

THE MARKET FOR LAWYERS IN BRITISH COLUMBIA

by

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ABSTRACT

This thesis analyses the dynamics of the market for lawyers in British Columbia from 1951 to 1983. Its specific objective is to empirically examine the hypothesis that there is an over supply of lawyers, which, because of potential negative externalities (a reduction in the quality of legal services), requires action to reduce the number of practicing lawyers or, at least, restrict the growth in the number of lawyers.

Two alternative economic models, which appear consistent with cyclical swings in and growth of the number of lawyers in British Columbia are used to test the "over supply" hypothesis. The first model is based on "A Recursive "Cobweb" Model of the Market for New Lawyers", by R. Freeman, and the second is based on "The Determinants of the Demand for and Supply of Lawyers", by B.P. Pashigan.

The recursive "cobweb" model seeks to examine whether an over or under supply of lawyers exists due to short term disequilibrium phenomena. This disequilibrium is said to result primarily from the four year lag between the decision to enter law school and the granting of a license to practice law. The model examines the market dynamics to determine whether the market adjusts to this lag without the necessity of controls on the number of new lawyers.

The second model looks at the market for lawyers in terms of its adjustment to long-run equilibrium. It is the contention of this model that the market has been slow to adjust and the actual number of lawyers has never been equal to the estimated long-run equilibrium number. This adjustment of the market to long-run equilibrium should be considered to determine if more controls on an already heavily regulated industry are necessary.

Both models were estimated for the period 1951 to 1983. The "cobweb" model was estimated using multiple regression analysis and ordinary least squares techniques. The results suggest that the market adjusts with a lag of approximately four years and that no controls on the number of entrants into law are necessary. The conclusion is that the market is self-correcting and there is no need to interfere in the market. Interference would only increase the rents presently earned by lawyers.

The non-linear nature of the long run equilibrium model leads to a maximum likelihood empirical model in which constraints are imposed on the regression coefficients. The results, when corrected for autocorrelation, were not satisfactory. The regression results were inconsistent with the theory, and the restrictions, imposed on the coefficients by the underlying theory, were rejected. Hence, the cobweb model appears a better explanation of the supply of lawyers and its subsequent policy conclusion stands.

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TABLE OF CONTENTS

Title Page	i
Abstract	ii
Table of Contents	iv
List of Tables	vi
List of Figures	vii
Acknowledgement	viii
Chapter 1 PURPOSE AND SCOPE	1
1.1 Introduction	1
1.2 The Market for Lawyers	1
1.3 Conclusions	15
Chapter 2 MODELS AND DATA	17
2.1 Introduction	17
2.2 The "Cobweb" Supply Model	19
2.3 The Long-run Equilibrium Model	23
2.4 The Data	27
Chapter 3 THE RESULTS OF ESTIMATIONS OF THE COBWEB SUPPLY MODEL	36
3.1 Introduction	36
3.2 The Supply of Law School Entrants (LENT)	36
3.3 The Supply of Law School Graduates (LGRAD)	42
3.4 Estimates for the Determination of Legal Salaries (LSAL)	45
3.5 The Cobweb Supply Model	48
3.6 Conclusions	53
Chapter 4 THE RESULTS OF ESTIMATIONS OF THE LONG- RUN SUPPLY MODEL	55
4.1 Introduction	55
4.2 The Long-run Equilibrium Model	57
4.3 Conclusions	63
Chapter 5 CONCLUSIONS AND PUBLIC POLICY	65
5.1 Introduction	65
5.2 Conclusions Based on Regression Results	66
5.3 Conclusions and Public Policy	68

Bibliography	71
Appendix A	74
Appendix B	76
Appendix C	84

LIST OF TABLES

TABLE	Page
Table 1.1 The Incomes of Lawyers and Other Professions.	5
Table 2.1 Variable Names, Definitions, and Sources	28
Table 3.1 Regression Results: OLS Estimates of the Determinants of The Supply of First Year Law Students (LENT)	38
Table 3.2 Regression Results: OLS Estimates of The Determination of The Supply of Law School Graduates (LGRAD)	43
Table 3.3 Regression Results: OLS and Cochrane-Orcutt Estimates of The Determination of Lawyers Salaries (LSAL)	46
Table 3.4 Regression Results: OLS Estimates of The Cobweb Supply Model with LENT as the Dependent Variable	49
Table 4.1 Regression Results: Non-Linear Estimates of the Coefficients of the Long-run Supply of Lawyers	56

LIST OF FIGURES

Figure	Page
Figure 2.1 Supply of New Lawyers 1951 - 1983	20

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CHAPTER 1

PURPOSE AND SCOPE

1.1 Introduction

The object of this thesis is to model the market for lawyers and to use the model to examine the hypothesis that there is an over supply of lawyers in British Columbia which, because of the possible negative externalities (a reduction in the quality of legal services), requires action to reduce the number of practicing members of the Bar.¹

1.2 The Market for Lawyers and the Possibility of Over Supply

There are two schools of thought about the supply of legal services. One school (comprised primarily of practicing members of the Bar) feels there is an over supply. It points to some, or all of the following real and perceived factors as evidence of a surplus of lawyers:²

- (i) Lawyers' incomes have been declining relative to other professionals.
- (ii) There has been a slowdown in the rate of growth of lawyers' real incomes.

1. R. Chisholm, "The Numbers Problem", Canadian Lawyer, 12, (December 1983).

2. David Stager, "Are There Too Many Lawyers?", Canadian Public Policy, (June 1983), IX, 2, p. 245.

- (iii) The unemployment rate of lawyers has been increasing.
- (iv) The rate of return to legal education has been declining.
- (v) There has been an increase in the number of lawyers per 100,000 population.
- (vi) The quality of legal services has deteriorated.

The only answer, presumably because the market for lawyers adjusts only slowly to supply and demand changes, is to actively intervene to reduce the number of lawyers.³

The other school argues that if supply is greater than demand it is a temporary condition which can be corrected by allowing the market to work. The argument runs as follows. For potential entrants, the number of places in a law school is dependent on demand for places which itself is derived from the demand for lawyers. If a surplus of lawyers exists, a reduced price and income

3. A representative statement is "In a recent survey of some 13,000 lawyers in the province [Ontario] conducted by the law society of Upper Canada, of the 58% who responded, 72% believed that controls on the numbers of new lawyers would benefit the public, and 85% felt that such controls would benefit the profession. This sentiment seems to be based on a growing concern about increased competition for legal work and a perception of declining standards of professional conduct." Curtis Cole, "A Developmental Market: Growth Rates, Competition and Professional Standards in the Ontario Legal Profession, 1881 - 1936", Canada-United States Law Journal, (1983), 6, p. 126.

would lead to a reduction in supply (some practicing lawyers would exit, temporarily or permanently), a reduction in the demand for admissions, and a removal of the surplus. Any attempt to intervene in the market is merely a ploy to protect the rents currently earned.

The result is that there are two opposing hypotheses about the way the market for lawyers works. The only way to settle the argument is empirically, by modeling the supply and demand for lawyers and estimating the speed of adjustment. While this is the main thrust of the thesis, it is useful initially to consider the strength and relevance of the arguments listed as (i) to (vi) above.

(i) Lawyers' Relative Income

There will be a surplus of lawyers in the short run if labour supply is greater than labour demand at the prevailing wage rate. In this context, a decrease in the incomes of lawyers of course is not indicative of a persistent surplus. The decline in lawyers' real incomes may be a normal market adjustment to demand and supply conditions. Supply adjustment is slow due to the length of law school education, and the demand for legal services closely follows the level of economic activity.⁴

4. David Stager, "The Market for Lawyers in Ontario: 1931 to 1981", Canada-United States Law Journal, (1983), 6, p. 113.

For these reasons it is possible for the market to deviate from equilibrium in the short run and for earnings to adjust accordingly. In addition, although the average real earnings of lawyers may have declined, this may be due to an increasing number of new lawyers who tend to earn less.⁵ A more detailed examination of the evidence is, therefore, needed before the legal profession can conclude that declining salaries are indicative of a surplus and hence that policy action is needed.

Consider for example, Table 1.1, column 1 which shows the real income of lawyers (including notaries) as a proportion of other professionals from 1950 to 1983. An examination of the data in column 1 shows that relative earnings of lawyers in British Columbia have not declined. In fact the reverse has been true. Therefore, on the face of it there is no evidence that a persistent surplus of lawyers exists.

(ii) Rates of Income Growth

With regard to rates of income growth, again consider Table 1.1. In examining columns 2 and 3, the data show that lawyers' real incomes are growing at a

5. Timothy Muzondo, and Bohimir Pazderka, Professional Licensing and Competition Policy: Effects of Licensing on Earnings and Rates-of-Return Differentials (Ottawa: Consumer and Corporate Affairs Canada, 1979), p. 47.

TABLE 1.1

Year	<u>COLUMN 1</u> ¹ Lawyers Incomes/ Income of Other Professionals	<u>COLUMN 2</u> ² % Change in Lawyers Real Incomes (1971=100)	<u>COLUMN 3</u> ³ % Change in Real Income of Profes- sionals (1971=100)	<u>COLUMN 4</u> ⁴ Lawyers per 100,000 Popula- tion
50-55	1.14	-11.47	5.86	70.80
55-60	0.95	9.69	6.65	82.34
60-65	0.98	22.48	8.75	84.58
65-70	1.10	18.52	19.23	87.37
70-75	1.10	23.38	8.03	90.56
75-80	1.25	-19.70	-22.92	112.54
80-81	1.30	3.25	- 5.55	141.26
81-82	1.43	- 0.06	1.36	147.05
82-83	1.40	- 5.98	-12.07	163.20

1. Source: Revenue Canada Taxation, Taxation Statistics, (Ottawa: Operations Research and Statistics Division), various pages, 1953 to 1986.

2. Source: Revenue Canada Taxation, Taxation Statistics, (Ottawa: Operations Research and Statistics Division), various pages, 1953 to 1986; and Statistics Canada, Consumer Prices and Price Indexes, (Ottawa: Supply and Services Canada), Catalogue 62-010, various pages, 1986.

3. Source: Revenue Canada Taxation, Taxation Statistics, (Ottawa: Operations Research and Statistics Division), various pages, 1953 to 1986; and Statistics Canada, Consumer Prices and Price Indexes, (Ottawa: Supply and Services Canada), Catalogue 62-010, various pages, 1986.

4. Source: Unpublished data from The Law Society of British Columbia; and Statistics Canada, Population Estimates, (Ottawa: Supply and Services Canada), Catalogue 91-581, various pages, 1986.

faster rate than those of other professionals. From 1955 to 1983, legal incomes have generally risen more than other professionals, or fallen less than other professionals. During the recession of the 1980's, lawyers' incomes have suffered considerably less than those of other professionals. Therefore, if the rate of income growth is considered as evidence of over supply, the existing evidence does not support this proposition.

(iii) Unemployment

If an increasing unemployment rate of lawyers is used as a measure of excess supply, the existing evidence tends to cast some doubt on the validity of the over supply argument. Data on the unemployment rate of lawyers by Province do not exist. However, Ontario has 51% of the lawyers in Canada, (1979)⁶, and if we assume that ceteris paribus, the unemployment of Ontario lawyers proxies all Provinces, then the evidence is somewhat inconsistent with the notion of over supply. In a recent report, for example, it was found that "young" lawyers in that province do not suffer from a great deal of unemployment.⁷ Of course, if differences exist in

6. George Finlayson, et. al., The Unknown Experts: Legal Specialists in Canada Today, (Ottawa: 1983), p. 82.

7. It should be noted that the Finlayson study suggests that unemployment in Ontario is quite low. "The unemployment on completion of the Bar Admission Course

regional economic activity, which they undoubtedly do,⁸ the situation could be different in British Columbia. However, with no empirical evidence the point is moot.

