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The Missing Technology:

An International Comparison of Human Capital Investment in Healthcare

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Abstract

This article explores human capital investment to understand cross-sectional variation and differences in growth of health spending among the US, Australia and Canada. Using a human capital model developed by Mincer, the article examines how rate of return to schooling and years of schooling impact wage rate levels in healthcare. The model is extended to approximate the probable trajectory of healthcare wage rate growth and thus the impact on health spending. The results suggest that a higher rate of return to schooling and a more educated healthcare workforce in the US may contribute to higher healthcare wage rates and thus contribute to higher health spending levels than in Canada and Australia. The results also suggest that average healthcare wage rates are growing at the rate of potential GDP; healthcare wage rates are not driving the growth of health spending.

Healthcare is a service industry that relies heavily on a human touch or, more formally, human capital inputs. Despite the large role of labour, an economic analysis of human capital and its role in health spending is absent from the literature. In the field of labour economics, the stock of knowledge and skill that a person possesses is called human capital. Society values human capital with a wage rate; wage rate is commonly estimated as a function of the years invested in schooling and the rate of return to schooling. Human capital investment is one form of technology investment and is often used to understand differences in the growth of economies.^[1]

Technology has been identified as a key driver of the growth in health spending among industrialized countries, but thus far has been primarily identified as the leftover (residual) after accounting for other known effects.^[2-5] For differences in levels of health spending across countries, studies have consistently identified per capita income and prices of medical goods and services as explanatory variables, but with minimal theoretical underpinnings.^[6-8] This article applies a human capital theoretical model to provide further clues about the relationship of technology with the levels and growth of health spending.

Discussions about technology in healthcare have focused primarily on investments in physical capital (e.g. MRI and CT machines), productive innovations (e.g. health information technology) and the development of procedures (arguably a form of physical capital) [see, for example, Glied^[2], Newhouse^[5], Cutler and McClellan^[9]]. The investment in training people to carry out health-related procedures or to use, for example, imaging

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machines is missing from the literature. According to a labour economics perspective, human capital often works as a complement to physical capital, whereby advances in physical capital and productive technologies require parallel advances in the labour force who need to gain knowledge to operate the technologies, which is also known as technology-skill complementarity.^[10] These new technologies do not necessarily make labour more efficient but rather improve the quality of the labour output, which is an often-sought objective when providing healthcare (see, for discussion, Cutler and McClellan^[9]). As new procedures and techniques become available, more skilled employees are needed to use the technologies. In order to fully appreciate the skill mix of the healthcare workforce, the definition of skilled employees should go beyond the common focus on physicians and nurses to include technicians and other aides.

This article hypothesizes that a human capital framework can be used to understand why some countries have higher health spending levels than others, as well as to understand the impact of human capital on health spending growth. This article modifies the Mincer wage rate model, which is well known in labour economics, to frame how human capital investment (e.g. years of schooling) is related to healthcare wage rate as well as health spending levels. The model is then further modified to focus on the probable future trajectory of healthcare wage rate growth; a discussion of the results and the impact on health spending follows. This article builds a model based on data trends in Australia, Canada and the US, and produces an approximation based on stylized assumptions; an econometric analysis is not conducted, given the focus on only three countries and the use of aggregate-level data for the key variables of interest. The US, Canada and Australia were chosen because they can easily be cross-walked to the International Standard Industrial Classification System for wage rate and labour data.

1. The Mincer Model

In the labour economics literature, human capital is defined as the embodiment of knowledge and skills in an employee. An increase in an employee's knowledge and/or skill translates to an increase in their contribution to society such that the employee is able to produce more goods or services or to develop innovations. Schooling and work experience are the two primary means of gaining knowledge and skills. While years of schooling alone has been used to proxy human capital levels in macroeconomic growth models, a more recent development uses wage rate as a measure of human capital, which is a common approach in the labour economics literature.^[1,11]

The wage rate reflects the financial reward (or rate of return) that employers place on additional skills gained from schooling relative to more years of work experience.^[12] The most well known model that relates wage rate to human capital investments is the Mincer model. In this model, the natural log wage rate (W) [also referred to as earnings] is a function of years of schooling (S); rate of return to schooling (r); years of experience, measured as the difference between the current age and the age that work started after S years of schooling (X); and years of experience squared (equation 1):

$$\ln(W) = \beta_0 + rS + \beta_1 X + \beta_2 X^2 \quad (\text{Eq. 1})$$

where β_0 , β_1 , and β_2 are regression coefficients to be estimated. Given that r is also a coefficient to be estimated, r is technically the marginal effect of schooling on wages; the common reference to r is "rate of return to schooling" (assumed to be a constant value across time) [see, for example, Heckman et al. ^[13]] Additionally, a more accurate measure of rate of return to schooling would take into account the cost of education, but this is

ignored in this article due to data limitations; the implication is discussed in the Discussion section.

