survives x is:

$$\sum_{n=1}^{n=110-y} \left\{ \left[\frac{l_{x+n-1} - l_{x+n}}{l_x} * \frac{l_{y+n}}{l_y} \right] + \left[\frac{l_{x+n-1} - l_{x+n}}{l_x} * \frac{l_{y+n-1} - l_{y+n}}{l_y} * 0.5 \right] \right\}$$

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[176] *See* Treas. Reg. § 20.2031-7(d)(4).

D. In our example, for *y*, age 70, and *x*, age 50, the probability that *y* survives *x* is 0.15239 or 15.239%.[177]

APPENDIX CONCLUSION

The probability that *y* will survive *x* determined under a life table is the sum of a series of annual probabilities.

Under the most easily expressed general solution, each annual probability requires the calculation of three probabilities. Calculating those three probabilities requires reading six *l* numbers from Table 90CM. Two of the six remain constant; thus, for each year after the first, only four new *l* numbers are read from the table.

A spreadsheet can be used to make these calculations easily. After the data from Table 90CM has been input, only a few formulae based on looking up values in the table are necessary. The VLOOKUP function in Microsoft Excel worksheets works to look up the values. After they are multiplied and each annual probability is determined, the annual probabilities can be easily summed up in the spreadsheet.

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[177] The probability calculated under the manner in this appendix—that the probability that *y*, age 70, will survive *x*, age 50, using Table 90CM data equals 15.239%—agrees to five significant figures with the result generated by a commercial software program, Tiger Tables, available at www.TigerTables.com. In addition, the general solution generated here agrees with the solutions generated by Tiger Tables for all of the many other age combinations tested by the author. Tiger Tables does not explain its calculation method, but the Tiger Tables website does advertise that the software is used by the Service.

Table 90CM

Age	l_x	Age	l_x	Age	l_x
0	100000	37	95969	74	62852
1	99064	38	95780	75	60449
2	98992	39	95581	76	57955
3	98944	40	95373	77	55373
4	98907	41	95156	78	52704
5	98877	42	94928	79	49943
6	98850	43	94687	80	47084
7	98826	44	94431	81	44129
8	98803	45	94154	82	41091
9	98783	46	93855	83	37994
10	98766	47	93528	84	34876
11	98750	48	93173	85	31770
12	98734	49	92787	86	28687
13	98713	50	92370	87	25638
14	98681	51	91918	88	22658
15	98635	52	91424	89	19783
16	98573	53	90885	90	17046
17	98497	54	90297	91	14466
18	98409	55	89658	92	12066
19	98314	56	88965	93	9884
20	98215	57	88214	94	7951
21	98113	58	87397	95	6282
22	98006	59	86506	96	4868
23	97896	60	85537	97	3694
24	97784	61	84490	98	2745
25	97671	62	83368	99	1999
26	97556	63	82169	100	1424
27	97441	64	80887	101	991
28	97322	65	79519	102	672
29	97199	66	78066	103	443
30	97070	67	76531	104	284
31	96934	68	74907	105	175
32	96791	69	73186	106	105
33	96642	70	71357	107	60
34	96485	71	69411	108	33
35	96322	72	67344	109	17
36	96150	73	65154	110	0

APPENDIX B

Calculate the Probability That *y* Will Survive *x* Using Table 2000CM

During the printing of this article, the Treasury Regulations were amended "to reflect the most recent mortality experience available," now contained in Table 2000 CM.[178] For valuation dates after May 1, 2009, Table 2000 CM replaces Table 90 CM.[179]

The algorithm provided in Appendix A remains valid for calculating survival probabilities for periods after May 1, 2009; simply substitute the l_x values from Table 2000 CM for those from Table 90 CM.

Appendix A derived a formula for the annual probability for the nth year that *y* survives *x*, as:[180]

$$= \left\{ \left[\frac{l_{x+n-1}}{l_x} - \frac{l_{x+n}}{l_x} \right] * \frac{l_{y+n}}{l_y} \right\} + \left\{ \left[\frac{l_{x+n-1}}{l_x} - \frac{l_{x+n}}{l_x} \right] * \left[\frac{l_{y+n-1}}{l_y} - \frac{l_{y+n}}{l_y} \right] * 0.5 \right\}$$

This Appendix B repeats the Appendix A example, but using Table 2000 CM data. Recall that in the example, *y* is age 70 and *x* is age 50. Forty annual probabilities must be calculated, one for each year until *y* reaches age 110 to determine the probability that *y* survives *x*.[181]

The first annual probability, where n=1, is

$$\left\{ \left[\frac{l_{50}}{l_{50}} - \frac{l_{51}}{l_{50}} \right] * \frac{l_{71}}{l_{70}} \right\} + \left\{ \left[\frac{l_{50}}{l_{50}} - \frac{l_{51}}{l_{50}} \right] * \left[\frac{l_{70}}{l_{70}} - \frac{l_{71}}{l_{70}} \right] * 0.5 \right\} =$$

$$\left\{ \left[\frac{93591 \cdot 93180}{93591} \right] * \frac{73001}{74794} \right\} + \left\{ \left[\frac{93591 \cdot 93180}{93591} \right] * \left[\frac{74794 \cdot 73001}{74794} \right] * 0.5 \right\} = 0.0042862 +$$

$$0.000052637 = 0.0043388$$

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[178] Table 2000 CM is published as the last table in Treas. Reg. § 20.2031-7T(d)(7) (2009), and is reproduced at the end of this Appendix B.