One factor which could alleviate potential unemployment in British Columbia is that advertising by lawyers has recently been permitted by the Law Society of British Columbia.⁹ Therefore, "young" lawyers who open their own practices can now advertise to attract business, where they would previously have had to rely on

for 1975, 1976, and 1977 law school graduates was approximately 41%. Thirty days after the Bar Admission Course, 24% of the 1975 graduates, 26% of the 1976 graduates and 29% of the 1977 graduates did not have positions. Six months after the Bar Admission Course 9.3% of the 1975 graduates, and 7.9% of the 1976 graduates did not have positions... Four percent of the 1975, 1976 and 1977 law school graduates were still not employed at the end of this survey - and half of these...[2 percent] had no jobs at all." *ibid.*

8. From 1983 to 1986 unemployment averaged 8.6% in Ontario while in British Columbia it averaged 10.5%. At the same time Gross Domestic Product in Ontario grew an average of 10.5% per year, while in British Columbia it grew 5.2% per year on average. These figures show that there are differences in regional economic activity between these two provinces. See Statistics Canada, Historical Labour Force Statistics - Actual data, Seasonal Factors, Seasonally Adjusted Data, 1987, Catalogue 71-201 (Ottawa: Minister of Supply and Services Canada, 1988); and Statistics Canada, System of National Accounts - Provincial Economic Accounts Historical Issue 1961-1986, (Ottawa: Minister of Supply and Services Canada, 1988).

9. The Law Society of British Columbia, Professional Conduct Handbook, (Vancouver: The Law Society of British Columbia, 1988), p. 15-23.

"word of mouth" or referrals to obtain clients. Thus, although average income might decrease, employment may increase. At the same time, increased advertising may shift the demand curve for lawyers to the right, therefore, increasing employment, while leaving average income the same or increased. Both inexperienced and experienced lawyers can now relocate within the Province reducing somewhat the difficulty of it taking years to build up a successful practice through the more traditional means. Whether or not this will occur remains to be seen.

(iv) Rates of Return

As aforementioned, the supply of lawyers is quite slow to adjust to changes in demand. This is due to the fact there is a lag between the initial decision to enter law and the right to practice, of approximately four years. Students will conceivably enter law when they perceive a higher than normal rate of return. However, when these students graduate, supply may have increased, while demand for services may have decreased or remained the same. If this were the case, rates of return to legal education may not be as high as initially perceived. An increasing supply, given a slowdown or decrease in demand, will lead to lower incomes and therefore, lower rates of return. In examining the data

in column 1 of Table 1.1, it is clear that lawyers' incomes have been, for the most part, above other profession's incomes. One interpretation of these figures is that rates of return to legal education may be too high (excess rents are being earned) and could be a result of restrictive practices.¹⁰ Therefore, if there has been a decline in the return to education it may be that lawyers are now earning a more "normal" rate.

(v) Lawyers Per Capita

Another measure that lawyers often point to as evidence of a surplus, and, therefore, of increased competition, is the number of lawyers per 100,000 population.¹¹ Again in examining Table 1.1, column 4, it can be seen that this ratio has been increasing. If this figure is used as a measure of surplus, a value judgement must be made as to the optimal number of lawyers per unit of population. Without such a value judgement this measure has no empirical usefulness. It cannot justify the current opinion that an increasing lawyer to population ratio is evidence that a surplus of lawyers exists or that competition is increasing. There are many other variables which come into play - lawyers' incomes,

10. Muzondo and Pazderka, op. cit., p. 153.

11. Cole, op. cit., p. 127.

lawyers' workloads, gross national product etc., before any definitive conclusions can be drawn.

(vi) Quality

Members of the legal profession contend that, due to the present surplus of lawyers, real incomes are declining, and therefore, to preserve incomes, lawyers are performing unnecessary work.¹² This phenomenon is what the legal profession describes as a decrease in quality.

In general, as Muzondo and Pazderka point out:

Professional licensing is sometimes seen as being analogous to regulation of "natural monopoly" in that both are designed to remedy the situation where competition does not guarantee a socially optimal outcome.¹³

In other words, professional self-regulation exists to free the lawyer from competitive pressures in order that he/she can act as an agent for the consumer.

The competitive model assumes that the consumer, in his successive purchases, abandons the product he found unsatisfactory and will search for a better alternative. In some cases, however, the option of next purchase either may or may not be available or other means of

12. Stager, "Are There Too Many Lawyers?", p. 245.

13. Muzondo and Pazderka, op. cit., p. 156.

rectifying the damage may not be fully compensatory.¹⁴

Quality control is the most prevalent argument for more regulation in the professions. The clearest statement from the legal viewpoint is from the Jabour judgement:

"Given that "a profession is a vocation of the highest standing..." professionals must submit to additional restraints which are "justifiable in law for they are necessary not only in the interests of the profession, but also in the interests of the public, who trust to the peculiarly high standing and integrity of a profession to serve it well."¹⁵

There exists an asymmetry of information between the provider of legal services and the consumer. The same argument holds for the medical profession. In fact, for all self-regulating professions most producers know much more than most buyers about the technology of production, and characteristics of the commodity produced.¹⁶ Therefore, the professional or lawyer acts as an agent for the consumer in interpreting and applying the law.

14. *ibid.*

15. W.T. Stanbury, "Provincial Regulation and Federal Competition Policy: The Jabour Case", The Windsor Yearbook of Access To Justice, Vol. 3, Offprints, (1983), p. 305-306.

16. R.G. Evans, Strained Mercy, The Economics of Canadian Health Care, (Toronto: 1984), p. 72.

Self-regulation has been provided, by society, for the lawyer so that the lawyer can put aside his economic self-interest and act in the best interest of his/her client.

It is difficult to say whether there has been a decrease in the quality of legal services in recent years since it is such a difficult variable to measure. On the one hand, lawyers would be reluctant to admit that they perform unnecessary work. On the other hand, since most consumers are uninformed as to the amount of work a legal transaction involves, a poll of consumers would be unreliable. If a person feels that his/her legal bill is unjustified or that he/she has been treated unfairly, complaints can be made to the Benchers of the Law Society. One should, therefore, be able to find an increase in the number of complaints as evidence of a decrease in quality, but the number of lawyers has also risen. A more appropriate measure would, therefore, be the proportion of complaints per lawyer. However, even if this statistic could be produced, most consumers do not realize that a complaint service exists, and, therefore, this measure would also prove unreliable.

If econometric estimates indicate a persistent surplus of lawyers exists, additional regulation by the Law Societies may be justified. In the face of an over

supply of lawyers, the agent role of lawyers could be jeopardized meaning lawyers could be more concerned with their economic position rather than the interests of their clients. If this market failure did occur, additional regulation of the supply of lawyers would ease economic pressures and allow practising lawyers to act in the best interest of their clients.

If econometric estimates do not indicate the existence of a surplus, any controls on numbers of new lawyers would only add to the rent extracted by an already heavily regulated industry. A recent study has shown that existing entry regulations are costing consumers dearly in terms of higher prices paid for legal services.¹⁷ Indeed, entry regulations and restrictions on competition are numerous in the legal profession. The entry barriers into the legal profession are of three types. The first type of entry barrier relates to the definition of the legal profession. The "practice of law" is defined in the Legal Professions Act in an extremely wide context and leaves no avenues open to the unsupervised paraprofessional.¹⁸ For instance, with

17. See Muzondo and Pazderka, op. cit., p. 127.

18. The Law Society of British Columbia, Legal Professions Act, (Vancouver: The Law Society of British Columbia, 1988), p. 15.

regard to Notaries Public, the number of licenses granted is restricted by the Law Society of British Columbia. In order for a Notary Public to practice he must obtain a license for that specific area. For example in the City of Duncan, British Columbia, only two licenses for Notaries Public are available.¹⁹ This type of barrier severely restricts competition in the legal profession.

The second type of entry barrier relates to educational requirements. Before becoming a lawyer in British Columbia there are certain educational barriers a person must overcome. A potential law student must receive an undergraduate degree, or complete three years in an undergraduate program. Students are accepted into law school based on the marks obtained in these courses and the mark they receive on the Law School Admissions Test. After successful completion of at least three years of law school a student must article with a law firm for one year. Finally, after all of these requirements are met, the student is permitted to write the bar examination, and if he/she passes, he/she will "be called to the bar." Only after all of these requirements are successfully met is the person permitted to practice law. The longer it takes to complete the

19. James L. Whittome, Barrister and Solicitor.

education process, the greater is the entry barrier into the profession. Length of education is obviously taken into account when a person considers entering law.

The third type of entry barrier is geographical in nature. For a law student to practice law in British Columbia, he/she must have completed his/her articles and written his/her bar examination in this province. A lawyer practicing in any other part of Canada cannot practice law in British Columbia without first successfully writing the British Columbia bar examination. This type of entry barrier severely restricts the supply of lawyers in British Columbia and keeps the rents presently earned at a high level.

1.3 Conclusions

From the foregoing it is evident that it is at best debatable whether a perceived surplus of lawyers exists. The key to answering this question is analyzing the supply of lawyers in a more sophisticated way. This is done here by estimating two²⁰ economic models of the supply of lawyers in British Columbia from 1951 to 1983.

20. The models estimated are in the papers by Richard B. Freeman, "Legal "Cobwebs": A Recursive Model of the Market for New Lawyers", Review of Economics and Statistics, (1975), p. 171-79 and by B. Peter Pashigan, "The Market for Lawyers: The Determinants of the Demand for and Supply of Lawyers", The Journal of Law and Economics, (1977), p. 53-85.

The first is a short run recursive model emphasizing "cobweb" fluctuations; and the second is a long run equilibrium model emphasizing "rational expectations" and long run growth. Both models seem appropriate as the underlying evidence in British Columbia - cyclical fluctuations in supply and long run growth - is common to both models. Therefore, the thesis proceeds as follows: In Chapter II, (and Appendices A and B) the theoretical models are reviewed; and the data necessary to estimate the models are outlined. In Chapter III, (and Appendix C) the "cobweb" results are reported. In Chapter IV, the long run results are reported. Conclusions as to the applicability of the models and the implications for excess supply are considered in Chapter V.

CHAPTER II

Models and Data

2.1 Introduction

An extensive literature exists on the legal services industry particularly in the United States.¹ However, few economic models have been developed to explain market behaviour in the industry in the United States, and none have been developed specifically for the Provincial legal markets in Canada. Two methods of estimating the supply of lawyers have been developed in the United States. These are by Richard B. Freeman², and by B. Peter Pashigan³.

1. See for example, Robert G. Evans and Michael J. Trebilcock, Lawyers and the Consumer Interest, (Canada: Butterworth and Co., 1982); A.W. Sweeny, "Legal Advertising: A Preface to the Journey Ahead", Capitol University Law Review, Vol. 7, (1977), p. 173-175.; R.H. Staton, "Access to Legal Services Through Advertising and Specialization: Comment", Indiana Law Journal, Vol. 56 (1977-78); Lawson A.W. Hunter, Canadian Competition Law and Occupational Regulation Notes on the British Columbia Law Society Cases, No. WSV-9, (University of Toronto Faculty of Law, Law and Economics Programme, December 1982); S. Colvin, et. al., The Market for Legal Services, Working paper #10, prepared for the P.O.C. (Toronto: Ministry of the Attorney General of Ontario, 1978); Roger D. Blair, and Stephen Rubin, Regulating the Professions, (Toronto: D.C. Heath and Company, 1980).

2. Freeman, op. cit., p. 171-79.

3. Pashigan, op. cit., p. 53-85.

The Freeman model was developed to attempt to explain the increase in the number of new lawyers and the increase in enrollment in law school in the United States during the 1960's. It does this by applying a recursive "cobweb" model to the market for lawyers. The Pashigan model differs from Freeman's in that Pashigan feels that "cobwebs", which result from inaccurate expectations, are unimportant. Lawyers, he argues, are not limited to pursuing a career in law. When they feel earnings are too low, other job avenues can be pursued. In addition, according to Pashigan, if students were to consistently make forecast errors, profits could be made by law schools.⁴ However, in both the U.S. and Canada this has not occurred. This suggests that students do not make the same forecasting errors over and over again and therefore, that the "cobweb" model is inappropriate. Nevertheless, the "cobweb" model will be estimated since it is not known if a model is appropriate until it has been tested. Therefore, although the concern is with the supply of lawyers, the data also provide a test of appropriateness of the model.

