

## Normalizing mix variables in law firm financial data

By Ron Paquette

Suppose researchers studying obesity in college students find that engineering majors have a higher average body weight than liberal arts majors. Obviously math and engineering courses aren't more caloric than English and history courses, but it's tempting to start comparing donut consumption in the engineering and liberal arts cafeterias.

Not so fast. It turns out that 80% of the engineering students are male, while only 50% of the liberal arts majors are male. Since the average male weighs considerably more than the average female, the researchers' finding merits further analysis only if a weight difference still exists after factoring out gender.

These researchers have just encountered a "mix" issue — the possibility that an aggregate difference between two data groups stems from varying proportions of component subgroups rather than from changes in the individuals within those subgroups. If relevant subgroup variables are not identified and normalized, the corresponding apples-to-kiwis analysis may lead to wildly wrong conclusions.

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### 'MIX' AND LAW FIRMS

Most law firm managers understand the importance that business analysis plays in steering a firm toward success. However, as with so many things in life, a little bit of analysis can be a dangerous thing.

Management reporting processes typically collect, organize, and ultimately *combine* data sets from different practice areas, offices, industries, etc. Superficial reports compare aggregate characteristics (*e.g.*, top-line results) without identifying the varying components contained within the data sets and normalizing for these variables. This can lead those who examine such reports to draw misleading or even totally wrong conclusions.

The mix issue can be graphically illustrated on a number of fronts.

### 'Mix' Issues in Billing Rates

Often firms attempt to judge billing rate increases at a rolled-up level: by clients, departments, or even on a firm-wide basis. However, mix can dramatically distort these results. Consider the following five scenarios in which two timekeepers bill a combined total of 40 hours to a particular client.

In the baseline scenario (Figure 1), attorneys Bob and Jim both worked 20 hours. Bob's rate was \$300 per hour, and Jim's rate was \$200 per hour, so their average rate was \$250.

In Figure 2, both attorneys worked the same hours but individually raised their rates by 10%, increasing the average rate to \$275.

In Figure 3, neither attorney raised his rates, but the average rate still increased to \$275. How? Bob, who bills at a higher rate, worked a much

higher proportion of the 40 billed hours. In this scenario, the average rate growth was due solely to a change in the mix.

By contrast, the increase shown in Figure 4 was caused by a combination of factors: Bob worked a slightly higher proportion of the 40 total hours, and both attorneys raised their rates 5%.

Finally, in Figure 5, the attorney's rates still went up by 5%, but the firm's average rates went *down* slightly. Here again, a mix issue was the sole cause: Bob simply worked a smaller proportion of the total hours.

Understanding the mix impact is vital to being able to analyze a firm's revenue growth. While the example scenarios above address only revenue derived from one client's work, the same issues arise in reviewing revenue at the department, section, and office levels, as well as for the firm as a whole. Managers need to know what portion of revenue growth was due to shifts in total hours worked, which portion was caused by individual rate increases, and the impact of mix. This sort of analysis is best depicted in a waterfall chart (Figure 6).

Pinpointing mix issues becomes particularly important as firms increasingly bid on work on a fixed-fee basis, because a firm's profitability on such matters is directly determined by variances in the hours worked between timekeepers.

### Need for Normalization

To account for the mix issue, data must be normalized. This requires dissecting the individual components that may be driving an overall number, and pulling out the mix effect.

Redwood Analytics has come across mix issues on a number of occasions, and our team has recognized the need to normalize certain data components before salient conclusions can be drawn. In a Redwood Think Tank study, we looked at the relationship between profits per partner (“PPP”) and firm leverage. At first glance, the correlation looked weak: There seemed to be little relationship between highly profitable firms and those that maintained strong leverage.

To make matters worse, anecdotal evidence seemed to support this impression. A number of New York’s

most prestigious and profitable firms maintain low leverage rates. Many a lawyer has pointed to those very firms as justification for ignoring business advice to increase leverage.

Our study established, not surprisingly, that revenue per lawyer (“RPL”) is a tremendous driver of PPP. When we then normalized for RPL, we discovered a much stronger relationship between PPP and leverage than previously detected. In other words, if you take 10 firms with an RPL of \$500,000 and varying profits per partner, the difference in leverage among the 10 firms is indeed a statistically significant cause of the profitability variation.

breaking it down into components such as matter arrangements (contingent vs. corporate), billing arrangements (monthly vs. quarterly), and types of law.

**Realization:** In analyzing realization, it’s helpful to keep in mind that a 95% realization on standard rates might be a good target for tax work, but practices such as public law are generally much more heavily discounted.

**Profit margins:** In comparing the profit margins of associates at different offices, it’s important to allow for differences in overhead rates between offices.

The prevalence of mix issues underscores the fact that effective law firm management requires more than the ability to decipher raw data. Managers should base analytic conclusions on a detailed knowledge of firm operations, including all relevant variables. In other words, the existence of mix is one more reason to have sophisticated business expertise helping to chart the course of the firm.

Figure 1

	Rate	Hours
Bob	300	20
Jim	200	20
Avg. Rate	250	

Figure 2

	Rate	Hours
Bob	330	20
Jim	220	20
Avg. Rate	275	

Figure 3

	Rate	Hours
Bob	300	30
Jim	200	10
Avg. Rate	275	

Figure 4

	Rate	Hours
Bob	315	25
Jim	210	15
Avg. Rate	275	

Figure 5

	Rate	Hours
Bob	315	15
Jim	210	25
Avg. Rate	249	

### SPOTTING ‘MIX’ ISSUES

Mix issues require attention whenever a data aggregate consists of subgroups — such as departments, clients, and specific time periods — with relevant variable characteristics. Certainly any use of weighted averages signals a mix issue.

When a mix issue may be present, those reviewing the data can avoid misinterpreting the results by carefully examining subgroup variations based on possibly relevant factors such as client size, type of work, and time-keeper titles. Once variable subgroups are identified, causative relationships should be considered, as well as other potential explanations that may drive results.

For example:

**Inventory:** Understanding a firm’s book of aged inventory requires



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Figure 6

