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THE ET INTERVIEW: PROFESSOR MAX KING

Interviewed by Jiti Gao and Brett Inder
Monash University



Emeritus Sir John Monash Distinguished Professor Max King.

BACKGROUND

In 1951, Maxwell Leslie King was born in Christchurch New Zealand. He grew up within walking distance of the Ilam Campus of the University of Canterbury where he completed a B.Sc. with First Class Honours in mathematics in 1972. A bursary with the Reserve Bank of New Zealand allowed him to complete an M.Com. in economics with First Class honours in 1974. He returned to the University in 1976 to undertake a Ph.D. in econometrics which was completed in 1979.

Max took up an appointment as Lecturer at Monash University in March 1979. He was promoted to Senior Lecturer in 1983 and Reader in 1986. In mid-1986, he was appointed Professor of Econometrics and in 1988 he became Head of the newly created Department of Econometrics, a position he held for 13 years.

In 1993 he was invited to chair Monash University's Ph.D. and Scholarships Committee, a position that led him to become the inaugural Director of the Monash Research Graduate School and in 2003, Pro Vice-Chancellor (Research and Research Training). Other Monash University appointments include Deputy

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Dean of the Faculty of Business and Economics from 2001–2005 and Sir John Monash Distinguished Professor 2003–2012. There were also visiting appointments at Trinity College, Cambridge; the University of Southampton; the University of Auckland and the University of California San Diego.

Max organised the first conference of the Australian Econometric Study Group which was held at Monash University in August 1982. This eventually led to the formation of the Australasian Region of the Econometric Society. Max was appointed secretary to the Australasian Standing Committee of the Econometric Society, a post he held for 34 years. The Committee was responsible for overseeing the organisation of Econometric Society Meetings within the Australasian region. In addition to this role, he served on a number of editorial boards, most notably *The Journal of Econometrics,* 1985–2010; *The Journal of Empirical Finance,* 1991–2000 and *The Australian Journal of Statistics,* 1985–1989.

Max's research has spanned a number of areas related to hypothesis testing in a finite sample context. His work is innovative, most notably introducing the idea of point optimal testing to maximize power where it is most needed, exploiting invariance to deal with nuisance parameters, as well as numerous contributions on computational aspects of hypothesis testing. He has always been driven by the view that we must capture the maximum amount of available information from the data, driving the best decisions, knowing that computational obstacles will be overcome with more time and computing power. His articles have been published in *Econometrica*, *Annals of Statistics*, numerous articles in *Journal of Econometrics* and *Econometric Theory*, the *Review of Economics and Statistics*, along with many other journals. His wide range of co-authors include a large proportion of his 45 completed Ph.D. students.

Max played an important national role in Postgraduate Research Education in Australia, first becoming a founding member of the Council of Deans and Directors of Graduate Studies in Australia in 1996, a member of the Council's executive over the period 2006–2012 and its Convenor 2007–2009. As Convenor he was appointed to a raft of Government committees and task-forces on a range of topics and was a member of the USA-based Council of Graduate Schools Global Summit Steering Committee during 2008–2011. In 2010 he was the co-chair of the Strategic Leaders Global Summit on Graduate Education.

Over his career, Max has received a number of honours. He was appointed an inaugural Fellow of The Journal of Econometrics in 1989 and a Fellow of the Academy of the Social Sciences in Australia in 1997. He received a Career Achievement Award from the Australian Learning and Teaching Council. Upon retirement from Monash University, he was appointed an Emeritus Sir John Monash Distinguished Professor and the University created the Maxwell King Ph.D. Scholarship as the premier Ph.D. Scholarship at Monash University.

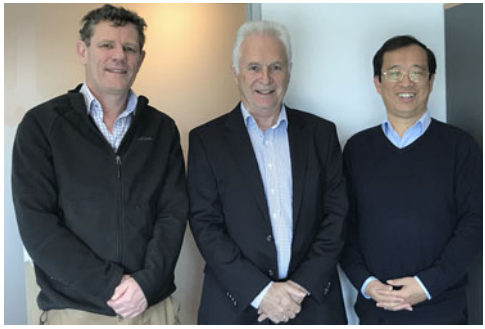
The following interview took place at Monash University in August 2016.