These two different models and approaches will be discussed in sections 2.2 and 2.3 of this Chapter. This

4. Pashigan, *op. cit.*, p. 55.

is followed by a discussion in section 2.4 of the availability of data with which to model the market for lawyers in British Columbia.

2.2 The "Cobweb" Supply Model ⁵

In examining United States data Freeman found that enrollment in law school, when compared to graduates with Bachelor of Arts degrees,

"Fluctuates with a peak-to-trough period of approximately four to five years....[and concluded that]....Fluctuations of these types are consistent with a "cobweb" market structure, which produces endogenous cycles as a result of the effect of numbers of graduates on job opportunities and incentives and therefore on future enrollments, though other factors, such as exogenous changes in the business cycle..., might also be responsible."⁶

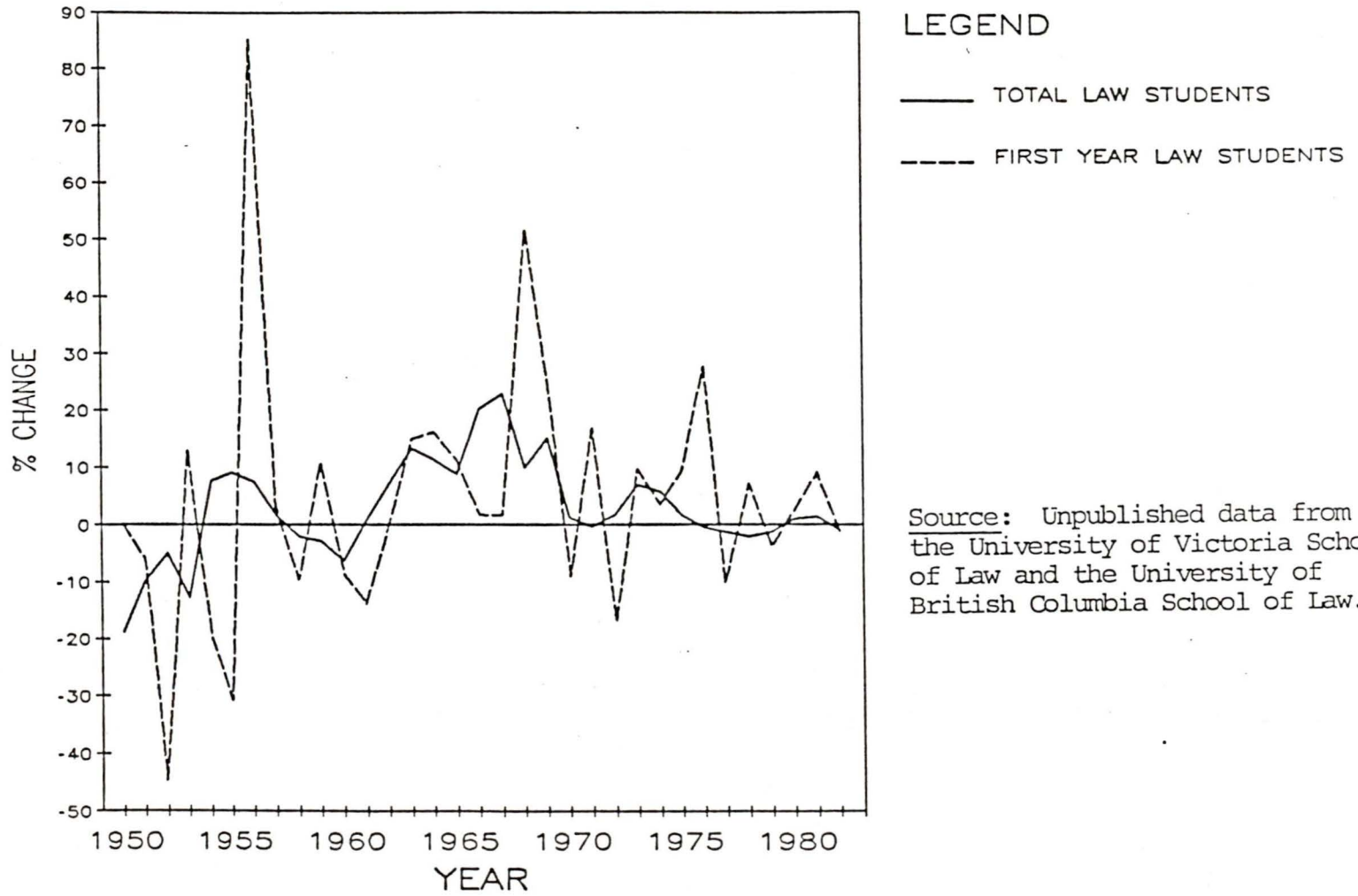
Figure 2.1 presents enrollment data for British Columbia, and shows that the supply of lawyers in this province also exhibits cyclical tendencies.

The recursive model is a representation of the supply side of the legal market using the "cobweb" model. The justification for applying a "cobweb" model to the legal profession is that it takes account of the time lag between the decision to enter law and actually being able to practice. Two behavioral equations represent the

5. For a more detailed description of the theory underlying this model see Appendix A.

6. Freeman, op. cit., p. 172.

FIGURE 2.1
SUPPLY OF NEW LAWYERS 1951 - 1983



Source: Unpublished data from the University of Victoria School of Law and the University of British Columbia School of Law.

supply side of Freeman's econometric model. The first equation relates the decision to take up law as a career to legal salaries and other factors influencing income expectations over the career term. The second equation relates the number of graduates to the lagged number of law student entrants, and various labour market conditions during the education period. Total supply in any given year is then estimated by adding total new entrants to the estimated number of law graduates. These equations are shown as equations [1] and [2] in Appendix A.

Two equations are also used to model the demand side of the legal market. The first demand equation (represented by equation [3a] in Appendix A) assumes "young" lawyers are not good substitutes for experienced lawyers. "Young" refers to a lawyer who has just been "called to the bar" or a lawyer with only a "few" years of experience in practice. The demand by students for law school degrees is made a function of "young" lawyers' salaries and various demand variables. The number of new law graduates is taken as predetermined so the model simplifies to an analysis of starting salaries and new entrants.

The second demand equation (represented by equation [3b] in Appendix A) relates the entire population of

lawyers to salaries and demand variables. This equation assumes "perfect substitutability" between experienced and inexperienced lawyers. It must be recognized in this equation that the possibility of simultaneity between salary determination and the number of people with law degrees exists. This is because "the recursive structure of the model generates endogenous cyclical fluctuations, with small (large) graduating classes increasing (reducing) salaries, altering incentives and numbers of new enrollees, which in turn alters future graduates and salaries."⁷

2.2.1 Cobweb Fluctuations and Market Adjustments

This section develops a model to test the prediction that supply exhibits "cobweb" cycles. The number of degrees granted and previous enrollments are examined to see whether effects on numbers of law students exhibit cobweb cycles.

The salary equation [3b] is substituted into the enrollment equation [1] (both contained in Appendix A) to obtain a "cobweb" supply equation linking enrollments to degrees and demand variables rather than salaries. The following equation is obtained.

7. *ibid.*, p. 174.

$$\begin{aligned} \text{LENT}_t = & (1-\lambda)\text{LENT}_{t-1} - a_1d_1\lambda\text{LGRAD}_t + a_1d_2\lambda\text{LOUT}_t \\ & - a_2\lambda\text{ASAL}_t + u_1 + a_1\lambda u_4 \end{aligned} \quad [4]$$

This equation is a summary of the predicted recursive model exhibiting its cyclical characteristics. The dependent variable, law school entrants (LENT), is predicted to be positively related to lagged entrants and various independent demand indicators (LOUT), and negatively related to law school graduates (LGRAD) and alternate professional salaries (ASAL). It also allows Freeman to estimate his model without directly using legal salaries because he feels that these data are often unavailable or, "of questionable quality".⁸

This model also recognizes that, when labour markets are in disequilibrium non-salary demand variables as well as salaries are important in attracting potential entrants. In addition, legal salaries can be added to the equation to test the hypothesis that salaries as well as non-salary variables directly influence enrollments.

2.3 The Long run Equilibrium Model

This model was developed by B. P. Pashigan in response to certain specific trends observed in the market for United States lawyers. In the United States the number of persons admitted to the Bar and number of

8. *ibid.*, p. 177.

lawyers were both showing a rapid growth rate. This is also the case in British Columbia where the number of people admitted to the Bar was 157 percent higher in 1978 than in 1968.⁹ During the same time period the number of lawyers increased 104 percent.¹⁰ The key element in Pashigan's theory is that law school students have expectations about how the market for lawyers will behave in the future. These expectations are rational, and students do not consistently make mistakes, therefore, "cobweb" cycles such as those predicted by Freeman will not result. In addition, Pashigan believes that when opportunities do not exist in law, these students are able to find other viable employment.

The basic question he asks is what are the determinants of the growth of the legal profession? Pashigan considers two hypotheses to be tested by the long run equilibrium model. First, that aggregate economic activity (as measured by the expansion of gross national expenditure) is partly responsible for an increase in the demand for lawyers; and second, that government regulation is a factor affecting legal demand.

9. Unpublished data from The Law Society of British Columbia Archives, Barristers and Solicitors Rollbooks 1945 - 1986, British Columbia Courthouse Library.

10. *ibid.*

This is based on the assumption that, in the United States "the social legislation of the sixties, the expanding scope of government regulations, and judicial rulings are responsible for the increase in the number of lawyers."¹¹ This model also seeks to examine how quickly law schools adjust to a change in the demand for lawyers.

2.3.1 The Regression Equations

The derivation of the theoretical model is presented in Appendix B of this thesis.¹² By combining equations [1], [2], [12] and [14] in Appendix B, and assuming that "the predicted values of L_{t-1} , Z_t , and U_t equal the actual values plus a nonserially correlated random error term"¹³ we obtain the following reduced form equations for L_t (the number of lawyers), NA_t (the number of new admissions to the Bar), and F_{t-3} (the number of first year law students lagged three years).

$$L_t = (1-w)L_{t-1} + \frac{w}{\beta_2} D_t + g_t \quad [5]$$

$$NA_t = \frac{w}{\beta_2} D_t + \frac{(d-w)}{(1-d)} L_{t-1} - g'_t \quad [6]$$

$$F_{t-3} = \frac{w D_t}{(1-d)c_t\beta_2} + \frac{(d-w)}{(1-d)c_t} L_{t-1} + g''_t \quad [7]$$

11. Pashigan, op. cit., p. 53.

12. The reader is urged to read Appendix B in order to gain a more thorough understanding of the underlying theoretical model.

13. Pashigan, op. cit., p. 62.

where

$$D_t = (\alpha_0 - \beta_0) + \alpha_2 Z_t + (\alpha_1 - \beta_1)(1+r)^3 H_t U_t$$

D_t , therefore, represents the influence of legal demand variables as well as the opportunity cost of attending law school.

Equations [5] and [6] are the equations which Pashigan estimates.¹⁴ Equation [5] suggests that the number of lawyers (L_t) is positively related to the lagged number of lawyers, a number of independent demand variables (Z_t , consisting of, for example, real gross national expenditure (LGNE), the divorce rate (LDIV), and the number of mortgages given (LMORT)), and to a salary variable adjusted to reflect the rate of return to legal education and the probability of failing law school (LSPEC). Equation [6] suggests that new admissions to the Bar (NA_t) are also positively related to a number of independent demand variables (Z_t as described above), a salary variable adjusted to reflect the rate of return to legal education and the probability of failing law school

14. It appears that Pashigan uses Ordinary Least Squares techniques to estimate these equations. In fact, it is more appropriate to use Non-Linear Maximum Likelihood techniques with restrictions on the variables since the variables and some of the coefficients are equal in all of the estimated equations.

(LSPEC), as well as a variable measuring the number of lawyers presently practicing (LTAX).

