What is a “fair salary” for a surgical subspecialist?

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The author presents a net present value model by which a “fair salary” for surgical subspecialists is justified. Neurosurgical practitioners are used as an example, based on assumed fair salary for family physicians.

KEY WORDS • net present value • neurosurgeon’s fair salary

In the present health care system, physicians are reimbursed according to a RBRVS and RVUs. Relative value units have a conversion rate that equates to the amount physicians are reimbursed for their work. The conversion rates have been diminished to such a degree that in some cases those received by specialty physicians in particular no longer cover the total cost of providing the services rendered. The Centers for Medicare and Medicaid Services (previously the Health Care Financing Administration) has not heeded cogent arguments regarding the need for more equitable reimbursement, despite intense efforts by numerous specialty groups. Neurosurgeons have used activity-based costing methodology to demonstrate that the overhead for running their businesses has high fixed and variable costs and that the present RVU conversion rates do not cover these overhead costs. In many cases, profits have been eliminated, which implies a loss for rendering certain surgical services.

A straightforward approach to justify a “fair salary” for a surgical subspecialist, with neurosurgeons as an example, has been formulated and will be presented in spreadsheet format in this paper. The approach is based on the economic and financial principles of the time value of money and NPV.

Abbreviations used in this paper: NPV = net present value; RBRVS = resource-based value system; RVU = relative value unit.

BASICS OF PRESENT VALUE

A well-known fact of economic life is that money is not free and can be downright expensive. If money is borrowed now, it must be repaid in a larger amount in the future (the amount borrowed plus interest). The result is that \$100 in hand today is worth more than \$100 to be received a year from now because \$100 today can be invested to provide \$100 plus interest next year. The existence of interest rates in the economy therefore provides an objective basis to evaluate investment returns that are uninfluenced by the attitudes of any one person or the investment opportunities available to a particular firm or individual.

Multiperiod decision making is based on the concepts of present value and NPV. Present value is that which at present is a payment or a stream of payments to be received in the future. An NPV is the difference between the present value of a future return or stream of returns (for example, cash inflows) from an asset or project and the cost (for example, cash outflows) of that asset or project. The present value rule states that an investment should be adopted only if the present value of the cash inflows it generates in the future exceeds the present value of its cash outflows—that is, if it has a positive NPV, which is the expected net benefit that accrues to the firm or individual after adopting the investment.

The key features of NPV calculations involve periodic

TABLE 1

Example of the most conservative model in which family practitioner salaries are used to estimate a fair salary for neurosurgeons†*

<i>NPV analysis</i>										
individual's age (yrs)	26	27	28	29	30	31	32	33	34	35–60
net salary (in thousands, \$) after malpractice ins										
FP	33	35	37	67	91	115	115	115	115	115
NS	33	35	37	39	41	43	46	90	128	166
NVP of future earnings (\$)										
FP		1397‡								
NS		1397§								
<i>assumptions underlying NPV analysis</i>										
malpractice ins (cost/yr)										
FP		\$5 in thousands								
NS		\$25 in thousands								
residency (no. of yrs)										
FP		3								
NS		7								
residency annual wage		\$33 in thousands (increasing 5–6% per yr)								
FP annual wage (already agreed on as “acceptable”)		\$120 in thousands								
discount rate										
FP		6%—the return needed to attract qualified individuals								
NS		7%—same as above but reflects higher “psychic risk” associated w/ being an NS								
implied NS annual wage		\$191 in thousands								
<i>key drivers of differences in salaries</i>										
FP vs. NS residency periods										
expected career length										
required (or expected) return on investment for each specialty, reflecting risks of practice										
differential malpractice ins costs										

* These data can be used as one input to estimate minimum fair salaries across medical specialties. Relying on the assumptions herein, if a fair annual family practitioner salary is \$120,000, a neurosurgeon's should be at least \$191,000. Abbreviations: FP = family practitioner; ins = insurance; NS = neurosurgeon.