Wage rate human capital models are often used for two purposes: (i) to estimate the rate of return for specified levels of attainment in schooling; and (ii) to estimate the optimal balance for an employee between years of schooling and experience, presuming a rate of return equal to the discount rate or an interest rate one would receive if they invested their work earnings rather than spend their time in school. If the rate of return is higher for schooling than the interest rate, the employee is likely to invest more years in school.^[14] From the employee's perspective, the motivation for investing in more years of schooling is the expectation of additional earnings; the opportunity cost is lost earnings while in school, i.e. wages that could have otherwise been gained from additional years of work experience. The social costs of a person not participating in the labour force and the social benefits of a person pursuing education (i.e. social rate of return) are not considered in the Mincer model.

2. Relative Wage Rates

A ratio of logged wage rates in one country versus another can be used to compare human capital investment across countries. First, a simplification is used in the macroeconomic growth literature: the years of experience is assumed to be approximately equivalent across countries, hence the term for years of experience drops out of the ratio,^[15-17] such that equation 1 without years of experience can be reduced to equation 2:

$$\ln(W) = \beta_0 + rS \quad (\text{Eq. 2})$$

A lifecycle model is assumed in order to simplify issues of employees entering and exiting the workforce; employees who enter the workforce at later ages may receive less in wages than a younger counterpart with the same years of education but more years of potential work experience.

Equation 2 can be rearranged with exponentiation of both sides to express the equation in terms of wage rate (equation 3):

$$W = ce^{rS} \quad (\text{Eq. 3})$$

where c is a constant resulting from the exponentiation of β_0 . This form is conducive for making statements about comparisons across countries and across sectors. A ratio of wage rates between country x and the US would be as shown in equation 4:

$$\frac{W_x}{W_{US}} = \frac{c_x e^{r_x S_x}}{c_{US} e^{r_{US} S_{US}}} \quad (\text{Eq. 4})$$

Before applying a cross-country comparison of wage rates, the education of employees within a chosen sector in each country should be standardized to the education of all industry employees in the country. This standardization approach prevents possible exacerbation of differences in education seen across countries. Following a similar form to equation 4, the within-country comparison of wage rates at any point in time for healthcare relative to the economy can be expressed as shown in equation 5:

$$\frac{w_H}{w_E} = \frac{ce^{rS_H}}{ce^{rS_E}} \quad (\text{Eq. 5})$$

where w_H is the average wage rate of the healthcare sector, using the Mincer model; w_E is the average wage rate of all employees in the economy, using the Mincer model; S_H is the average years of schooling of healthcare employees; and S_E is the average years of schooling of all employees.

Similar to the assumption that years of experience are similar across countries, the same assumption is used across sectors within countries (and hence across countries). While this may not be a realistic assumption, the impact of the simplification is a second-order effect on the final results.

In the wage rate calculation, r and c are values unique to a whole country and do not vary by sector. In equation 5, c is constant and cancels out of the equation. Rate of return (r) is also assumed to be time invariant, for which there is some evidence.^[18,19] Rate of return would increase over time if the market values more years of education with higher wages and/or values fewer years of education with lower wages, i.e. the wage inequality gap increases. In the context of comparing across countries, assuming a constant rate of return value means that the wage inequality gap is assumed to grow at the same rate in all countries. This is a slightly unrealistic simplification, and is left for future research, given the historical trends in wage inequality with the implications touched on briefly in the Discussion section. In the 1970s, all three countries under study saw similar decreases in wage gaps, followed by a modest increase in the 1980s in Canada and Australia and a large increase in the US.^[20] In the 1990s, skills-based technical change occurred concurrently with the computer revolution and was coupled with immigration; this further increased the wage gap in the US compared with the other two countries.^[21,22] Given these two simplifications for c and r , equation 5 simplifies as shown in equation 6:

$$\frac{w_H}{w_E} = e^{r(S_H - S_E)} \quad (\text{Eq. 6})$$

Conceptually, combining the wage rate ratio (equation 4 for across countries and equation 5 for across sectors), the human capital framework for cross-sectional wage rate differences can be expressed as shown in equation 7:

$$\text{Relative Healthcare Wage Rate} = \frac{f_x c_x (w_{sH} / w_{sE})}{f_{us} c_{us} (w_{usH} / w_{usE})} \quad (\text{Eq. 7})$$

which is the healthcare wage rate relative to the wage rate of all industry employees, allowing for fringe benefits plus tax (f) in country x relative to the US.