2.4 The Data

The regression results to be presented in Chapters III and IV of this thesis are based on the models described in sections 2.2 and 2.3 above. The variable names, definitions used and data sources are presented in Table 2.1. The equations are estimated using time series data from 1949 up to, and including 1983. The time period is determined by two considerations. First, prior to 1949, there were no law schools operating in British Columbia, which limits the starting point of the analysis. Second, data on salaries is available from the Department of National Revenue Taxation Statistics, but with a four to five year lag between data collection and data publication. This limits the end point of the analysis to 1983. The region of interest is the province of British Columbia which has two schools of law; the University of British Columbia School of Law which started in 1949, and the University of Victoria School of Law which started in 1976.¹⁵

15. University of Victoria School of Law and University of British Columbia School of Law.

Table 2.1

Variable Names, Definitions and Sources

1. Salary Data

ASAL1	The natural log form of the composite real salary variable measured by a weighted average of alternate professional salaries in British Columbia. (1971=100). ¹⁶ <u>Source:</u> Revenue Canada Taxation, <u>Taxation Statistics</u> , (Ottawa: Operations Research and Statistics Division, 1953 to 1986), various pages.
ASAL2	The natural log form of the industrial composite real salary variable measured by average weekly earnings in all industries in British Columbia multiplied by 52. (1971=100). <u>Source:</u> Statistics Canada, <u>Employment, Earnings and Hours</u> , (Ottawa: Minister of Supply and Services Canada, 1950 to 1986), Catalogue 72-002, various pages.
LSAL	The natural log form of real average lawyers' salaries in British Columbia. (1971=100). <u>Source:</u> Revenue Canada Taxation, <u>Taxation Statistics</u> , (Ottawa: Operations Research and Statistics Division, 1953 to 1986), various pages.
LSPEC	The average real industrial composite salary variable (ASAL2) adjusted for the expected rate of return to legal education and the probability of failing law school. <u>Source:</u> Salary data is compiled from Revenue Canada Taxation, <u>Taxation Statistics</u> , (Ottawa: Operations Research and Statistics Division, 1953 to 1986), various pages. Data on failure rates for law school are from published data from

16. Where 1971=100 is used, this refers to the Consumer Price Index. Source: Statistics Canada, Prices and Price Indices, (Ottawa: Minister of Supply and Services Canada, 1950 to 1986), Catalogue 16-010.

Table 2.1 cont'd

the University of British Columbia School of Law and the University of Victoria School of Law, and the expected rate of return is assumed to be equal to 0.10.¹⁷

SAL Real average lawyers' salaries in British Columbia. (1971=100). Source: Revenue Canada Taxation, Taxation Statistics, (Ottawa: Operations Research and Statistics Division, 1953 to 1986), various pages.

2. Supply Factors

GRAD The natural log form of the number of law degree recipients in British Columbia proxied by the number of third year law students. Source: Unpublished data from the University of British Columbia School of Law and the University of Victoria School of Law.

LENT The natural log form of the number of entrants into British Columbia Law Schools. Source: Unpublished data from the University of British Columbia School of Law and the University of Victoria School of Law.

LNUM The natural log form of the number of practising members of the Law Society of British Columbia. Source: Unpublished data from the Law Society of British Columbia Archives, Barristers and Solicitors Rollbooks 1945 - 1986, British Columbia Courthouse Library.

LTAX The natural log form of the number of taxpaying lawyers and Notaries Public in British Columbia, an alternate measure of LNUM. Source: Revenue Canada Taxation,

17. Pashigan uses a rate of return equal to 0.10 which he assumes is normal. See in addition, Muzondo and Pazderka, op. cit., p. 150.

Table 2.1 cont'd

	<u>Taxation Statistics</u> , (Ottawa: Operations Research and Statistics Division, 1953 to 1986), various pages.
NUM	The number of practising members of the Law Society of British Columbia. <u>Source:</u> Unpublished data from the Law Society of British Columbia Archives, <u>Barristers and Solicitors Rollbooks 1945 - 1986</u> , British Columbia Courthouse Library.
TAX	The number of taxpaying lawyers and Notaries Public in British Columbia. <u>Source:</u> Revenue Canada Taxation, <u>Taxation Statistics</u> , (Ottawa: Operations Research and Statistics Division, 1953 to 1986), various pages.
NA	The natural log form of the number of new admissions to the Bar in British Columbia. <u>Source:</u> Unpublished data from the Law Society of British Columbia Archives, <u>Barristers and Solicitors Rollbooks 1945 - 1986</u> , British Columbia Courthouse Library.
3. <u>Demand Indicators</u>	
LDIV	The natural log form of the divorce rate in British Columbia per 100,000 population. <u>Source:</u> Statistics Canada, <u>Marriages and Divorces Vital Statistics Volume III</u> , (Ottawa: Minister of Supply and Services Canada, 1949 to 1986), Catalogue 84-205, various pages.
DIV	The divorce rate in British Columbia per 100,000. <u>Source:</u> Statistics Canada, <u>Marriages and Divorces Vital Statistics Volume III</u> , (Ottawa: Minister of Supply and Services Canada, 1949 to 1986), Catalogue 84-205, various pages.
LGNE	The natural log form of real gross national expenditure (GNE) in Canada. British Columbia GNE is not available for the time frame under study, therefore, it

Table 2.1 cont'd

	<p>is assumed that the growth in British Columbia GNE approximates the growth in Canadian GNE. <u>Source:</u> Statistics Canada, <u>National Income and Expenditure Accounts</u>, (Ottawa: Minister of Supply and Services Canada, 1949 to 1986), Catalogue 13-207, various pages.</p>
GNE	<p>Real gross national expenditure in Canada. <u>Source:</u> Statistics Canada, <u>National Income and Expenditure Accounts</u>, (Ottawa: Minister of Supply and Services Canada, 1949 to 1986), Catalogue 13-207, various pages.</p>
LMORT	<p>The natural log form of all mortgage loans approved by lending institutions on existing residential property in Canada. It is assumed that the growth in the number of mortgages in British Columbia approximates the growth in the number of mortgages in Canada. <u>Source:</u> Canadian Mortgage and Housing Corporation, <u>Canadian Housing Statistics</u>, (Ottawa: Statistical Services Division, 1950 to 1987).</p>
MORT	<p>All mortgage loans approved by lending institutions on existing residential property in Canada. <u>Source:</u> Canadian Mortgage and Housing Corporation, <u>Canadian Housing Statistics</u>, (Ottawa: Statistical Services Division, 1950 to 1987).</p>

2.4.1 Data Definitions and Sources

1. Salary Data

Average legal salaries (LSAL) are calculated by dividing gross income of lawyers and notaries in British Columbia by the number of tax paying lawyers and notaries public (LTAX). Lawyers and notaries public are defined as those where "The method of earning the income is given preference over the type of work performed. Thus...only those engaged in practice for profit are listed in their professional capacity."¹⁸ Salaries of lawyers are not available separately from salaries of Notaries Public. It should also be noted that from 1948 to 1956, with the exception of 1952, salary data includes lawyers practicing in the Yukon Territory. Again, a separate breakdown of British Columbia lawyers and Yukon lawyers is not available.

The alternate professional salary variable (ASAL1) is also an average of gross income divided by the number of taxpayers. A weighted average of all alternate professional salaries was computed to obtain a composite alternate professional salary variable.¹⁹ The alternate

18. Revenue Canada Taxation, Taxation Statistics, (Ottawa: Operations Research and Statistics Division, 1986), p. 75.

19. This variable was computed by multiplying the ratio of doctors to total professionals by doctors average salaries, the ratio of dentists to total professionals by

professions encompassed Doctors, Dentists, Consulting Engineers and Architects and Accountants. Prior to 1951, salaries of accountants were not reported, therefore, they were not included in the weighted average until 1951.

2.4.2 Supply Factors (LNUM, LTAX, LENT, and NA)

The number of lawyers (LNUM) is available from the Law Society of British Columbia membership statistics. However, an alternative measure is the number of taxpaying lawyers reported by the Department of National Revenue (LTAX). Both measures will be used in the econometric estimations so as to test whether one data set better reflects the supply of lawyers in British Columbia. It should also be noted that between 1950 and 1965, membership statistics were computed only every five years, therefore, in the periods 1950 to 1955, 1955 to 1960, and 1960 to 1965, these numbers had to be interpolated.

The number of first, second and third year law students (LENT) is available from both the University of British Columbia School of Law and the University of Victoria School of Law. But the number of law school graduates was not available from the University of

dentists average salaries, etc. for all professionals and summing.

British Columbia law school. Therefore, the number of third year law students in year $t+1$ will be used as a proxy for law school graduates (LGRAD). This should be a fairly accurate proxy since unpublished data from the University of Victoria School of Law shows that only approximately two percent of law students either drop out or fail their third year.

The number of new admissions to the bar (NA) was made available by the Law Society of British Columbia.

2.4.3 Demand Indicators (LGNE, LDIV, and LMORT)

Real gross national expenditure (LGNE) is assumed to proxy business and economic activity, and, therefore, to indicate a demand for legal services. Provincial economic accounts are still in their experimental stages and are not available prior to 1961, therefore, real Canadian Gross National Expenditures were used as a proxy for British Columbia economic activity.

Other positive determinants of demand are assumed to be the divorce rate per 1,000 population in British Columbia (LDIV); and all mortgage loans approved by lending institutions on existing residential property in Canada (LMORT). The variable LMORT was not available for British Columbia during the time period under study.

Regrettably, other potential demand indicators such as the crime rate per 100,000 population, numbers of

automobile accidents, numbers of court cases, active corporations and bankruptcies are either unavailable or not available on a consistent basis for the time frame under study. Therefore, these factors were not considered in the empirical analysis.

CHAPTER III

THE RESULTS OF ESTIMATIONS OF THE COBWEB SUPPLY MODEL

3.1 Introduction

This chapter contains the results of estimated equations for the Cobweb Supply Model which is presented in equations [1] to [4] in Chapter II and Appendix A. The model proceeds in four steps. First, the supply of law school entrants (equation [1] in Appendix A) is estimated. Second, the equation for the determination of the supply of law school graduates (equation [2] in Appendix A) is estimated. Third, estimates of the determination of lawyers salaries (equations [3a] and [3b]) are obtained. Lastly, the first three equations (equations [1], [2], and [3a]) are combined to obtain the summary Cobweb Supply Model (equation [4] in Chapter II). The key hypothesis of this model is: when the market for lawyers is not in equilibrium it will adjust on its own and no market intervention will be needed because no persistent surplus will exist.

The results are as follows.

3.2 The Supply of Law School Entrants (LENT)

Alternative estimates of equation [1], in Chapter II, modelling the supply of first year law students

(LENT) are presented in Table 3.1 below. The equations are estimated using Ordinary Least Squares (OLS) techniques with no correction for serial correlation.¹ The difference between the equations is that alternative definitions of alternate salaries are used.

With regard to the results, the \bar{R}^2 for both specifications is high, but the sign on the alternate salary variable (ASAL2) used in equation 3.1.2 is not as predicted. The alternate salary variable is an average industrial composite income measure and is predicted to be negatively related to law school entrants. One reason

1. Since autocorrelation can be present in time series data, a test for autocorrelation must be performed. The Durbin-Watson statistic is the most common test for serial correlation. However, this statistic becomes invalid in the presence of a lagged endogenous variable such as $LENT_{t-1}$ in equations 1 and 2 of Table 3.1. When a lagged endogenous variable is present, the Durbin-h statistic can be used to test for autocorrelation. The Durbin-h statistic is approximately normally distributed so that a z test can be performed to test the null hypothesis of no serial correlation. In examining equation 1 in Table 3.1, the estimated Durbin-h statistic is found to equal -1.4043. The critical value for the h statistic is equal to -1.9251 and the null hypothesis can be accepted if the estimated Durbin-h statistic is greater than the critical value. Since, in equations 1 and 2 the estimated Durbin-h statistic is less than the critical value, the null hypothesis of no serial correlation can be accepted and the Ordinary Least Squares technique can be used. See, Robert S. Pindyck and Daniel L. Rubinfeld, Econometric Models and Economic Forecasts, (McGraw-Hill Book Company, 1981), p. 87.