† Items missing from the analysis include: differential tax rates; quality differences (perhaps reflected by dispersion of salaries for family practice compared with neurosurgery); and other intangibles (value added by good outcomes—less disability, less unemployment).

‡ Given the aforementioned assumptions, this represents the present value of the assumed stream of salary cash flows.

§ Given the aforementioned assumptions, the stream of cash flows depicted in the table would presumably make someone indifferent to the choice of entering neurosurgery over family practice.

cash flows, a time period, and an interest or “discount” rate. The discount rate is also referred to as the cost of capital and reflects the riskiness of the project. In this model, it is considered the return needed to attract qualified individuals into the field of medicine given the risks they are expected to encounter. The discount rate for a surgical subspecialist is assumed to be higher than that for a family practitioner, reflecting the higher risk associated with being a surgical subspecialist. For example, neurosurgeons have greater medicolegal liability exposure, longer training periods (residency), and shorter careers than family practitioners.

APPLICATION TO NEUROSURGERY SALARIES

The model proposed in this paper involves an NPV analysis in which family practitioner salaries are used to estimate the opportunity cost of becoming a neurosurgeon. This spreadsheet approach can be used as one input to estimate minimum fair salaries across medical specialties (Table 1). The model does not involve RBRVS or RVUs; rather, a neurosurgeon's fair salary is simply determined based on an assumed fair salary for a family practitioner. The assumptions underlying the NPV analysis in the most conservative model presented in the first spreadsheet include the following: 1) family practitioner malpractice insurance cost of \$5,000 per year; 2) neuro-

surgeon malpractice insurance cost of \$25,000 per year; 3) family practice residency of 3 years; 4) neurosurgery residency of 7 years; 5) residency annual wage of \$33,000 (increasing by 5–6% per year); 6) acceptable or fair family practice wage of \$120,000 per year; 7) discount rate in family practice of 6%; 8) discount rate in neurosurgery of 7%; and 9) retirement age for both practitioners at 60 years of age.

Ignoring any practice-related costs beyond malpractice insurance, the NPV of a family practitioner's future earnings in this conservative model is \$1,397,000. In the first analysis, a neurosurgeon's salary would have to be \$191,000 to obtain an equivalent NPV (see “assumptions underlying NPV analysis” in Table 1). This would presumably make someone indifferent to the decision of entering family practice or neurosurgery.

The key drivers of differences in salaries include the following: family practice compared with neurosurgery residency periods; expected career length; required (or expected) return on investment for each specialty reflecting risks of practice; and differential malpractice insurance costs.

The items missing from the analysis include the following: differential tax rates; quality differences (perhaps reflected by dispersion of salaries for family practice compared with neurosurgery); and other intangibles (value added).

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TABLE 2

Sensitivity analysis in which the family practitioner salary has been increased to \$150,000^{†}*

<i>NPV analysis</i>										
individual's age (yrs)	26	27	28	29	30	31	32	33	34	35–60
net salary (in thousands, \$) after malpractice ins										
FP	33	35	37	85	115	145	145	145	145	145
NS	33	35	37	39	41	43	46	118	166	213
NVP of future earnings (\$)										
FP		1738 [‡]								
NS		1738 [§]								
<i>assumptions underlying NPV analysis</i>										
malpractice ins (cost/yr)										
FP		\$5 in thousands								
NS		\$25 in thousands								
residency (no. of yrs)										
FP		3								
NS		7								
residency annual wage		\$33 in thousands (increasing 5–6% per yr)								
FP annual wage (already agreed on as “acceptable”)		\$150 in thousands								
discount rate										
FP		6%—the return needed to attract qualified individuals								
NS		7%—same as above but reflects higher “psychic risk” associated w/ being an NS								
implied NS annual wage		\$238 in thousands								
<i>key drivers of differences in salaries</i>										
FP vs. NS residency periods										
expected career length										
required (or expected) return on investment for each specialty, reflecting risks of practice										
differential malpractice ins costs										

* These data reflect a neurosurgeon's salary if a family practitioner's salary is \$150,000 and all other assumptions remain unchanged. Relying on the assumptions herein, if a fair annual family practitioner salary is \$150,000, a neurosurgeon's should be at least \$238,000.