JITI: It's a great privilege for us to talk with you today Max, and to celebrate a wonderful career.

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BRETT: Before we start talking about your career, I want to fill in a few gaps from the earlier years before you started university. Which school did you study at?

MAX: Christchurch Boys' High School.



Brett Inder, Maxwell King and Jiti Gao.

BRETT: A very good Government school, and the rival to the school that I attended!

MAX: Rex Bergstrom was also a student at Christchurch Boys' High School a number of years before me. He was most likely taught mathematics by the same master (teacher) as me. I had an old master who was finishing his career who was very sharp and very brilliant. Then I had somebody new and young who was very good as well. One highlight I remember was that in my last year there was a mathematics competition run by IBM. They were just getting started in New Zealand. The first computer at the University of Canterbury was an IBM. The competition was for high school students across the top half of the South Island of New Zealand, the catchment of the University of Canterbury basically, and I won it. I guess I felt I had a comparative advantage in mathematics as a result of that.

BRETT: Did that competition have a computing element to it given that it was IBM, or was it all technical?

MAX: No, it was just a series of questions using standard mathematical problem solving. After we'd done the test though we went to Caterpillar in Christchurch and saw their IBM computer in action, which was a novelty for us.

BRETT: I'm asking about that because computer power is a bit of a theme with your research. To what extent did some of those early experiences make you think "Hey wow, is this the potential future of mathematics and statistics?"

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MAX: There was no teaching of computing when I was at school, but one of the new masters took me aside and allowed me to do some computing using the University of Canterbury computer. I seem to remember you would write a small program and it would be punched up on cards. Then it would go into the computer and out would come more punched up cards with the program compiled onto them. Then you put those cards back in and it would do what you asked it to do. I wrote a program to do factorials just to see and it did it pretty quickly! That was fun, but it was more at university that I started to see the potential of computers and mathematics and statistics.

BRETT: What was it like using computers in the days of your science degree, in terms of what you learnt and how you interacted with the computer?

MAX: It was new. They began teaching a subject called computer science when I was in third year that basically taught programming skills. I remember we had a competition within the class; three dimensional noughts and crosses. We each played each other's program so I wrote one that was very forward looking and searched out different strategies—and no one else thought of that idea. So I could search through all possible moves and look to see if I could win by consecutive moves which forced the other person to defend so they didn't lose. I heard the next year they used my program as a demonstration.

JITI: Let's go to a couple of questions about the early parts of your career, at Canterbury University in New Zealand, and then your move to Monash. What were some of the pivotal moments from this stage of your career?

MAX: I would say the first pivotal moment was studying mathematics at university. I did an honours degree in mathematics and was well trained, but then I switched to doing a commerce degree. I felt mathematics was all very nice but I wanted to see more application; economics and econometrics provided that.

Before I did the transfer, over the summer holidays I read Samuelson's textbook which was just a lot of common sense and very easy to read. I enjoyed finding out about economics written by a master in quite a simple way. The first econometrics course I took was taught by a person called Tony Rayner, the professor of econometrics. He had a position at Birmingham University before coming to Canterbury University in Christchurch where I attended. He used Johnston's textbook, second edition, just new that particular year. I nearly didn't have Tony as a teacher because on the weekend before classes started he got lost in the Southern Alps of New Zealand. There were headlines in the newspaper on the Monday morning, "Two lost in the Southern Alps." They were found and fortunately the lecture went ahead on the Thursday. I think we all clapped when he came into the classroom. Tony was a really excellent teacher. Johnston was a nice, well organised textbook and Tony really turned me on to econometrics.

JITI: So you came to Monash from 1978 and then you went back for the submission of your Ph.D. thesis. Can you tell me some more about how you started your career at Monash?