TABLE 3.1

Regression Results: OLS Estimates of the Determinants
of The Supply of First Year Law Students (LENT)

	<u>Equation 3.1.1</u>	<u>Equation 3.1.2</u>
Constant	1.2991 (1.5290)*	-7.3411 (-2.9912)**
LSAL	0.63931 (1.5805)*	0.41272 (3.1162)**
ASAL1	-0.69682 (-1.5639)*	
ASAL2		0.62086 (3.0988)**
LENT _{t-1}	0.84813 (8.7347)**	0.57599 (4.1997)**
\bar{R}^2	0.8883	0.9107
n	33	33
Durbin-h	-1.4043	-0.97429

* denotes t ratios in parentheses significant at 10% for a one tail test.

** denotes t ratios in parentheses significant at 5% for a one tail test.

for the positive result may be the problem of multicollinearity.²

The existence of multicollinearity can be established, as a rule of thumb, "if the simple correlation between two variables is larger than the correlation of either or both with the dependent variable."³ In equation 3.1.2, in Table 3.1, the correlation of LSAL with ASAL2 is larger than the partial correlation of either with the dependent variable which would suggest that multicorrelation could be a problem. If multicollinearity is not a problem, it is unclear why this variable has a positive sign. However, it could be that when students see industrial wages increasing they may view it as a sign that the economy is improving and that future legal salaries will increase.

The signs of variables shown in equation 3.1.1 in Table 3.1 are as predicted and suggest that entrants into law school (LENT) are positively related to current

2. Multicollinearity exists if two or more independent variables are highly correlated with each other. When multicollinearity exists, the interpretation of the estimated coefficients is difficult. One can no longer say that the influence of that independent variable on the dependent variable is equal to the estimated coefficient, all other things remaining the same. All other things in the presence of multicollinearity do not remain the same. While the estimates may be unbiased, the reliance placed on one or the other will be small.

3. Pindyck and Rubinfeld, op. cit., p. 87.

salaries in the legal profession (LSAL) and positively related to law school entrants the previous year ($LENT_{t-1}$). The results also show that law school entrants are negatively related to alternate professional salaries (ASAL1) suggesting that alternate professions are competing with the legal profession for new members. All computed t statistics show that the estimated coefficients on the variables are significant at the ten percent level.

Of particular interest in the estimation of equation 3.1.1 are the short and long run elasticities of law school entrants with respect to the salaries of lawyers and alternate salaries. Short run income elasticities are equal to the derivative of entrants with respect to income which is equal to the estimated coefficient on the salary variable. The law school entrants variable is inelastic with respect to both legal salaries and alternate professional salaries with elasticities equal to 0.63931 and -0.69682, respectively. This suggests that when legal salaries increase by one percent, legal entrants will increase in the short run by less than one percent. This result is reasonable since places in law school are limited in the short run and an increase in demand may lead to a demand for places which is greater than the supply.

The short run elasticity of entrants with respect to alternate professional salaries suggests that when alternate professional salaries increase by one percent, law school entrants will decrease by less than one percent. Again the explanation for this result may be the short run limit on law school places. People who have been on a waiting list for law school may be reluctant to give up their current positions simply because alternate professional salaries have increased. In addition, there may be a long waiting list to gain entry into other professions.

The long run elasticities of law school entrants with respect to income are computed by dividing the estimated coefficients on each income variable by λ . The value for λ is obtained from the estimated coefficient of $(1-\lambda)$ on the lagged dependent variable $LENT_{t-1}$. In the long run, as estimated by equation 3.1.1, entrants into law school are very dependent on lawyers' salaries with an elasticity equal to 4.21. In other words in the long run a one percent increase in lawyers' salaries will lead to a 4.21 percent increase in law school entrants. The response of law school entrants is negative and elastic with respect to increases in alternate professional salaries in the long run. A one percent increase in professional salaries will, in the

long run, lead to a 4.59 percent decrease in numbers of first year law school students.

The results presented in Table 3.1 suggest that the supply of first year law students is very dependent on the salaries of lawyers as well as salaries of other professionals. It is also clear that other professions are a substitute for potential lawyers, most specifically in the long run. If students do not perceive the return to legal education to be as high as in other professions, they will choose to pursue another professional career. This leads to the conclusion that the market for lawyers is in fact dynamic and supply adjustment does occur in the long run (since λ is estimated to equal 0.15, this suggests that long run equilibrium is reached after 6.67 years, which suggests the long run is quite long). The argument of a persistent over supply of lawyers would seem to be inconsistent with the results obtained from these equations.

3.3 The Supply of Law School Graduates (LGRAD)

Table 3.2 shows the results of estimating alternative versions of the supply of law school graduates (LGRAD) (equation [2] in Appendix A). Again,

TABLE 3.2

Regression Results: OLS Estimates of The Determination
of The Supply of Law School Graduates (LGRAD)

Equation 3.2.1

Constant	-6.49240 (-3.72440)**
LSAL	0.67852 (1.59550)*
ASAL1	0.076011 (0.139940)
LENT _{t-3}	0.76578 (8.72770)**
\bar{R}^2	0.8863
n	33
Durbin-Watson	1.8461

* denotes t ratios in parentheses significant at 10% for a one tail test.

** denotes t ratios in parentheses significant at 5% for a one tail test.

the equations were estimated using the OLS technique and no correction for autocorrelation was necessary.⁴ The results must be viewed with caution, however, since there is a high degree of correlation between ASAL1 (note that ASAL2 is dropped from the estimation because of the sign problem in equation 3.1.2 in Table 3.1) and the other independent variables. This suggests that multicollinearity may be a problem, and could be the cause of the incorrect sign on the ASAL1 variable.

All signs on the independent variables are as expected, with the exception of the positive sign on the alternate income variable ASAL1. As well as having the wrong predicted sign, the estimated coefficient on this variable is insignificant. The number of law school graduates (LGRAD) responds positively to both the number of entrants three year previous ($LENT_{t-3}$), and lawyers' salaries (LSAL).

4. Results show a computed Durbin-Watson statistic of less than 2.00, which suggests the possibility of positive serial correlation. If the computed Durbin-Watson statistic lies between d_1 and 2.00, the null hypothesis of no positive serial correlation can be accepted, where in this case d_1 is equal to 1.65. Since the estimated Durbin Watson statistic is equal to 1.8433, the null hypothesis of no serial correlation can be accepted and the results of equation 1, using the ordinary least squares estimation technique, can be accepted.

The elasticity of law school graduates with respect to legal salaries is equal to the estimated coefficient on the LSAL variable. The variable law school graduates is both positive and inelastic with respect to lawyers' salaries, meaning a one percent rise in legal salaries will lead to a less than one percent rise in law school graduates. This result suggests that once a student enters law school he/she is reluctant to give up a potentially lucrative career even if real legal salaries decline. Also because of the large number of entry barriers which must be overcome before entering law school, graduates may be reluctant to sacrifice all of their work and their place in law school.

3.4 Estimates for the Determination of Legal Salaries (LSAL)

Table 3.3 below shows the results of estimating equations [3a] and [3b] in Appendix A, which model the determination of legal salaries (LSAL), using the Cochrane-Orcutt procedure to correct for

TABLE 3.3

Regression Results: OLS (3.3.1 and 3.3.2) and Cochrane-
Orcutt Estimates of
The Determination of Lawyers' Salaries (LSAL and SAL)

	<u>Equation 3.3.1</u>	<u>Equation 3.3.1(a)</u>	<u>Equation 3.3.2</u>	<u>Equation 3.3.2(a)</u>
Constant	3.7458 (0.38708)	9.3178 (0.50632)	10160.0 (3.0580)**	-25330 (-3.1328)**
LTAX	-1.1291 (-3.9738)**	-1.4780 (-5.3184)**		
TAX			-0.10165 (-3.6428)**	-1.0006 (-9.1910)**
LMORT	-0.19376 (-0.29868)	-1.0666 (-1.3975)*		
MORT			-0.01375 (-0.5097)	-0.021221 (-1.6320)*
LDIV	-0.50876 (-0.53332)	-0.71597 (-0.52059)		
DIV			-40.239 (-1.198)	5.70470 (0.25466)
LGNE	1.6590 (1.4954)*	2.3341 (1.1239)		
GNE			0.23797 (2.4933)**	1.1545 (7.5099)**
\bar{R}^2	0.4248	0.4623	0.3945	0.8535
n	33	33	33	33
Durbin- Watson	1.0694	1.0214	0.6868	2.1106

* denotes t ratios in parentheses significant at 10% for a one tail test.

** denotes t ratios in parentheses significant at 5% for a one tail test.

autocorrelation.⁵ The best results were obtained when estimating legal salaries using an equation with the number of tax paying lawyers (TAX) (equation [3a]) as an independent variable rather than the number of law school graduates (LGRAD) (equation [3b]). The results of this estimation are shown in equation 3.3.2(a). Statistically, (in terms of \bar{R}^2 and t values) this equation gives the better results. The \bar{R}^2 is significantly higher than any other equation, and all estimated coefficients except those for MORT and DIV are significant and have the predicted signs.⁶

Legal salaries are predicted to respond negatively to the number of practicing lawyers which is the case in Equation 3.3.2(a). It is also predicted that salaries should be positively related to demand variables such as the number of mortgages, (MORT), the divorce rate (DIV) and real Gross National Expenditure (GNE). The results in equation 3.3.2(a) show that legal salaries respond

5. The estimated Durbin-Watson statistic is equal to 0.6868 for equation three estimated by the ordinary Least squares method. Since the estimated Durbin-Watson statistic is less than 2.00, this suggests that positive serial correlation may be present. The critical values of the Durbin-Watson statistic are 1.73 and 2.00, since the estimated statistic does not lie between these two values, the null hypothesis of no serial correlation cannot be accepted.

6. The Durbin-Watson statistic was estimated to be 2.1106 suggesting autocorrelation is no longer a problem.

negatively and significantly to the number of tax paying lawyers. The salary variable is also positive and significant with respect to real Gross National Expenditure. Results for the independent variables MORT and DIV, however, are not as expected. The sign on the MORT variable is not as predicted, but is significant at the 10 percent level. The sign on DIV is as predicted, but is insignificant.

The elasticities calculated at the means of the variables suggest that lawyers' real salaries will decrease by 0.051 percent when the number of lawyers increases by one percent. This is intuitively appealing since legal fees are fixed "somewhat" by the legal profession.⁷ In addition, the estimated elasticities suggest that when real GNE increases by one percent, legal salaries will increase by 4.81 percent. It can be concluded therefore, that salaries are very rigid with respect to legal entrants but are elastic with respect to the level of economic activity.

3.5 The Cobweb Supply Model

The results for the Cobweb supply equation (equation [4] in Chapter II) are shown in Table 3.4. As noted by

7. Price schedules are "suggested" by the legal profession but are not strictly enforced.

TABLE 3.4

Regression Results: OLS Estimates of The Cobweb Supply
Model with LENT as the Dependent Variable

	<u>Equation 3.4.1</u>	<u>Equation 3.4.2</u>	<u>Equation 3.4.3</u>	<u>Equation 3.4.4</u>	<u>Equation 3.4.5</u>
Const	-8.0062 (-3.918)**	-6.16081 (-3.361)**	-5.9096 (-3.259)**	-8.3723 (-3.273)**	-8.1639 (-4.212)**
LENT _{t-1}	0.27465 (1.3399)*	0.23337 (1.0692)	0.20577 (0.95551)	0.29886 (1.4862)*	0.30531 (1.5906)*
LENT _{t-3}		0.093255 (0.61651)			
LENT _{t-4}			-0.0064419 (-0.048521)		
LGRAD	-0.46244 (-1.8141)**			-0.4781 (-1.821)**	-0.48419 (-1.995)**
LMORT	-0.042515 (-0.53476)	-0.042150 (-0.49152)	0.052733 (-0.62062)		
LDIV	0.53184 (2.3604)**	0.18357 (0.88628)	0.25780 (1.2409)	0.50341 (2.1882)**	0.49468 (2.385)**
LGNE	1.0324 (4.2222)**	0.70910 (2.5515)**	0.81027 (3.5813)**	1.0311 (3.855)**	1.0249 (4.367)**
LSAL				-0.039873 (-0.10631)	
ASAL1	0.011266 (0.47073)	0.12164 (0.72159)	0.018620 (0.72504)	0.40635 (0.12243)	
n	33	31	30	33	33
\bar{R}^2	0.9265	0.9173	0.9160	0.9256	0.9313

* denotes t ratios in parentheses significant at 10% for a one tail test.