3. Wage Rate Growth

Equations 4-7 are static wage rate models and do not state anything about wage rate growth. The average wage rate (before taxes and not including fringe benefits) of healthcare employees has been growing at approximately the same rate as employees of all industries in Australia, Canada and the US (figure A1 in the Supplemental Digital Content 1, <http://links.adisonline.com/APZ/A25>). The average wage rate of the healthcare sector in the

calculation is based on a broad industrial classification of health services that includes social services.

Long-run wage rates grow at approximately the same rate as GDP per capita, a well documented phenomenon in the macroeconomic literature. The total average cost of healthcare labour (the sum of wage rate, taxes and fringe benefits) in the US also grows at approximately the same rate as potential GDP per capita, where potential GDP is a trended GDP without the economic shocks (figure A2 in the Supplemental Digital Content). The parallel trend of healthcare wage rate and potential GDP per capita is also likely to be occurring in Australia and Canada, since generally wage rates must grow by the rate of GDP over the long run (30–50 years). However, taxes and fringes have been growing slightly in Australia and Canada rather than remaining constant as in the US (data not shown), although historical data on taxes and fringes are limited. These trends can be extrapolated to suggest that growth of wage rate is due to the growth of GDP, while the level of wage rate is influenced by some other factors, namely the inputs to human capital.

Human capital is usually thought of as the stock of human capital that leads to higher production levels, but it does not affect the rate of growth.^[12,17] One approach based on historical trends displayed in figure A2 in the Supplemental Digital Content is to model the wage rate growth of the healthcare sector within a country as a function of potential GDP by accounting for wage-level differences using equation 6, along with additional multipliers representing total labour cost, which leads to equation 8:

$$\widehat{W}_t = f d_1 \frac{w_H}{w_E} \widehat{G}_t \quad (\text{Eq. 8})$$

where $\widehat{W}$ is the estimated wage rate including fringes and taxes of healthcare employees; f is a multiplier for fringe benefits (401K, health benefits, etc.) and taxes (e.g. employer taxes for Medicare and Social Security) [f is assumed to be constant]; d_1 is the ratio of the wage rate of all employees, w_E , and potential GDP per capita (d_1 is assumed to be constant); w_H is average wage rate of the healthcare sector using the Mincer model; w_E is the average wage rate of all employees in the economy using the Mincer model; $\widehat{G}$ is the potential GDP per capita; and t is time. The ratio of w_H/w_E is assumed to be constant because the changes in years of schooling over time are assumed to be the same in the healthcare sector as in all other sectors; again, this is further discussed in the Discussion section.

Plugging in equation 6, which includes the Mincer model, equation 8 can be expressed as equation 9:

$$\widehat{W}_t = f d_1 e^{r(S_H - S_E)} \widehat{G}_t \quad (\text{Eq. 9})$$

The value of d_1 is close to 1.0 in the three countries (1.02 in Australia, 0.92 in Canada and 1.24 in the US), which is expected given that GDP is an indicator of the average income in a country.^[23-26] There has been a slight downward trend in the ratio due to changes in labour participation rates (e.g. increase in female employees).^[21] The higher value in the US is most likely a result of the short time line analysed in this paper, but, in the very long run, the average wage rate of all industries must cycle closely to GDP.

The Mincer model is a measure of gross earnings that includes employee's tax contributions, bonuses, tax deferred savings, etc. Analysis of fringe benefits plus taxes (defined as employer's legal obligations) in the US shows that it has been near constant as a share of compensation over the last 15 years for the general population.^[26-28] The same applies for

healthcare employees in the US. [26-28] Data are not available on compensation for healthcare employees in Australia and Canada. Limited data on fringes and taxes in Australia and Canada show growth of <0.5% per year (controlled for inflation and population growth). [29-31] However, for ease of calculation, the fringe benefit plus tax is assumed constant in the three countries; for the average employee, a multiplier of 1.20 is used to model fringe benefits plus taxes in the US; 1.14 in Australia and Canada.