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Econometrics department members Graham McLaren, Brett Inder, Keith McLaren, Maxwell King, Merran Evans and Grant Hillier in 1987. The department was celebrating Monash University's ranking as the eighteenth in the world for its research in theoretical econometrics.

MAX: After I finished my Master's degree in economics I worked for two years at the Reserve Bank of New Zealand in Wellington. There I did quite a bit of what I'd call regression analysis more than modern day econometrics. I was helping work on a model of the economy that needed adapting, changing, and fixing, and there were all sorts of problems that came along. That was my first introduction to econometrics being actually used. But it was a bit unsatisfying so I thought I'd go and do a Ph.D.

BRETT: Tell us more about the work at the Reserve Bank. You were working on this 120 equation model of the New Zealand economy? What was it like to actually try and construct a statistical/mathematical model on that scale?

MAX: It had actually already been constructed when I arrived, but there were some equations that didn't work very well. Some of the leading people there at the time were trying to work out how well it was forecasting, so I got to learn a lot about that. You run the model and pretend that you're at a certain time and can only use information up to that time. Then you make your forecast and compare it with reality to see how well it worked. There was a lot of work going on in that area.

We also had visiting academics come through the Bank. Ken Wallis was a very early visitor that I can remember.

It was also at the Bank that I produced my first publication [1]. I did it with Viv Hall on price expectations and it was published in the *New Zealand Economic Papers*. There was very high inflation at the time, and so we were trying to assess if people expected inflation to increase, or if they expected the inflation rate to slow down. Somebody did a quarterly survey that asked "Do you think prices are going to go up, stay the same or go down?" We tried to use the results of that survey to get some measure of expectations about inflation.

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BRETT: An interesting example of how research topics evolve. I guess we're talking about the mid-'70s, which had very high inflation. Compare that to nowadays where we're worried about, in some parts of the world, negative inflation! You pose very different questions back then when you're talking 10%, 20% inflation rates.

Tell us more about your experiences with the Bank.

MAX: The Bank served the New Zealand economy quite well in that it recruited a lot of young economists who often spent a few years there and then moved on to other things. It actually gave us a good idea of how the economy worked. Working on the model, running simulations and seeing where it went wrong and where it worked well was all good training.

BRETT: The work with Viv Hall, was he at the Bank or was he elsewhere?

MAX: He came as an academic visitor to the Bank. He worked at the University of Sydney but was originally from New Zealand so he found it attractive to come to Wellington for a summer. The article was the result of that summer's work with him.

BRETT: So whilst the Bank was public service it sounded like it had some pretty good academic stimulus for you with Viv Hall and Ken Wallis coming through?

MAX: Yes. It was very much like a university department in the sense that it had some quite reasonable employees and people coming through talking about new research. Instead of teaching, we were maintaining a model of the economy and answering questions that were raised by different sections of the Bank and even by the government who wanted advice from the Bank on various economic issues.

BRETT: Okay, tell us about how the transition to being a Ph.D. student and then to Monash occurred.

MAX: There was a scholarship available to me so I went and studied under Tony Rayner at the University of Canterbury. He went off halfway through my time as a Ph.D. student on a sabbatical to Birmingham where Peter Phillips was the Professor of Econometrics. Peter had taken a visiting appointment at Yale University, and Birmingham needed somebody to do Peter's teaching. Tony had previously been there and was due a sabbatical, so he left for Birmingham. A previous Ph.D. student of Tony Rayner, David Giles, was at Monash as a lecturer at that time and the scholarship allowed me to travel. David and I had worked together at the Reserve Bank and written some joint articles together ([2], [3], and [5]) so it wasn't a difficult decision to come and spend nine months at Monash.

I fell in love with Melbourne and Monash. There was a critical mass of econometricians, a very large statistics department, a very well stocked library—and there was a wine club. It was like going from a country town to a city. While I was at Monash as a visiting student there was a vacancy for a lectureship so I applied and was awarded it. I went back to New Zealand to try and finish the Ph.D. before

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I was due to start the lectureship, but I didn't quite manage it. I came back the next year (1979), and started as a lecturer here at Monash while finishing off the Ph.D. It was finally submitted in November of that year.