** denotes t ratios in parentheses significant at 5% for a one tail test.

Freeman, "This equation provides an especially useful summary of the recursive model, exhibiting its cyclical characteristic, and allowing estimation in the absence of salary data which is often lacking or of questionable quality."⁸

Results for equation 3.4.1 are encouraging with the exception of the insignificant negative coefficient estimated for the variable LMORT, and the positive and insignificant results for the alternate salary variable (ASAL1). Equations 3.4.2 and 3.4.3 substitute $LENT_{t-3}$ and $LENT_{t-4}$ respectively, for the variable LGRAD to determine whether law school entrants are more dependent on previous entrants rather than previous graduates. Neither equation 3.4.2 nor equation 3.4.3 give better results than equation 3.4.1. Both equations have a lower \bar{R}^2 and the coefficients have lower t values.

A variation on equation 3.4.1 was estimated and is shown as equation 3.4.4. The chief difference is that the variable LMORT was dropped and the legal salary variable LSAL was added. The equation works well for all variables except the salary variables, both of which had the wrong predicted sign, and were insignificant.

8. Freeman, *op. cit.*, p. 177.

Equation 3.4.5 was, therefore, estimated without the salary variables and without the demand variable LMORT. The \bar{R}^2 is equal to 0.9313 suggesting a good overall fit. All variables have the correct predicted sign and have t ratios significant at the ten percent level. However, the Durbin-h statistic, used as a test for autocorrelation, could not be computed since the variance of the estimated coefficient is negative and it is impossible to take the square root of a negative number.

In order to test for autocorrelation in these circumstances an alternative test developed by Durbin must be performed. It was concluded that autocorrelation was not present and that the OLS method of estimation could be used.⁹

The estimated coefficient on the number of third year law students (LGRAD) is particularly noteworthy. As Freeman notes "The key coefficient is that for degrees which, according to the model, should be negative and the basic cause of cyclical fluctuations in the market."¹⁰ As predicted this coefficient has a negative sign supporting the hypothesis that the number of entrants into law school (LENT) reacts negatively to the number of

9. For a more thorough description of this method see Appendix C.

10. Freeman, op. cit., p. 178.

law school graduates (LGRAD). A one percent increase in law school graduates results in a 0.5% decrease in the number of new entrants into law school. This suggests that the market for lawyers is cyclical with periods lasting about two years. This estimate comes from the estimated value for λ in equation 3.4.5 in Table 3.4.

Also as predicted, the number of law school entrants responds positively to increases in the demand for lawyers. Both the divorce rate (LDIV) and real Gross National Expenditure (LGNE) variables have positive and significant estimated coefficients. Law school entrants increase by 0.5 percent and 1.02 percent (equation 3.4.5), respectively when the divorce rate and real Gross National Expenditure increase by 1 percent. This supports the hypothesis that law school entrants are responding to the level of demand for legal services. Since neither of the salary variables (LSAL, and ASAL1) are significant, it can be concluded that the salary variables exert no additional influence to that which operates through the demand variables.

In the long run the variable law school entrants (LENT) is negative and inelastic with respect to increases in numbers of law school graduates (GRAD). A one percent increase in graduates leads to an approximate 0.7 percent decrease in the number of entrants. The long

run elasticity of law school entrants with respect to the divorce rate is approximately equal to 0.7. In the long run, a one percent increase in the divorce rate will lead to a 0.7 percent increase in the number of entrants into law. The long run elasticity of law school entrants with respect to real Gross National Expenditure is equal to 1.47. Therefore, in the long run a one percent increase in real Gross National Expenditure will lead to an approximately 1.5 percent increase in law school entrants.

3.6 Conclusions

In conclusion, the Cobweb Supply Model performs well in its explanations of the behavior of the supply of law school entrants. Law school entrants respond positively to legal salaries and negatively to other professional salaries. In the short run law school entrants are inelastic with respect to salaries. However, in the long run, it is estimated that the number of law school entrants will decrease by over 4 percent in response to either a one percent increase in alternate professional salaries or a one percent decrease in legal salaries. In addition, the results suggest that other professions are a substitute for law school entrants (Table 3.1).

The number of third year law students is also dependent on legal salaries, with an elasticity equal to

0.7. The results for the effect of alternate salaries on third year law students are insignificant (Table 3.2).

The econometric results of the determination of legal salaries show that salaries do respond negatively and significantly to the number of lawyers. Salaries also respond positively and significantly to real Gross National Expenditure, but no conclusions can be made as to the response of salaries to other demand variables since results were indeterminate (Table 3.3).

Finally, because the market has a recursive structure it undergoes cobweb cycles of approximately two years duration. This was shown by the response of law school entrants to the variable LGRAD in the Cobweb Supply equation (Table 3.4). The market for lawyers is essentially self correcting, leading to the conclusion that artificial market restrictions on the number of law school entrants are not necessary. It should also be noted that the cobweb supply equation was estimated with entrants lagged three and four years as a substitute for law school graduates. Neither of these variables, however, gave better statistical results.

CHAPTER IV

Estimating The Long Run Supply of Lawyers

4.1 Introduction

The regression results of the long run equilibrium model presented as equations [5] and [6] in Chapter II are presented in Table 4.1 below. These results are essentially used to test the hypotheses that "increases in the level of economic activity will increase the number of transactions between consumers and firms and between firms and presumably raise the demand for lawyers."¹; and that as the opportunity cost of legal education increases, the number of lawyers will decrease.²

Econometric tests of these hypotheses using the estimates in Table 4.1 were performed and the results are presented in equations [9], [10], [11] and [12] below.³

1. Pashigan, op. cit., p. 67.

2. A third hypothesis tested by Pashigan is that an increase in the number of regulations will increase the demand for legal services. But, this hypothesis is outside the scope of this paper since data on regulatory activity is not consistently available for Canada or British Columbia for the time frame under study.

3. Again, it should be noted that Pashigan's results are questionable since he seems to have used Ordinary Least Squares techniques where he should have used a Non-linear Maximum Likelihood technique with restrictions on the estimated coefficients.

TABLE 4.1

Regression Results: Non-Linear Estimates of the
Coefficients of the Long run Supply Model

<u>Coefficient</u>	<u>1</u> <u>Estimated Value</u>	<u>2</u> <u>Estimated Value</u>
w	0.79593 (12.928)**	1.0607 (54.896)**
d	0.26893 (16.549)**	0.75607 (21.895)**
β_2	-755.17 (-12.939)**	431000 (16.602)**
CONSTANT	1970.3 (1.3075)	-197400 (-17.488)**
α_2	-897.42 (-4.2725)**	-246860 (-54.804)**
α_3	-79.177 (-1.9804)**	-8232.1 (-4.7550)**
α_4	-244.48 (-3.5169)**	34107 (14.701)**
$\alpha_1 - \beta_1$	47.284 (1.3713)	-17861 (-5.9741)**
R^2	0.5398	0.9319
Durbin-Watson	1.1810	2.2024
n	33	33

** denotes a t ratio significant at the 5% level for a one tail test.

4.2 The Long run Equilibrium Model

The results in Table 4.1 show the estimated coefficients w , d , and β_2 as well as the estimated coefficients on the exogenous demand (LGNE, LMORT, and LDIV) and opportunity cost (LSPEC) variables. The regression analysis was performed using a non-linear estimation technique⁴ with the following specified equations and coefficient restrictions. Using equations [5] and [6] from Chapter II, let the equation for L_t equal

$$\begin{aligned} \text{LTAX}_t = a_1 \text{LTAX}_{t-1} + a_2 [(\alpha_0 - \beta_0) + \alpha_2 \text{LGNE} + \alpha_3 \text{LMORT} + \\ \alpha_4 \text{LDIV} + (\alpha_1 - \beta_1) \text{LSPEC}] \end{aligned} \quad [7]$$

and let equation [6], the equation for NA_t equal

$$\begin{aligned} \text{NA}_t = a_3 [(\alpha_0 - \beta_0) + \alpha_2 \text{LGNE} + \alpha_3 \text{LMORT} + \alpha_4 \text{LDIV} + \\ (\alpha_1 - \beta_1) \text{LSPEC}] + a_4 a_1 \text{LTAX}_{t-1} \end{aligned} \quad [8]$$

where the coefficients a_1 , a_2 , a_3 , and a_4 are restricted to equal the following (see equations [5], [6], and [7] in Chapter II).⁵

4. Pindyck and Rubinfeld, op. cit., p. 261.

5. It must be noted that the estimated equations were specified such that only one estimated value for each of the coefficients w , d and β_2 was obtained.

$$a_1 = (1-w)$$

$$a_2 = w/\beta_2$$

$$a_3 = w/(1-d)\beta_2$$

$$a_4 = (d-w)/(1-d)$$

The non-linear iterative technique used to estimate the equations uses a linear version of the equation with an initial set of specified values for the coefficients. Ordinary least squares is then used to estimate this linear equation and obtain a new set of values for the coefficients. The resulting equation is again made to be linear, and ordinary least squares is performed once more. This iterative procedure is followed until the estimated coefficient values are fairly stable.⁶ The advantage to this kind of non-linear procedure is that t statistics, the R^2 , and other standard test statistics can be used to analyze the estimated equations. However, it should be noted that these statistics apply only to the final linearized ordinary least squares estimation which is assumed to be a good approximation of the non-linear equation.⁷

6. Kenneth J. White, Shirley A. Haun, and Nancy G. Horsman, Shazam, The Econometrics Computer Program User's Reference Manual, (Vancouver: Department of Economics, University of British Columbia, 1987), p. 131.

7. Pindyck and Rubinfeld, op. cit., p. 263.

Using the estimates w , d , and β_2 in column 1 of Table 4.1 it is possible to calculate a_1 , a_2 , a_3 , and a_4 and derive the coefficients which show the relationships in equations [7] and [8] above. The resulting equations for the number of lawyers (LTAX) and new admissions to the bar (NA) are shown in equations [9] and [10] below.

$$\begin{aligned} \text{LTAX}_t = & -2.0762 + 0.20407\text{LTAX}_{t-1} + 0.9457\text{LGNE} \\ & + 0.08343\text{LMORT} + 0.25762\text{LDIV} - 0.04983\text{LSPEC} \quad [9] \end{aligned}$$

$$\begin{aligned} \text{NA}_t = & 0.843 - 0.7209\text{LTAX}_{t-1} + 0.0384\text{LGNE} + 0.03389\text{LMORT} \\ & + 0.10463\text{LDIV} - 0.02024\text{LSPEC} \quad [10] \end{aligned}$$

The results in Table 4.1 suggest that all of the estimated coefficients used to calculate the restricted coefficients in equations [9] and [10] above (except the constant and the coefficient on LSPEC) are significant at the 10% level. In addition, all of the coefficients in equations [9] and [10] have the correct predicted signs.

As shown in column 1 of Table 4.1, the depreciation rate d was estimated to equal 0.26893 which is less than the estimated adjustment coefficient w (the estimate for w is greater than 1.00, which contravenes the theory as presented in Appendix B). This suggests that there are more new law students than there are retiring lawyers, which would mean the number of lawyers (LTAX) in year t is positively related to the number in year $t-1$ (the number of lawyers is growing). The number of new

admissions to the bar (NA) is estimated to be negatively related to the number of lawyers (LTAX) in year t-1. As the number of lawyers in year t-1 decreases, the number of new admissions to the bar increases. New admissions to the bar and the number of lawyers are both positively related to the exogenous demand variables (LGNE, LMORT, and LDIV), and both negatively related to the opportunity cost variable LSPEC. This would suggest that as the demand for legal services increases, the number of lawyers increases, but as the opportunity cost of attending law school grows, the number of lawyers decreases.