[179] Treas. Reg. § 20.2031-7T(c) (2009).

[180] *See infra.*

[181] Recall that under the general solution of Appendix A, annual probability calculations are made until the oldest of the two lives reaches 110. Thus, the number of annual probability calculations is 110-*y*, where y is the older of the two ages. *See infra.* When *y* is 70, 110-*y* equals 40.

The second annual probability, where n=2, is

$$\left\{\left[\frac{l_{51}}{l_{50}} - \frac{l_{52}}{l_{50}}\right] * \frac{l_{72}}{l_{70}}\right\} + \left\{\left[\frac{l_{51}}{l_{50}} - \frac{l_{52}}{l_{50}}\right] * \left[\frac{l_{71}}{l_{70}} - \frac{l_{72}}{l_{70}}\right] * 0.5\right\}$$

$$\left\{\left[\frac{93180 \cdot 92741}{93591}\right] * \frac{71092}{74794}\right\} + \left\{\left[\frac{93180 \cdot 92741}{93591}\right] * \left[\frac{73001 \cdot 71092}{74794}\right] * 0.5\right\} = 0.0044585 +$$

$$0.00005986 = 0.0045183$$

The third annual probability, where n=3, is

$$\left\{\left[\frac{l_{52}}{l_{50}} - \frac{l_{53}}{l_{50}}\right] * \frac{l_{73}}{l_{70}}\right\} + \left\{\left[\frac{l_{52}}{l_{50}} - \frac{l_{53}}{l_{50}}\right] * \left[\frac{l_{72}}{l_{70}} - \frac{l_{73}}{l_{70}}\right] * 0.5\right\}$$

$$\left\{\left[\frac{92741 \cdot 92270}{93591}\right] * \frac{69056}{74794}\right\} + \left\{\left[\frac{92741 \cdot 92270}{93591}\right] * \left[\frac{71092 \cdot 69056}{74794}\right] * 0.5\right\} =$$

$$0.0046464 + 0.000068496 = 0.0047149$$

Succeeding annual probabilities are calculated until the last of the series, which in our example is the fortieth annual probability, *i.e.*, n=40.

$$\left\{\left[\frac{l_{89}}{l_{50}} - \frac{l_{90}}{l_{50}}\right] * \frac{l_{110}}{l_{70}}\right\} + \left\{\left[\frac{l_{89}}{l_{50}} - \frac{l_{90}}{l_{50}}\right] * \left[\frac{l_{109}}{l_{70}} - \frac{l_{110}}{l_{70}}\right] * 0.5\right\}$$

$$\left\{\left[\frac{21443 \cdot 18472}{93591}\right] * \frac{0}{74794}\right\} + \left\{\left[\frac{21443 \cdot 18472}{93591}\right] * \left[\frac{11 \cdot 0}{74794}\right] * 0.5\right\} = + 0.0000023343 =$$

$$0.0000023343$$

The 40 annual probabilities are added together, and the probability that *y* age 70 survives *x* age 50, using the morality data in Table 2000 CM is 0.13928 or 13.928%. Using the data from Table 90 CM, the probability was 0.15239 or 15.239%.[182]

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[182] The probability calculated in this Appendix B—the probability that *y* age 70 will survive *x* age 50 using Table 2000CM data equals 13.928%—agrees to five significant figures with the result generated by a commercial software program, Tiger Tables, available at www.TigerTables.com, when Tiger Tables is instructed to use the "Current Mortality Table." The Appendix A algorithm and Tiger Tables also generate identical results when both use Table 90 CM data. *See infra* note 177.

Within the text of the article, when illustrating the application of section 2037, three survival probabilities are used: that a 60 year old will survive an 81 year old, a 78 year old will survive an 81 year old, and a 50 year old will survive an 81 year old. The respective probabilities calculated under Tables 90 CM and 2000 CM are as follows:

age	age	Probability that a life of column 1 age survives a life of column 2 age	
		Table 90 CM	Table 2000 CM
60	81	0.86	0.88
78	81	0.57	0.57
50	81	0.94	0.94

Table 2000 CM

Age	lx	Age	lx	Age	lx
0	100000	37	96921	74	66882
1	99305	38	96767	75	64561
2	99255	39	96600	76	62091
3	99222	40	96419	77	59476
4	99197	41	96223	78	56721
5	99176	42	96010	79	53833
6	99158	43	95782	80	50819
7	99140	44	95535	81	47694
8	99124	45	95268	82	44475
9	99110	46	94981	83	41181
10	99097	47	94670	84	37837
11	99085	48	94335	85	34471
12	99073	49	93975	86	31114
13	99057	50	93591	87	27799
14	99033	51	93180	88	24564
15	98998	52	92741	89	21443
16	98950	53	92270	90	18472
17	98891	54	91762	91	15685
18	98822	55	91211	92	13111
19	98745	56	90607	93	10773
20	98664	57	89947	94	8690
21	98577	58	89225	95	6871
22	98485	59	88441	96	5315
23	98390	60	87595	97	4016
24	98295	61	86681	98	2959
25	98202	62	85691	99	2122
26	98111	63	84620	100	1477
27	98022	64	83465	101	997
28	97934	65	82224	102	650
29	97844	66	80916	103	410
30	97750	67	79530	104	248
31	97652	68	78054	105	144
32	97549	69	76478	106	81
33	97441	70	74794	107	43
34	97324	71	73001	108	22
35	97199	72	71092	109	11
36	97065	73	69056	110	0