JITI: That leads to the next set of questions, more about your research. I'd really like to know how you got into the research area of point optimal testing from a very early stage. You published that first article in 1977?

MAX: When I started the Ph.D., I had this feeling that the Durbin–Watson test was unsatisfactory. You would actually apply the test as a bounds test because you couldn't get an exact critical value. I thought it could be improved so I started to search for something better than the Durbin–Watson test. I looked into non-parametric tests based on counting the number of sign changes in consecutive residuals and worked on that for quite some time. I tried to find the exact distribution of the number of sign changes. It was quite challenging, quite tricky, and then I realised that it wasn't using all the information that was available in the data—it was only using the sign changes and wasn't using the size of the residuals. That made me realise it wasn't any good. I then looked at transforming the residuals so they were IID. I found that Theil and others had also published in this area but I did my own work in that area. That research helped me understand some of the technical background that I later used in my 1980 *Annals of Statistics* article [6], particularly invariance and the concept of a maximal invariant statistic. I didn't do anything on point optimal testing until my second year out of the Ph.D. I first tried the idea as an alternative to the Durbin–Watson test on a certain data set and I found it was more powerful so that's where it started [21]. About a year later Adrian Pagan pointed out to me that it might be very good at testing for unit roots and that turned out to be the case.

BRETT: Before we talk more about Point Optimal testing, what was the topic of your Ph.D.?

MAX: You could probably say it was series of essays. One area was the class of spherically symmetric distributions. It is a very wide class and it includes distributions that have no moments, so these distributions could have very fat tails and the normal distribution is also a special case. Any statistic that was invariant to the scale parameter of the disturbances is invariant to whether the error distribution is normal or follows any one of these spherically symmetric distributions. So I worked quite a bit on this robustness idea. There were also three chapters on testing regression disturbances for autocorrelation.

BRETT: This is the work that made it into your 1980 *Annals of Statistics* [6] article?

MAX: Yes. There was a beginning of point optimal in that *Annals of Statistics* article but that idea wasn't explored there.

JITI: That was my next question. Looking at that article, it is not just cited by yourself and some co-authors, but by many others. In Google Scholar it has around 200 citations. When I first had a look at the article, I was very impressed

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not only with the novel idea, but also the right mathematics involved in the derivations.

BRETT: I recall when I was a Ph.D. student Max gave me that article to read, but I didn't have the mathematical background and I remember spending hours and hours on the first page and struggling. You clearly need strong training to get you there.

MAX: Yes. I spent hours working through the theory of invariance outlined by Lehmann (1959) and understanding the importance of a maximal invariant statistic. I realised it allowed an invariant testing problem to be reduced down to a simpler problem, involving fewer parameters, that treats the maximal invariant as the observed data. To construct optimal invariant tests, one needs to know the distribution of the maximal invariant statistics. I was able to derive that distribution for the case of testing linear regression disturbances and have used it many times to construct new tests.

My early interest was in deriving locally best invariant tests. Durbin and Watson (1971) showed their test for autocorrelation was approximately locally best invariant against first order autoregressive disturbances. In my thesis, I was able to show that it was approximately locally best invariant against first order moving average disturbances [16]. That and an extension of the result to spatial autocorrelation [10], led to a collaboration with Grant Hillier where we derived the locally best invariant test for a very general setting [22].

I kept discovering new locally best power properties of the Durbin–Watson test [13]. Merran Evans and I collected and extended these results in [37] where we showed that the Durbin–Watson test is approximately locally best invariant uniformly in a range of directions from the null hypothesis against multiparameter alternatives. Examples include sums of independent ARMA(1,1) processes, certain spatial autocorrelation processes and a stochastic cycle model. We called this property uniformly locally best (ULB) invariant. The question of how to construct a locally best type test against a multiparameter alternative when a ULB test does not exist led to the locally mean most powerful test that Ping Wu and I outlined in [63].