The Durbin-Watson statistic indicates the presence of autocorrelation in these regression results, therefore, the regression was performed with an adjustment for autocorrelation.⁸ The regression results for the coefficients are presented in column 2 of Table 4.1, and the equations are presented as [11] and [12] below.

$$\begin{aligned} \text{LTAX}_t = & -0.4858 - 0.0607\text{LTAX}_{t-1} - 0.6075\text{LGNE} \\ & -0.02026\text{LMORT} - 0.08394\text{LDIV} - 0.04396\text{LSPEC} \quad [11] \end{aligned}$$

8. The procedure to correct for autocorrelation uses the algorithm of a Quasi-Newton method based on maximum likelihood techniques from White, et. al., op. cit., p. 125.

$$\begin{aligned}
 NA_t = & -1.99 + 0.7581LTAX_{t-1} - 2.4906LGNE - 0.08305LMORT \\
 & + 0.08305LDIV - 0.1802LSPEC \qquad [12]
 \end{aligned}$$

All of the estimated coefficients used to calculate the restricted coefficients are significant at the 5% level, however, the signs on the variables are not all as predicted. The number of lawyers (LTAX) and new admissions to the bar (NA) are predicted to be positively related to the exogenous demand variables LGNE and LMORT. This is not the result in either of the estimated equations. The estimated coefficient for the opportunity cost variable (LSPEC) is negative in both equations as predicted. This suggests that as the opportunity cost of attending law school increases, the number of lawyers and new admissions to the bar decreases. The signs on the coefficients estimated for the variable LTAX_{t-1} are not as predicted. In conclusion, the only variables with the correct predicted signs are the exogenous demand variable LDIV and the opportunity cost variable LSPEC.

The results of the regression equations are as expected, in equations [9] and [10]. However, when these equations are adjusted for autocorrelation, the results are not as predicted by the theory. A test can be performed to test the restrictions on the coefficients suggested by the underlying theory in the model.⁹ The

9. Pindyck and Rubinfeld, *op. cit.*, p. 312.

test statistic approximates the chi-square distribution and is specified as follows.

$$\chi^2 = 2(\log\text{-likelihood}_{UR} - \log\text{-likelihood}_R)$$

where

UR = unrestricted model

R = restricted model

The degrees of freedom are equal to the number of restrictions on the coefficients, which in this model equals four. The chi-square test statistic was found to equal 108.2748 for equations [9] and [10] whereas the critical value is equal to 9.49. This means the null hypothesis must be rejected. It must, therefore, be concluded that the restrictions on the coefficients which are suggested by the theory are not supported by the regression results. However, all other standard tests of these results suggest the model has some explanatory power. When this same test is performed on the autocorrelated adjusted results of equations [11] and [12] above, the chi-square statistic is equal to 34.88, and again the restrictions on the model must be rejected.

4.3 Conclusions

The long run equilibrium model estimated using non-linear techniques with restrictions on the coefficients does not give consistent results. When the estimation is performed with no adjustment for autocorrelation, the results are as predicted and almost all variables are found to be significant. However, when the estimation is done with the coefficients adjusted for autocorrelation, almost no variables have the correct predicted signs, although they are all significant.

When a log-likelihood test was performed on the restricted and unrestricted models, it was found that the restrictions on the variables were rejected. The rejection of these restrictions suggests there is some problem with the underlying theory of the model. This could be the cause of the inconsistent regression results.

Based on the regression estimates, no conclusions can be drawn as to whether law students make career changes when they feel that legal incomes are too low. Using this model it is not possible to answer any questions as to the long run equilibrium number of lawyers or their long run equilibrium earnings. The model does not suggest any relationship between the number of lawyers and demand variables such as the level

of Gross National Expenditure, the divorce rate or the number of mortgages approved. The regression results are inconsistent with the theory and the restrictions imposed on the coefficients by the underlying theory are rejected. Therefore, to answer any questions as to how the market for lawyers in British Columbia works it would seem that the market is more accurately reflected with the recursive "cobweb" model as suggested by Freeman.

CHAPTER V

CONCLUSIONS AND PUBLIC POLICY

5.1 Introduction

The main purpose of this thesis was to model the market for lawyers and use the model to examine the hypothesis that there is an over supply of lawyers in British Columbia. This over supply could, it is claimed, produce negative externalities, such as a reduction in the quality of legal services, and thus require action to reduce the number of practicing members of the Bar.

The legal profession is essentially self-regulating. A license to practice must be obtained, subject to the fulfillment of educational requirements which are under the control of the Law Society of British Columbia. If the models presented here demonstrate that the market either exhibits cycles, or is adjusting to long run equilibrium, increased controls by the Law Society would be questionable. Such a demonstration could also lead to questions of whether the Bar Association is working for the benefit of its members or the benefit of consumers.

The two models presented here differ in their treatment of inaccurate expectations of legal demand and earnings. The recursive "cobweb" model suggests that inaccurate expectations lead to cycles in the number of new lawyers. The long run equilibrium model is based on

the premise that inaccurate expectations are not important since law school graduates are not limited to practising law as a career.

Econometric estimates of both models have been carried out and the results suggest that any questions as to how the market for lawyers in British Columbia works should be answered using the recursive cobweb model. A maximum likelihood test was performed on the long run equilibrium model which led to the conclusion that the underlying theory of the model, which suggests restrictions on the estimated coefficients, is not entirely correct. It would seem that inaccurate expectations of demand and supply conditions by law students do lead to cycles in the number of lawyers.

5.2 Conclusions Based on Regressions Results

Based on the regression results it can be concluded that the number of lawyers is positively related to exogenous demand variables. In the short run, the demand variable which exerts the largest influence on the number of lawyers is the real level of economic activity. A one percent rise in real gross national expenditure leads to a 1.02 percent rise in the number of lawyers. The divorce rate also influences the number of lawyers, with a one percent rise in the number of divorces per 100,000 people leading to a 0.5 percent rise in the number of

lawyers. In the long run these elasticities rise to 1.47 and 0.7 respectively for the variables LGNE and LDIV.

It was also found that the number of law school entrants is positively related to lawyers' salaries and negatively related to other professional salaries. In the short run the number of law school entrants is inelastic with respect to salaries. In the long run, however, it is estimated that law school entrants will decrease by over four percent in response to either a one percent rise in other professional salaries or a one percent decrease in legal salaries. Other professions are presumably seen as substitutes.

The regression results also suggest that lawyers' salaries are negatively related to the number of lawyers, with a one percent rise in the number of lawyers leading to a 0.05 percent decline in lawyers' real salaries. Salaries are also dependent on the level of real economic activity. A one percent increase in real Gross National Expenditure leads to a 4.81 percent increase in lawyers' real salaries. Based on these results it can be concluded that although salaries respond to the number of lawyers and the level of economic activity, they are still very rigid with respect to law school entrants, but very elastic with respect to the level of economic activity.

Finally, the response of the number of law school entrants to the number of law school graduates suggests that the market has a recursive structure with cycles lasting approximately two years (from the Cobweb Supply equation). The cycles are generated due to inaccurate expectations of market demand and supply conditions by potential entrants. A one percent rise in the number of law school graduates leads to a 0.7 percent decline in the number of law school entrants in the long run. The number of graduates affects job opportunities and salaries which in turn affects the number of law school entrants. The entire process takes approximately two years with large graduating classes leading to small numbers of entrants.

5.3 Conclusions and Public Policy

Based on the above noted results, it can be concluded that the market for lawyers is essentially self-correcting. Any current surplus of lawyers in British Columbia is the result of short term disequilibrium phenomena. The market adjusts slowly to demand and supply conditions with cycles of approximately two years. If supply is presently greater than demand, the demand for places in law school will presumably decline. A surplus of lawyers would lead to a reduced price which would lead to a reduction in income, a

reduction in the demand for admissions and a removal of the surplus. The regression results show that salaries are negatively related to the number of law school entrants and the number of entrants is itself dependent on the number of law school graduates. This leads to the conclusion that further artificial market restrictions on the number of law school entrants or numbers admitted to the Bar are not necessary.

The regression results do not suggest that a persistent surplus of lawyers exists in British Columbia. Any present over supply should not be corrected by artificial entry limits, but should be recognized as a short term deviation of the market from equilibrium. The factors noted and described as (i) to (vi) in Chapter I can be perceived as the market's reaction to a short run surplus of lawyers. The declining salaries should lead to a decrease in law school entrants and a correction of the surplus. Any attempt by members to artificially correct this surplus by the imposition of controls on the market would only add to an already heavily regulated industry and allow existing members to earn higher rents.

Finally, the quality issue deserves some comment. Professional self-regulation exists to free the lawyer from competitive pressures in order that he/she can act in the best interest of his/her clients. Entry barriers

are in place to ensure that "undesirables" are not free to practice law and so that legal incomes are preserved at such a rate as to allow the lawyer to assume his/her agent role. Regulations on who is qualified to practice law and give legal advice are in place for this purpose as well. If the quality of legal services is in fact declining, it may be due to an incorrect perception that the economic position of the lawyers is in jeopardy. The real incomes of lawyers have declined only slightly, and still remain well above other professions' real incomes, which would lead to the conclusion that the legal profession is still a lucrative one. The relationship between a declining quality of legal services and a declining income is, therefore, doubtful.

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APPENDIX A

Equations Underlying the "Cobweb" Supply Model

For simplicity Freeman assumes supply depends on salary and market demand conditions by the "partial adjustment formula". The two supply equations are as follows.¹

$$\text{LENT}_t = a_1\lambda\text{LSAL}_t - a_2\lambda\text{ASAL}_t + (1-\lambda)\text{LENT}_{t-1} + u_1 \quad [1]$$

$$\begin{aligned} \text{GRAD}_{t+3} = & b_1(\text{LSAL}_1 + \text{LSAL}_2) - b_2(\text{ASAL}_1 + \text{ASAL}_2) \\ & + b_3\text{LENT}_t + u_2 \end{aligned} \quad [2]$$

Equation [1] relates the number of new entrants (LENT) to lawyers' salaries (LSAL), alternate salaries (ASAL) and new entrants one year previous, with a lag determined by λ , where λ is a partial adjustment parameter which relates the adjustment of the number of entrants to the equilibrium number. The larger is λ , the quicker is the adjustment process. Equation [2] relates law school graduates three years from now to

1. The first equation is derived from the following two behavioural equations.

$$\text{LENT}_t = \text{LENT}_{t-1} + \lambda(\text{LENT}_t^* - \text{LENT}_{t-1})$$

$$\text{LENT}_t^* = a_1\text{LSAL}_t + a_2\text{ASAL}_t$$

where LENT_t^* is the desired or equilibrium level of new entrants.

salaries during the first two years of law school, plus entrants.

The two salary (demand) equations are as follows.

$$LSAL_{t+3} = -c_1 LNUM_{t+3} + c_2 LOUT_{t+3} + u_3 \quad [3a]$$

$$LSAL_{t+3} = -d_1 GRAD_{t+3} + d_2 LOUT_{t+3} + u_4 \quad [3b]$$

The salary equations relate legal salaries directly to legal demand (LOUT) and inversely to law graduates and the number of people with law degrees (LNUM). Equation [3a] is the stock version of the salary equation, relating legal salaries to the stock of existing lawyers and a series of legal demand variables. Equation [3b] is the flow version of the salary equation, relating legal salaries to the flow of new lawyers into the market and a series of legal demand indicators.