4. Rate of Return and Advanced Education

Psacharopoulos^[32] and Psacharopoulos and Patrinos^[33] have provided the most common source of rate of return values internationally using the Mincer model, such that each country's rate of return value has been calculated using survey samples of employees. However, their work has limitations when doing cross-country comparisons, mainly being differences in definitions of rate of return (private vs social), sample of employees, years and data collection process. Also, their work only estimated rate of return through secondary education, with little focus on higher levels of education. This article makes an argument for the necessity of including all years of education for a more telling rate of return value.

A cross-sectional rate of return can be estimated using the logarithmic form of the Mincer model in equation 2. The main dependent variable, wage rate, is taken from the OECD Educational Outlook Data; [34] data are expressed at the national level as the relative average earnings for citizens at each major level of educational attainment (tertiary type B education set equal to 100 in figure 1). Using educational levels (below upper secondary represents approximately 8 years of education, upper secondary about 12 years, post-secondary non-tertiary about 13 years, tertiary type B about 14 years, tertiary type A about 17 years) as the independent variable, rate of return is the parameter of interest to be solved using an ordinary least squares approach. The benefit of the approach shown here is the ability to use aggregate-level data that may be more easily accessible and standardized than individual-level survey data that may have considerably different timeframes and methodology.

The rate of return estimates are significant at $p \leq 0.01$ for each country, which confirms Mincer's concept that years of schooling significantly contribute to the increase in wage rates (table I). In the first column, the average rate of return is 8.4% across the three countries, which is within range of the average rate of return (9.0%) across the three countries as reported by Psacharopoulos and Patrinos^[33,36]; differences may be attributable to sample, data source and years of availability.

Most literature on returns to education combines advanced degrees (i.e. MD, JD, PhD and master's) with bachelor's degrees in one category (i.e. tertiary type A and advanced research programme) often because of how data are collected. The combining of the higher years of schooling (bachelor's, master's, professional and doctorate degrees) results in an underestimation of the average rate of return using the Mincer model. A bachelor's degree is approximately 16 years of schooling, while the highest level of education (a medical degree) is approximately 23 years (4 years of medical school plus 3 years of residency) for a general practitioner (GP) and 27 years (7 years of residency) for a specialist or surgeon. The estimate for residency requirements is based on the US education system, but the training is fairly similar across industrialized countries. Given only a small percent of the population has a professional or doctoral degree, the high wage rate of this group does not significantly skew the average wage rate calculation when combining wage rates of those with bachelor's and higher degrees. However, separating out the higher levels of education provides a more complete view of, and results in a different picture for, the rate of return for education value.

In an effort to analyse the rate of return for the full spectrum of educational levels, relative average earnings at the highest levels of education – medical degrees – was taken from the

recently re-instated health professional remuneration data in the OECD Health Data, which is a conservative estimate,^[35,37,38] this article uses data for self-employed rather than salaried GPs and specialists, which may be a slight overestimation of the average physician wage rate. Equivalent data on other professional (non-medical) and doctoral degrees are not available across the countries. Extending years of schooling to include the highest levels of education (i.e. medical degrees) and then estimating equation 2, results in an average rate of return of 11.6% in the three countries, again each statistically significant at $p \leq 0.01$ (table 1). The confidence intervals of the rate of return overlap in this estimation as well as in the estimation without the extended years of education, which suggests that the rate of return values do not differ significantly across countries. A two-sample t-test with equal variances suggests that the population average years of schooling are not significantly different ($p \leq 0.01$) across countries.

Given the difficulties in defining physician wage rates and the small samples compared with other education levels, a sensitivity analysis suggests that every increment of 100 (approximately equal to the GDP per capita in national currency units [NCU] in each country) in a GP's income alone, in a specialist's income alone, and in a combination of the two increases the rate of return by 0.7–0.8%, 0.6–2.0%, and 1.3–2.0%, respectively. Even after a conservative estimate of physician income in each country (100 increments below the data used in the analysis), the rate of return using advanced years of education is at least half a percentage point higher than when combining the higher education levels.

5. Wage Rate and Years of Schooling

The Mincer model can be rearranged to approximate the average years of schooling among employees in a particular sector – data that are often not available – using the rate of return estimated in Section 4 and the actual average healthcare wage rate (W_H);^[26] the result is only an approximation, since the Mincer model estimates the market value of education. Using the rate of return through advanced degrees in table I, and solving for S in the Mincer model for each country (equation 10):

$$S_H = \frac{\ln(W_H/c)}{r} \quad (\text{Eq. 10})$$

the average years of schooling among healthcare employees is 11.9 years in Australia, 11.8 years in Canada and 13.9 years in the US (table II).

