Male–female income disparity

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Women are now increasingly found in the teaching profession. There is considerable anecdotal information that in most professions, women face a glass ceiling and are also under-compensated when compared to their male counterparts. Using live data from a university payroll, a mathematical model demonstrates with statistical data that in terms of financial (net-worth) returns, only in the very long term is it better to be a man, given the disparitiess currently prevailing in the academic sector in India.

Some preliminaries

Women are now increasingly found in the academic profession. At school level, this has not been disputed for quite some time. In recent years, even at the university and college level, the number of women teachers is slowly catching up with that of men teachers.

The Cochin University of Science and Technology (CUSAT) in Kerala, is a leading research university in this part of the world – a faculty that is about 280 strong, publishing nearly 300 refereed papers a year and producing about 80–100 PhDs a year. Among the faculty, 202 are male and 74 are female. The present mathematical model examines with live statistical data from CUSAT, whether there is male–female income disparity, in a context where the men and women have essentially the same background in terms of educational level, nature of job, working time, etc.

The scatter diagram statistics and cash-flow calculations

Data were obtained from the CUSAT records regarding 276 permanent faculty of CUSAT, currently on the payroll. There were 202 male faculty, who ranged in age from 30 to 60 yrs. There were 74 female teachers, and this group ranged in age from 31 to 59 yrs. Also the basic pay (BP) fixed for each faculty member was available. It was assumed that the other allowances do not vary so much with the gender issue and therefore, the difference in BP was taken as the quantity that determines the differential earning capacity at different stages of one's professional career graph.

The data were then plotted in the form of X–Y scatter diagrams. Figures 1 to 3 show how the BP of the male and female groups cluster in different ways. Trendlines were also computed, which revealed clearly that for faculty members under 40 years of age, females have a small financial advantage over the males. In fact, as a statistical average, only after the age of 40 years does a male faculty member start earning more than his female counterpart. If it is assumed that this early financial advantage is invested in a reasonably safe instrument, then in the medium term, a male will never be able to recoup the opportunity he has lost in the early part of his career, but only in the very long term, will males have benefitted from gender disparity.

Figure 1. X–Y scatter diagram showing how the basic pay of the male faculty varies with age.

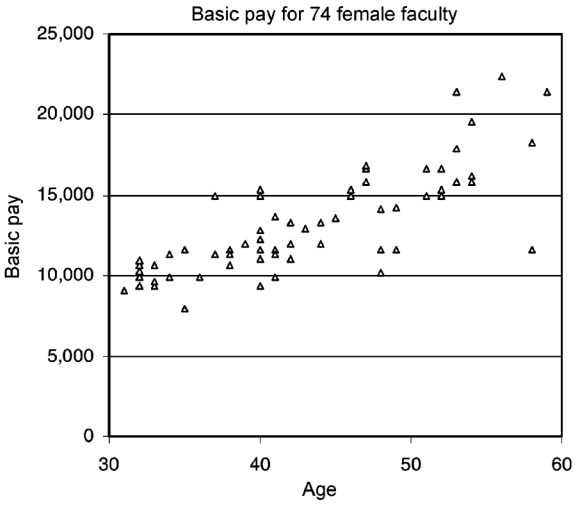

Figure 2. X–Y scatter diagram showing how the basic pay of the female faculty varies with age.

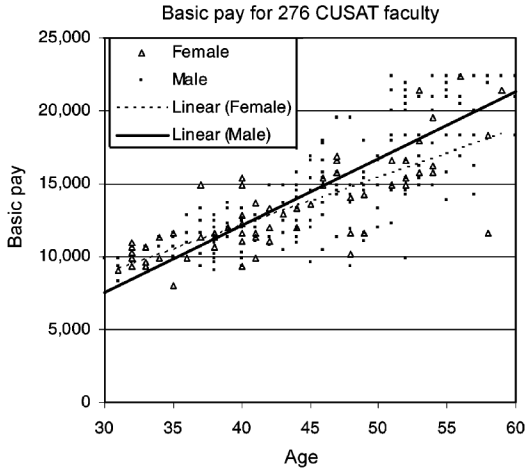

Figure 3. *X–Y* scatter diagram showing how the basic pay of the two gender groups cluster in different ways. Trend-lines were also computed, which reveal clearly that female faculty members under 40 years have a small financial advantage over their male counterparts.

To continue the analysis, the linear trend-lines can be described by the formulae:

BP (male) = –6255.47 + 459.07*(age),

BP (female) = –1169.99 + 332.22*(age).

The monthly financial advantage (or disadvantage) is then taken as being invested annually in a secure financial instrument which gives compound interest at a specified rate. The data above imply that on average, at age 30 years, females actually start with a Rs 1280 per month advantage, which is then neutralized by age 40 years. At the age of 60 years, a male earns approximately Rs 2525 more than his female counterpart, in terms of BP alone. If a financially astute female faculty member invests this differential as proposed above, then the investment of the difference in BP between a male and a female accumulates as net worth to the individual. Spread-sheet cash-flow calculations show (not included here), that in the medium term (i.e. when the projection is carried only to the age of 60 years, the current age of retirement), a male will never be able to recoup the pecuniary opportunity he has lost in the early part of his career, if the compound interest is more than 7%, just by investing only the differential in BP (note, allowances are ignored in this calculation). The post-retirement pensionary benefits which are a function of the last pay drawn at the time of retirement have not been factored in, and considering the current average life-expectancy, this could mean a substantial post-retirement income (fairly well comparable with an employee's entire earnings during his/her service period). Accounting for this, the bottom-line is, 'it pays to be male!'

Otherwise, whatever gender disparity there is, as long as female faculty join service at an early age, they have a long-term pecuniary advantage.

Concluding remarks

A new approach has been proposed to quantitatively explore issues like gender–wage gap. By working with a sample where men and women have nearly identical backgrounds, it is seen that between the ages of 30 and 40 years, women actually have a positive gender pay advantage and lose this only after 40 years of age. Qualitative evidence suggests that two reasons for men more than making up for this early disadvantage in later years is that women are likely to take time off to start families and become home-makers, and are also less likely to pursue and earn PhDs. This will translate into a glass ceiling of sorts, as current practices (UGC and AICTE norms) require a PhD for promotion to Reader and Professor grades.

ACKNOWLEDGEMENTS. I am grateful to Mr Sebastian Ouseph, Finance Office, CUSAT, for making available to me the data used, in a user-friendly Excel format. He also alerted me about the very long-term effects of post-retirement benefits.

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Reflections on the discovery of toxic species of marine micro-algae known to form harmful blooms

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Harmful algal blooms (HAB) are scientifically complex events challenging our ability to safeguard the health of the coastal ecosystems. As natural events, algal blooms do have beneficial effects on the marine environment, but their adverse impacts prominently discernible from the catastrophic loss of cultured and wild fish, and ill-effects on human health have created a daunting impression globally. HAB research, therefore, largely aims to achieve bloom prediction capability and mitigation of adverse impacts. In the interim, it looks for rapid bloom detection methods and effective transmission of safety alerts for human health and fish stocks under aquaculture.

Currently, HAB detection in the ocean regime relies mainly on costly cruises for sampling and microscopic identification of constituent bloom species. Identification to a species level and the time required to do so, are critical in issuing alerts or advisories primarily for fishing industries and public health. This underlines the importance of taxonomy and taxonomists.