JITI: Looking at your research career, in particular your publication career, it is clear you prefer finite sample theory rather than asymptotic theory. Can you tell us a little bit more about that choice of approach or the research environment at that stage?

MAX: In the very early days, computing power was almost nonexistent or just starting up so econometricians would use computer packages. Some people would do some programming but mostly the derivations were of the asymptotics. In fact we largely couldn't do maximum likelihood estimation because that required too much computing power. Also there were difficulties in convergence, which meant that the programs we did have, ran for quite some time and sometimes didn't quite get the right answer. In terms of testing, there was a sort of Holy Grail. The likelihood ratio test was *the* test. It had asymptotic properties, optimality

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properties but when you applied it to the problem of testing for autocorrelation in the linear regression model it actually performed extremely poorly. It was very poor for small sample sizes and in fact there's very little written on the likelihood ratio test for that problem. I ran some simulations on it and got very poor results so I ditched it. That was an example to me of how asymptotics didn't necessarily work for the sample sizes that we were dealing with in those days. Asymptotics has come into its own a bit more with the bigger samples that we've got these days but back then it was more likely to mislead.

JITI: That's absolutely true. It's part of the reason in the late '80s and '90s, even early 2000s, simulation and bootstrap methods were used to find critical values when you have small or medium sample sizes. I think the point you made was that this related to poor test performance when you base the testing procedure on asymptotic distribution theory.

MAX: The other thing I found with the likelihood ratio test and testing for autocorrelation in a regression was that even if you used simulation to find the right critical value and then applied the test with that correct critical value, typically the power would first of all go down towards zero as you moved away from the null hypothesis of zero correlation in the direction of positive correlation. Then as the correlation increased further the power started to go up. So the power curve was wrongly positioned and you needed the sample size to get bigger for this problem to disappear. As the sample size got bigger, the power curve got better positioned in the sense that its minimum was closer to the null hypothesis value of zero. But for small samples it can be a long way out.

BRETT: So there were two problems with the likelihood ratio test; one was size, and then the other was the strange behavior of the power. I guess that motivated you to think of optimal tests. You used to have a fair bit of criticism too of Wald and LM tests. They can also display strange behaviour in different situations.

MAX: Yes. The LM test is interesting: it did have an optimality property in that it maximized asymptotic local power. In certain circumstances it even has a small sample power property in the case of the one-sided version of the LM test. In the absence of nuisance parameters, that test is locally best so it is most powerful right at the null hypothesis. Where you need the power least it gave you good power. That was the key criticism. The Wald test sometimes had even worse properties because you've got an information matrix that is a variance–covariance matrix. That can be very poorly estimated in small samples, in fact can destroy the test because it can be a singular matrix. That can really mess up the test. Sometimes the power will go up and then come down to zero as you move away from the null hypothesis. There is plenty written about the poor power properties of the Wald test.

BRETT: If we go back to our traditional training in hypothesis testing the foundations of the LR, LM, and Wald tests, what you've discovered by experience and

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through the literature is that there's some significant problems with each one of these. Therefore we need to customise our efforts a little bit more for a particular class of tests?

MAX: Yes, exactly. Moreover the Wald test required one to estimate the variance–covariance matrix of the parameters that you've estimated and that's causing a second problem. The likelihood ratio test doesn't have that second problem. It has its own problems, largely caused by the presence of nuisance parameters but it's not compounded by this other problem.

BRETT: The point that Jiti made before about the evolution of bootstrap suggests that the rapid growth of computer power allows us to take a different approach to testing. For example, the LM test was always sold as having the benefit of not having to try and estimate the model under the alternative hypothesis because it was too hard sometimes to do that well. Nowadays we estimate many models under many hypotheses or many values of the alternative hypothesis without blinking.

MAX: Exactly.

BRETT: So that advantage has disappeared and bootstrapping is perhaps an extreme example of that. This must have driven some of your thinking about how we approach testing and how we can make use of computer power?