APPENDIX B

**The Derivation of the Long run Equilibrium
Theoretical Model**

Part 1

The derivations in this Appendix are for the most part from the Pashigan paper. Equations [1] and [2] below determine the number of practicing lawyers and the number of new admissions to the Bar respectively.

$$L_t = (1-d) (L_{t-1} + NA_t) \quad [1]$$

$$NA_t = c_t F_{t-3} + n_t \quad [2]$$

where

- L = the number of practicing lawyers
- NA = the number of new admissions to the Bar
- F = the number of first year law students
- d = the depreciation rate measuring quits and deaths in the legal profession
- t = time subscript, where t represents the current year
- c = the proportion of students who have completed law school and passed the bar exam.
- n = random error term to measure students who have failed the Bar examination or have taken longer than three years to complete law school.

Equation [1] relates the current number of practicing lawyers to a proportion of the number of lawyers practicing one year previously plus the number of current new admissions to the Bar. Equation [2] states that the number of persons admitted to the Bar is a proportion of the number of first year law students in year t-3.

The demand for lawyers is given by

$$LS_t^D = \alpha_0 + \alpha_1 LE_t + \alpha_2 Z_t + u_t \quad \alpha_1 < 0, \alpha_2 > 0 \quad [3]$$

where

LS_t^S = the quantity of legal services demanded
 LE_t = the annual earnings per lawyer¹
 Z_t = a vector of exogenous demand variables
 u_t = a random error term

The supply of legal services, LS_t^S , is represented by

$$LS_t^S = \beta_0 + \beta_1 LE_t + \beta_2 L_t + v_2 \quad \beta_1, \beta_2 > 0 \quad [4]$$

The supply of legal services is assumed to vary directly with the number of lawyers and with lawyers' earnings. Existing lawyers will increase legal services by increasing the use of other factors when lawyers' earnings rise. An increase in the number of lawyers raises the supply of legal services given present legal earnings. This equation, therefore, assumes that an increase in alternative occupations salaries does not affect legal services in the short run. However, in the long run it would lead to a change in the number of lawyers and therefore, the amount of legal services supplied.

1. Quantity demanded is usually related to a price charged P_t . LE_t can be substituted for P_t if total days worked per year h_t and operating costs as a share of total revenue v_t have not changed much over time so that $P_t = \frac{1}{1 - v_t} \frac{1}{h_t} \times LE_t = \tau LE_t$ where $\tau = \frac{1}{1 - v} \frac{1}{h}$

Given the number of lawyers, equilibrium earnings can be represented by

$$LE_t = \frac{(\beta_0 - \alpha_0) + \beta_2 L_t - \alpha_2 Z_t + v_t - u_t}{(\alpha_1 - \beta_1)} \quad [5]$$

(ie. Let $LS_t^D = LS_t^S$ and solve for LE_t). Since $(\alpha_1 - \beta_1) < 0$, LE_t varies inversely with L_t and directly with Z_t .

Part 2

This section analyzes the decision to enter law school and its effects on the long run equation. This equation assumes perfect foresight concerning future earnings and also that all people who wish to enter law school are able to do so.

For simplicity, university graduates are assumed to decide either not to enter law school and earn $\$U^2$ forever, or to enter law school with three possible outcomes. The first outcome is, the student will pass law school and the Bar examination; the second alternative is the student passes law school but fails the Bar examination; and the final outcome is the student fails to complete law school.³ The expected present

2. The present Value of earnings = $\sum_{i=0}^{\infty} \frac{U}{(1+r)^i} = \frac{(1+r) U}{r}$

3. (i) If the student passes law school and the bar exam with probability $pp^{\hat{}}$, the present value of their earnings is

$$\frac{1}{(1+r)} LE$$

value of entering law school would be the sum of these three possible outcomes, or

$$PV = p\hat{p} \frac{1}{(1+r)^3} \frac{(1+r)}{r} LE + \hat{p}(1-p) \frac{1}{(1+r)^3} \frac{(1+r)}{r} U \\ + (1-\hat{p}) \frac{1}{(1+r)^2} \frac{(1+r)}{r} U$$

where \hat{p}

- \hat{p} = the probability of passing law school
- p = the probability of passing the bar exam
- r = normal rate of return to legal education

In the long run students will earn a normal rate of return to education, therefore, the present value of earnings if you enter law school will be equal to the present value of earnings if you do not enter. This is the condition behind equations [6] and [7].

where $\frac{1}{(1+r)^3} \frac{(1+r)}{r}$

- r = normal rate of return to education, assumed to equal 0.10.
- \hat{p} = the probability of passing law school
- p = the probability of passing the bar exam

(ii) The student will pass law school but fail the bar exam with a probability of $\hat{p}(1-p)$, the present value of their earnings is

$$\frac{1}{(1+r)^3} \frac{(1+r)}{r} U$$

(iii) The student will fail law school with a probability of $(1-\hat{p})$, the present value of their earnings is

$$\frac{1}{(1+r)^2} \frac{(1+r)}{r} U$$

This assumes the student fails law school after completing two years.

$$LE_t = (1+r)^3 U_t H_t \quad [6]$$

where

LE_t = the long run equilibrium lawyers earnings, reflecting possible failure.

$$H_t = \frac{(1+r)^2 - (1-\hat{p})(1+rh)^2}{\hat{p}\hat{p}(1+r)^2} - \frac{(1-p)}{(1+r)\hat{p}\hat{p}} - \frac{(1+rh)^3(1-p)r}{(1+r)^4\hat{p}} + \frac{(1+rh)^2(1-\hat{p})(1-p)}{(1+rh)^3\hat{p}\hat{p}} \quad [7]$$

where

h = the number of days worked per year expressed as a proportion

$1+rh$ = the assumed rate of return earned by a law student who has graduated but not passed the bar examination.

H_t is the summary equation representing the opportunity cost of attending law school and the possibility of failure.

Lawyers' real earnings will exceed those of college graduates if either p or \hat{p} is less than one.

Part 3

Forecasts of earnings made at the time of entering law school are now entered into equation [6].

$${}_{t-3}LE_t = {}_{t-3}U_t (1+r)^3 H_t \quad [8]$$

where

${}_{t-3}LE_t$ = the forecast made in year $t-3$ of legal earnings in year t .

${}_{t-3}U_t$ = the forecast made in year $t-3$ of college graduate earnings in year t .

If it is assumed that forecasts are made by rational expectations, then it can be assumed that the forecast earnings are equal to the mean of the distribution of lawyers' incomes in year t .

$${}_{t-3}LE_t = {}_{t-3}E(L_t)$$

where E is the expected value operator.

In year $t-3$, expected lawyers' incomes will depend on the number of lawyers now (L_{t-3}), the number of students currently in law school (F_{t-3} , F_{t-4} , F_{t-5}) and the forecast of exogenous demand ${}_{t-3}Z_t$.⁴

$$\begin{aligned} L_t = & (1-d)^3 L_{t-3} + (1-d)^3 c_{t-2} F_{t-5} + (1-d)^2 c_{t-1} F_{t-4} \\ & + (1-d) c_t F_{t-3} + (1-d)^3 n_{t-2} + (1-d)^2 n_{t-1} \\ & + (1-d) n_t \end{aligned} \quad [10]$$

Substituting equation [10] into equation [5] and taking the expected value gives equation [11].⁵

4. Substituting equation [2] into [1] you obtain

$$L_t = (1-d)L_{t-1} + (1-d)c_t F_{t-3} + (1-d)u_t$$

Lagging this equation and substituting for L_{t-1} you obtain

$$\begin{aligned} L_t = & (1-d)((1-d)L_{t-2} + (1-d)c_{t-1} F_{t-4} + (1-d)u_{t-1} \\ & + (1-d)c_t F_{t-3} + (1-d)u_t \text{ etc. so as to derive} \end{aligned}$$

equation [10].

5. It is assumed here that students predict without error, therefore the expected value of the random error term equals zero.

$$\begin{aligned}
{}_{t-3}LE_t = & \frac{(\beta_0 - \alpha_0) + \alpha_2 {}_{t-3}Z_t + \beta_2 [(1-d)^3 L_{t-3} + (1-d)^3 c_{t-3} F_{t-5}]}{\alpha_1 - \beta_1} \\
& + \frac{(1-d)^2 c_{t-1} F_{t-4} + (1-d) c_t F_{t-3}}{\alpha_1 - \beta_1} \quad [11]
\end{aligned}$$

Part 4

Next, the number of first-year law students, when the market is in equilibrium, can be derived by substituting equation [11] into equation [8].

$$\begin{aligned}
F_{t-3} = & \frac{(\alpha_0 - \beta_0 + \alpha_2 {}_{t-3}Z_t + (\alpha_1 - \beta_1)(1+r)^3 H_t {}_{t-3}U_t)}{\beta_2(1-d)c_t} \\
& - \frac{\beta_2 [(1-d)^3 L_{t-3} + (1-d)^2 c_{t-1} F_{t-4} + (1-d)^3 c_{t-2} F_{t-5}]}{\beta_2(1-d)c_t} \quad [12]
\end{aligned}$$

The equilibrium number of new admissions in year t is expressed by

$$NA_t = \frac{(\alpha_0 - \beta_0) + \alpha_2 {}_{t-3}Z_t + (\alpha_1 - \beta_1) H_t {}_{t-3}U_t - (1-d) {}_{t-3}L_{t-1}}{\beta_2} \quad [13]$$

This equation represents the number of new admissions in year t to be equal to the difference between the number of lawyers demanded at the prevailing level of legal earnings and the forecast number of lawyers in year $t-1$.

Part 5

The actual number of law students may be less than equilibrium. Law schools are essentially non-profit and growth is monitored by the parent university. One of

Pashigan's reasons for formulating a model of the market for lawyers is to investigate the speed with which law schools respond to an increase in the demand for lawyers. A first assumption is that there are enough seats to cover replacement demand ($d_{t-3}L_{t-1} / (d_t(1-d))$). A second assumption is that the number of first year seats increases "so that a proportion, w ," of the gap between the equilibrium and expected number of lawyers is narrowed. Taking into consideration these two assumptions we obtain equation [14] representing the observed number of first-year students.

$$F_{t-3} = w \left[\frac{(\alpha_0 - \beta_0) + \alpha_2 t^{-3} Z_t + (\alpha_1 - \beta_1) H_t t^{-3} U_t - t^{-3} L_{t-1}}{\beta_2 (1-d) c_t} \right] + \frac{d}{(1-d) c_t} t^{-3} L_{t-1} \quad [14]$$

where $0 < w < 1$. The proportion w measures the adjustment speed of law schools to changes in demand. Therefore, if $w=1$, the observed number of first year law students is equal to the equilibrium number, ie. no adjustment is necessary.

APPENDIX C

An Alternative Test for Autocorrelation

In this case the procedure is to take the residual variable ϵ_t generated by the econometric estimation, and regress it on ϵ_{t-1} , the dependent variable lagged one period ($LENT_{t-1}$), and the independent variables. The equation will have the following form.

$$\epsilon_t = \alpha + p^* \epsilon_{t-1} + \beta^* Y_{t-1} + \tau^* X_t + \mu_t$$

where

ϵ is the estimated residual,
 Y is the independent variable,
 X is the dependent variables, and
 μ the random error term

A t test is then performed on p^* , the null hypothesis being that p^* is not significantly different from zero.¹

The residuals computed for equation 5 were used as the dependent variable in this equation, and a t test was performed on the estimated p^* . The following results were obtained, with the numbers in brackets being the calculated t statistics.

$$\begin{aligned} \epsilon_t = & 1.8802 + 0.56685\epsilon_{t-1} + 0.47494 LENT_{t-1} - \\ & (0.78395) \quad (-1.2986) \quad (1.1532) \\ & 0.20535 LGRAD - 0.036804 LDIV - 0.27577 LGNE + \mu_t \\ & (-0.17815) \quad (-0.87777) \end{aligned}$$

1. Pindyck and Rubinfeld, op. cit., p. 195.

From the estimation $p^* = -0.56685$, with an estimated t statistic equal to -1.2985 . This allows the acceptance of the null hypothesis that p^* is not significantly different from zero. The critical value for t is -2.045 which is less than the value of the computed t statistic, therefore, no autocorrelation is present and the ordinary least squares method of estimation can be used.

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