† Items missing from the analysis include: differential tax rates; quality differences (perhaps reflected by dispersion of salaries for family practice compared with neurosurgery); and other intangibles (value added by good outcomes—less disability, less unemployment).

‡ Given the aforementioned assumptions, this represents the present value of the assumed stream of salary cash flows.

§ Given the aforementioned assumptions, the stream of cash flows depicted in the table would presumably make someone indifferent to the choice of entering neurosurgery over family practice.

TABLE 3

Sensitivity analysis in which the family practitioner salary is \$150,000 and the discount rate for neurosurgeons is increased to 9%^{†}*

<i>NPV analysis</i>										
individual's age (yrs)	26	27	28	29	30	31	32	33	34	35–60
net salary (in thousands, \$) after malpractice ins										
FP	33	35	37	85	115	145	145	145	145	145
NS	33	35	37	39	41	43	46	168	232	296
NVP of future earnings (\$)										
FP		1738 [‡]								
NS		1738 [§]								
<i>assumptions underlying NPV analysis</i>										
malpractice ins (cost/yr)										
FP		\$5 in thousands								
NS		\$25 in thousands								
residency (no. of yrs)										
FP		3								
NS		7								
residency annual wage		\$33 in thousands (increasing 5–6% per yr)								
FP annual wage (already agreed on as “acceptable”)		\$150 in thousands								
discount rate										
FP		6%—the return needed to attract qualified individuals								
NS		9%—same as above but reflects higher “psychic risk” associated w/ being an NS								
implied NS annual wage		\$321 in thousands								
<i>key drivers of differences in salaries</i>										
FP vs. NS residency periods										
expected career length										
required (or expected) return on investment for each specialty, reflecting risks of practice										
differential malpractice ins costs										

* These data reflect a neurosurgeon's salary if a family practitioner's salary is \$150,000 and all other assumptions remain unchanged. Relying on the assumptions herein, if a fair annual family practitioner salary is \$150,000, a neurosurgeon's should be at least \$321,000.

† Items missing from the analysis include: differential tax rates; quality differences (perhaps reflected by dispersion of salaries for family practice compared with neurosurgery); and other intangibles (value added by good outcomes—less disability, less unemployment).

‡ Given the aforementioned assumptions, this represents the present value of the assumed stream of salary cash flows.

§ Given the aforementioned assumptions, the stream of cash flows depicted in the table would presumably make someone indifferent to the choice of entering neurosurgery over family practice.

TABLE 4

*Sensitivity analysis in which the family practitioner salary is \$150,000 and the discount rate for neurosurgeons is increased to 12%**[†]

<i>NPV analysis</i>										
individual's age (yrs)	26	27	28	29	30	31	32	33	34	35–60
net salary (in thousands, \$) after malpractice ins										
FP	33	35	37	85	115	145	145	145	145	145
NS	33	35	37	39	41	43	46	269	327	465
NVP of future earnings (\$)										
FP		1738 [‡]								
NS		1738 [§]								
<i>assumptions underlying NPV analysis</i>										
malpractice ins (cost/yr)										
FP		\$5 in thousands								
NS		\$25 in thousands								
residency (no. of yrs)										
FP		3								
NS		7								
residency annual wage		\$33 in thousands (increasing 5–6% per yr)								
FP annual wage (already agreed on as "acceptable")		\$150 in thousands								
discount rate										
FP		6%—the return needed to attract qualified individuals								
NS		12%—same as above but reflects higher "psychic risk" associated w/ being an NS								
implied NS annual wage		\$490 in thousands								
<i>key drivers of differences in salaries</i>										
FP vs. NS residency periods										
expected career length										
required (or expected) return on investment for each specialty, reflecting risks of practice										
differential malpractice ins costs										

* Relying on the assumptions herein, if a fair annual family practitioner salary is \$150,000, a neurosurgeon's should be at least \$490,000.