MAX: Yes, it did. Very much so. It made me say rather than working on constructing a test that we can apply easily on the back of an envelope, why don't we try and construct the test that we would really like to apply without any thought about the computational demands? Maybe early on some of those tests weren't able to be applied, but as computer power has grown they've come into their own more and more.

BRETT: That's a good way of articulating it. Rather than tie down solutions to fit within the constraints we currently have, let's be forward-looking.

MAX: In fact in my very early days as a university administrator I discovered how much computing time was being used in physics and chemistry and other areas. What we were doing was a very small drop in the ocean compared to them, so even in those days potentially we could have done a lot more computing.

BRETT: We just had the small mindset of being able to produce results in a few seconds instead of the physicists who ran massive parallel computers that take hours or days?

MAX: Exactly. Another problem with LR, LM, and Wald tests as outlined in econometrics texts in those days was that they were all applied as two-sided tests. In my experience, many econometric testing problems are one-sided in nature, the most obvious being when testing for a zero variance—variances are not negative. Using a one-sided test instead of a two-sided test can result in a healthy increase in power, over 50% in one case Merran Evans and I examined [19]. As you can see, I have always been focused on finding tests with very good power properties.

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Also later in my career, I discovered that these bias problems with the small-sample power of the LR, LM, and Wald tests seemed to be caused by the presence of nuisance parameters which resulted in biased maximum likelihood estimates. Granville Tunnicliffe-Wilson introduced me to the marginal likelihood which for modelling and testing regression disturbances, was a way of overcoming these nuisance parameter effects. Ismat Ara and I (Ara and King, 1993) found that for the regression disturbance case, the marginal likelihood is identical to the density of the maximal invariant from my *Annals of Statistics* article [6]. I worked with Shahidur Rahman, Mizan Laskar, and Abdul Latif in exploring the use of the marginal likelihood in a number of settings [48], [55], [58], [64], [66], [68], and [78].

BRETT: Let's go back to discussing your career progression. You started at Monash as a lecturer first?

MAX: When I came to Monash as a Ph.D. student I worked as a research assistant part-time for a professor of finance. Then I was a part-time tutor.

BRETT: And then you applied for a lecturing position?

MAX: Yes, and then I was a full-time lecturer from early 1979 onwards.

BRETT: And that was in the department of?

MAX: Econometrics and Operations Research.

BRETT: And the head of department at that time?

MAX: Was Nick Hastings.

BRETT: Soon after that David Giles became head is that correct? Or professor and then head?

MAX: Yes, he became professor when I was back in Christchurch trying to finish my Ph.D. In those days the head of department post rotated amongst the professors, so Nick Hastings had a period of being head and then David and then it would've gone back to Nick.

BRETT: And your career at Monash in the early days was it a pretty standard academic career; teaching, research? Any particular highlights in those first few years of significant events or significant visitors that had an impact on your research or study leave?

MAX: I do remember with great fondness going to my first World Congress of the Econometric Society which was at Aix-en-Provence in France in 1980. I met a lot of people who became life-long friends. I remember Peter Phillips giving one of the invited addresses. I remember Arnold Zellner and David Hendry having a little bit of a disagreement; let's call it a friendly discussion.

BRETT: When you're isolated from the rest of the world in Australia and New Zealand some events like that are pretty significant aren't they? In terms of being able to get exposure for your work?

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MAX: Yes. The first contributed article I went to was actually one given by Jim Durbin. I asked some questions at the end of the talk and he and I had lunch together after that. He was pretty impressed and that started a little friendship. He wanted to tell me of the influence of Donald Cochrane, who was the Dean at Monash at that time, on the development of the Durbin–Watson test. That was why that Monash connection was so important to him.

BRETT: Then some years later you were promoted through to professor?