Including social services in the 'years of schooling' calculation in equation 10 results in a slight underestimate of the average years of schooling of healthcare employees. Social services generally have a lower average wage rate than other categories of the healthcare sector (based on observations of the US data) [data not shown], which reflects a slightly less educated population, possibly driven by the lower proportion of physicians and nurses in the category. However, wage rate data separating out social services are not available in Australia and Canada, so actual wage rates of healthcare employees are not available.

Table II shows the data for the average years of schooling of the working population in Australia, Canada and the US. The table shows that the three countries have had similar levels of average education over the last 35 years. The average number of years of schooling increases by between one-half and 1 extra year every decade.^[20] One reason for the increasing level of education over the last few decades is the growing share of the population continuing beyond high school for more advanced degrees. Given the lack of data on the average education of healthcare employees in 1970 in all three countries, this article makes a simplifying assumption that the average education of the working population

increases at approximately the same rate as for healthcare employees. Therefore, the years of schooling is not modelled as time dependent, with the assumption that the difference in years of schooling between the total working population and healthcare remains constant over time. Time dependency of the gap in the years of schooling has been found by the author to have only a second-order effect on the overall modelling findings.

6. Do Australian Healthcare Employees Have Low Education or Low Wages?

Based on table II, US healthcare employees have an average of 1 year more of schooling than the average working population. Estimates based on limited data support this difference.^[26,28,39] Again, based on table II, healthcare employees in the US have 2 years more education than health employees in Australia and Canada. Lower average years of schooling among health employees in Australia and Canada versus the US might be due to the mix of employees with varying education levels. For example, Australia and Canada have fewer surgeons (0.2 and 0.1 per capita, respectively, in 2005) than the US (0.5 per 1,000 population) and Australia has more GPs (1.4 per 1,000 population in 2005) than the US and Canada (1.0 and 1.0 per 1,000 population, respectively);^[35] one interpretation is that the difference reflects the Australian and Canadian healthcare systems' orientation towards preventive care as a means to enhance the health status of their population.

The data also suggest that healthcare employees in Australia and Canada are less educated than the general working population. However, limited data from the Australian Bureau of Statistics^[29] suggest that Australia's healthcare employees actually have approximately 1 more year of schooling than the general working population, just as in the US. Given that the numbers of non-physician and non-nurse healthcare employees per 1,000 population are higher in the US (28.7) and Canada (29.9) than in Australia (23.0),^[35] this inconsistency between the educational levels indicated by the Mincer model and the actual data leads to the conclusion that Australia's healthcare employees are working at a wage rate below market value.^[35] Data on the actual average education by sector in Canada are not available to conduct a similar analysis. Thus, this article assumes that Canada, on average, may also be underpaying their healthcare employees.

7. Application of the Model Within and Between Countries

Table III summarizes the parameters discussed throughout this article for each country: rate of return for schooling; ratio of healthcare wage rate relative to the average wage rate of the total economy, taking into account years of schooling; average wage rate of the total economy relative to potential GDP; and tax and fringe multiplier. Figure 2 shows the results of the total healthcare labour cost using equation 9, based on the parameter values in table III, compared with the growth of potential GDP for a reference point. The results in figure 2 provide information about how healthcare wage rate performs relative to the general economy within a country. The healthcare wage rate level is higher than potential GDP in Australia and the US, while lower in Canada. The US has the widest spread between the two, which according to the Mincer model is due to the higher average number of years of schooling of healthcare employees.

The wage rate per healthcare employee (accounting for fringe and taxes) in Australia is 64% of that in the US and in Canada it is 53% of that in the US. The difference in healthcare wage rates between the US and Canada and Australia is attributable to US healthcare employees having approximately 2 years more education and a higher rate of return for education (tables I and III).

8. Discussion

Rate of return to education is an indication of how a society rewards education. The rates of return are not significantly different from each other across the countries and may be even more similar when the cost of schooling is considered. In the US, the higher rate of return may be a way of compensating for the high cost of schooling. Alternatively, the wage inequality gap is possibly rising faster in the US than in Australia and Canada, which would lend to a higher rate of return in the US. However, this article argues that rate of return could be a point of comparison to understand wage rate differences across countries and that calculations should include all levels of education. By not separating out the highest levels of education, the rate of return may be underestimated by 2.1–3.8%. Countries that look towards industrialized countries for lessons learned should carry out further research to understand if there is a positive association between high cost of schooling and high health spending.