[†] Items missing from the analysis include: differential tax rates; quality differences (perhaps reflected by dispersion of salaries for family practice compared with neurosurgery); and other intangibles (value added by good outcomes—less disability, less unemployment).

[‡] Given the aforementioned *assumptions*, this represents the present value of the assumed stream of salary cash flows.

[§] Given the aforementioned *assumptions*, the stream of cash flows depicted in the table would presumably make someone indifferent to the choice of entering neurosurgery over family practice.

TABLE 5

*Sensitivity analysis in which the family practitioner salary is \$150,000, the discount rate for neurosurgeons remains at 12%, and the neurosurgical malpractice cost increases to \$50,000 annually**[†]

<i>NPV analysis</i>										
individual's age (yrs)	26	27	28	29	30	31	32	33	34	35–60
net salary (in thousands, \$) after malpractice ins										
FP	33	35	37	85	115	145	145	145	145	145
NS	33	35	37	39	41	43	46	260	363	466
NVP of future earnings (\$)										
FP		1738 [‡]								
NS		1738 [§]								
<i>assumptions underlying NPV analysis</i>										
malpractice ins (cost/yr)										
FP		\$5 in thousands								
NS		\$50 in thousands								
residency (no. of yrs)										
FP		3								
NS		7								
residency annual wage		\$33 in thousands (increasing 5–6% per yr)								
FP annual wage (already agreed on as "acceptable")		\$150 in thousands								
discount rate										
FP		6%—the return needed to attract qualified individuals								
NS		12%—same as above but reflects higher "psychic risk" associated w/ being an NS								
implied NS annual wage		\$516 in thousands								
<i>key drivers of differences in salaries</i>										
FP vs. NS residency periods										
expected career length										
required (or expected) return on investment for each specialty, reflecting risks of practice										
differential malpractice ins costs										

* The malpractice insurance is increased to \$50,000. Note that this variable simply leads to additive marginal increase in salary. Relying on the assumptions herein, if a fair annual family practitioner salary is \$150,000, a neurosurgeon's should be at least \$516,000.

[†] Items missing from the analysis include: differential tax rates; quality differences (perhaps reflected by dispersion of salaries for family practice compared with neurosurgery); and other intangibles (value added by good outcomes—less disability, less unemployment).

[‡] Given the aforementioned *assumptions*, this represents the present value of the assumed stream of salary cash flows.

[§] Given the aforementioned *assumptions*, the stream of cash flows depicted in the table would presumably make someone indifferent to the choice of entering neurosurgery over family practice.

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SENSITIVITY ANALYSIS

Sensitivity analyses are presented in the second through fifth spreadsheets (Tables 2–5). These sensitivity analyses demonstrate the various effects on a neurosurgeon’s fair salary when the fair family practice salary is increased, the discount rate is increased, and the neurosurgery malpractice insurance rate is increased. The key driver of differences in salaries in the sensitivity analyses is the required (or expected) return on investment for each specialty, reflecting risk of practice. An increase in a neurosurgeon’s malpractice insurance cost leads merely to an additive marginal increase in required salary and thus to indifference on the part of prospective doctors to the choice between family practice and neurosurgery.

The fifth spreadsheet was designed to represent a common present-day scenario in which the following factors are applied: an annual family practice salary of \$150,000 per year, a discount rate of 12% reflecting twice the risk associated with being a neurosurgeon, and an annual malpractice cost of \$50,000 (Table 5). In this model, the implied annual wage for a neurosurgeon is \$516,000.

SUMMARY

The net present value model described in this paper justifies a fair salary for surgical subspecialists, in which neurosurgeons are used as an example, based on an assumed fair salary for family practitioners. Macroeconomic market principles are applied, and there is no reference to RBRVS and RVUs.

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