MAX: I become senior lecturer, in 1983. In 1985 I applied for a chair at the University of New England (in Australia) and they offered it to me. My family weren't too happy about the prospect of leaving Melbourne but we would have gone. Then David Giles announced that he was leaving Monash, so I took the gamble and decided not to take up the New England position. It paid off because I did get appointed Professor in 1986. I was promoted to the position of Reader at the end of 1985 having already been offered a chair at another university. That was almost what you had to do to become a Reader at Monash at that time.

BRETT: Somewhere in there you went to Trinity College, Cambridge on a study leave as well and worked with Gene Savin?

MAX: That was my first sabbatical in 1982. I met Gene at the World Congress in 1980 and then I went and visited him for two or three days in Cambridge in 1981 after attending the European Meeting of the Econometric Society. The following year he organized a visiting scholar's position for about six weeks, so I was resident in one of the new halls at Trinity College in Cambridge. That was a very pleasant time.

I was able to present seminars at different parts of the United Kingdom as well. I went up to Manchester, went down to London and gave a seminar at the LSE with Jim Durbin in the front row. It was while walking through the grounds at Trinity College and talking about my ideas for point optimal testing that Gene Savin came up with the phrase point optimal and I thought "that is a good name."

BRETT: So you came to Monash and you settled in here well but actually some significant international exposure really shaped your research.

MAX: That's right.

BRETT: Meanwhile at Monash you were starting to recruit Ph.D. students. Your first one was Merran Evans part way through her thesis, then there was me (Brett Inder) in '82. Others must have started to flow from there fairly quickly?

MAX: It wasn't a big flow initially. There was also Chris Skeels and Murray Smith but they both went and worked more with Grant Hillier. There were no new Ph.D. students until after I became professor.

JITI: My question at this stage is about how you managed to balance the supervision and being head of department plus all the articles you published in that time—most of which were single author articles. In the 15 year period from 1978 to 1993 you published 14 articles in *Journal of Econometrics*, which is impressive

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by any standard! So how did you cope with all the different duties on the one hand and your research on the other?

MAX: To some degree I was fortunate that when I first became professor it was a fairly easy time. You could get on with your research and I had a secretary who could do things on my behalf, so a lot of projects got started then. When I first became Head of Department in 1988, that role was not as demanding as it is today.

BRETT: When you took over as Head of Department it was still a joint department with the operations research people and a relatively small cohort of econometricians compared to nowadays. You were able to build the department quite significantly in size and quality. What are some of the key things that helped you develop that growth trajectory?

MAX: The operations research group had just begun a new degree in information systems, so it was agreed that they should break away and form their own department. I became head of a new department of Econometrics with only one professor. Heads had to be professors in those days so I determined to grow the department so we could have two professors and I could then step down as head. At that time Monash had a new vice chancellor, Mal Logan, and he was having meetings with every department and asking some searching questions. He came to our department and said "How many Ph.D. students have you got?" and I think at the time we had two. He said "That's not good enough," so the first task I had was to think about how could we grow our Ph.D. student numbers.

Monash had quite a good Ph.D. scholarship system so I learnt about how the scholarship system worked. We also had a very big first-year program and every subject had tutorials—which meant we needed a lot of tutors. It was clear that you could use some of the tutorial teaching as a financial incentive for somebody to do a Ph.D. You could bundle together the scholarship and the work as a tutor and it could actually be competitive with the starting salary in the city because the scholarship was tax free. I think we advertised the bundle as well. In the first year I recall we had five students join the program, and we started growing at about five students per year for a while there.

BRETT: So the Ph.D. student cohort was the first key strategy and that gets the profile of the department up.

MAX: That's right. The second thing was the seminar program, which I would say was something that was very special about Monash. It was well attended and there would often be a lot of discussion. Staff and students would learn things from presenters and each other. It was a really important part of the department. When I first came here as a lecturer there were six people who would come to econometrics seminars. They had six different points of view and you knew exactly what that point of view was. But when we grew the department and added another ten to twenty Ph.D. students, suddenly it was a much more dynamic place with some of the senior students and new staff asking quite interesting and

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different questions. Having 20 people at a seminar instead of six made a big difference. People started to take notice of Monash econometrics too because they'd come and give a seminar and be quite impressed.