This article also suggests that healthcare employees in the US may, on average, be more educated than those in Australia and Canada. The lower years of schooling among healthcare employees in Australia and Canada may be a reflection of a health system more focused on primary care, such that more GPs and nurses provide preventive care. Indeed, the higher average education levels of healthcare employees in the US may be due to the mix of occupations – specialists, GPs, nurses and other types of administrators and technicians; however, further research is necessary to investigate the differences in schooling by specific occupations.

This article used a broader definition of healthcare employees than the limited definition often used in the literature. However, many other categories of healthcare-related employees are still excluded, such as those who work in private insurance companies, government and R&D-related sectors. This article only considered healthcare employees as defined by the common set of industrial codes across the three countries. Future research could expand the view of human capital investments and the interaction with other forms of technology (e.g. physical). Of particular relevance is the human capital investment of scientists and researchers who underlie the development of the advanced medical equipment, technologies and medicines and how this additional human capital cost may be contributing to health spending.

In terms of growth, healthcare wage rates in all three countries appear to be growing similarly to the GDP. The trend is most likely a reflection of the wide array of people who work in the healthcare industry, many of whom have transferable skills. Other countries that plan to increase health spending are wise to consider the mix of occupations, relative wage rates and return for education relative to health spending, keeping in mind that fewer highly educated specialists in turn for more GPs trained to provide preventive care may have a positive impact on health spending.

9. Conclusions

This article provides a framework for modelling one aspect of technology investment – human capital – in healthcare, relative to other industries and other countries. According to the model, within a country, healthcare wage rate levels differ from other sectors of the economy because of differences in the average years of schooling of the employees in each industry. Differences in healthcare wage rates across countries may be due to the US having a higher average educational level of healthcare employees and a higher rate of return for education. The healthcare wage rate growth appears to be increasing at a constant rate

relative to GDP. These results should be interpreted with caution given the limited statistical evidence due to small sample size.

In addition, the US has more healthcare employees per capita than Australia and Canada, which (in combination with the higher wage rates) could be contributing to the higher levels of health spending in the US. The steady growth of healthcare wage rates suggests that wages are not the culprit for healthcare spending growing at faster rates than GDP.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Fig. 1. Mincer model rate of return: relative wage rate versus education through advanced degree.^[34,35]

a.

b.

c.

Fig. 2.

Annual wage rate per healthcare employee estimated using the Mincer model, and potential GDP per capita, 1970–2005. (a) Australia, (b) Canada, (c) US. Annual wage rate per healthcare employee calculated using equation 9; controlled for inflation (base year 2000). NCU = national currency unit.

Table I

Rate of return (%) estimation using the Mincer model (Australia, 2001; Canada, 2002; US, 2003; rate of return using equation 2; all values significant at $p \leq 0.01$)^a

Country	Through 17y of education	Through 27y of education (advanced degree)
Australia	6.6 (2.6, 10.6)	10.4 (7.5, 13.3)
Canada	7.6 (3.8, 11.4)	11.3 (9.2, 13.5)
US	10.9 (7.9, 13.9)	13.0 (11.0, 15.0)

^aFor 17 years of education, an exponential curve was fit based on 5 observation points of national average wage levels at select levels of schooling. For 27 years of education, an exponential curve was fit based on 7 observation points of national average wage levels at select levels of schooling (as illustrated in figure 1). All figures are presented as % (95% CI).

Table II

Average years of schooling among working population vs Mincer estimated years of schooling for the healthcare industry^a

Country	Total work force ^[20]			Healthcare 2002
	1971	1998	2002	
Australia	11.1	12.3	12.5	11.9
Canada	11.4	12.9	13.1	11.8
US	11.6	12.7	12.9	13.9

^aYears of schooling for healthcare industry calculated using equation 10.

Table III

Summary of final model parameters

Category	Parameters	Australia	Canada	US
Mincer return	r	10.4%	11.3%	13.0%
Healthcare wages relative to average wage rate	w_H/w_E	0.94	0.86	1.14
Average wage rate relative to GDP	d_1	1.02	0.92	1.24
Tax + fringe multiplier	f	1.14	1.14	1.20