BRETT: So you're really building the brand of econometrics at Monash with some critical mass of students and then some external recognition. In turn, that boosts the reputation of the department and makes it an attractive place for those starting out their careers.

MAX: Yes. Another thing that was happening was that around the world, econometricians were either by themselves or in very small groups of econometricians in an economics department. Many were quite attracted to visiting Monash where there was a single department of econometrics. We got a lot of visitors from around the world who wanted to come here and they added a lot to the department as well.

BRETT: To change focus a little, early on in your career you also joined the Library Committee?

MAX: I got drafted onto the Library Committee. In those days every professor was on a committee of Professorial Board (now known as Academic Board). So when the vacancy came up on the Library Committee and I was a newly appointed professor, that was the one I got. I would have preferred the Ph.D. and Scholarships Committee but I didn't get that one, I got the Library Committee.

BRETT: You had quite an influence on that committee in taking a much more formula-based approach to how funds are allocated. How did your quantitative training influence the way you went about and contributed to that committee?

MAX: I can give you lots of examples about that. The Fraser government had cut funding to universities and consequently there was a cut in funding to libraries. At the same time a fall in the Australian dollar caused the cost of books and journal subscriptions to rise. University libraries had to cut journals and there were fights about what journals to cut. It was agreed we needed to allocate journal subscription budgets to broad disciplines and ask those disciplines to make cuts according to their allocated budget. I remember the Dean of Engineering wanted an allocation that had an exponential part in the formula, which would really favour them in the future. So I just graphed this and I held it up at Academic Board and said "This is what will happen if we use this formula." I was a great fan of averages—you can take different approaches and you can average them and it kind of keeps people a bit happier than one extreme case or another extreme.

BRETT: That was possibly the first graph shown in an academic board to make a point—which precisely shows the benefits of being able to analyse and quantify. So if I recall it ended up that the funding model became connected to student numbers rather than being based on how much money you got last year which kind of favours the traditional faculties?

MAX: Yes, although the cost of journals in different disciplines did also come into the formula.

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BRETT: I guess Arts faculties lost and Business and Economics faculties won out of that?

MAX: We didn't lose as severely as we might've lost. Everyone took cuts.

BRETT: Tell us a bit about how The Econometric Society Australasian meetings evolved, and your contribution to that?

MAX: It started as a reaction to an experience Gordon Fisher had when he was a visitor in the department. I think it might've been '81 or '82 and he went to the Economic Society of Australia conference. I didn't go. He came back and said "It was very weird. They had econometrics papers at the beginning of the conference and econometrics papers at the very end of the conference and none in the middle." It was as though econometrics got a bit of a bad deal out of this—treated as though it was a fringe discipline. He wasn't very happy with that and I thought "I wonder if we could just run something at Monash. We'd just call it a workshop and instead of having just one person come and give a seminar let's have two or three people. Then we could have some of us give papers as well and we could probably have a day of papers." That's what I thought at the beginning.

I started working on that idea. In those days there was no email so I wrote letters to different people and got some idea of interest. I approached David Giles who was the head of the department and see if he would fund any of it and I was allowed the money for two seminar presentations. Bill Farebrother and Graham Mizon were visiting Australia and so they were the two people we could pay to come. Then I just invited people to make submissions of papers and turned out we had a lot. We ran it from midday on Thursday to Saturday midday and it was quite a success.

We had a meeting in the middle of it to say "What shall we do next?" and a committee was appointed. A few days before that, the past president of the Econometric Society, Marc Nerlove, visited Monash to give a seminar and he suggested that we form an Australasian subcommittee or standing committee and have an Australasian region of the Econometric Society. With his help, I made the submission to the Executive of the Econometric Society and I met with them just after they'd had their 1982 meeting in Dublin and they agreed to us having one meeting. So the next year we ran the first Econometric Society Australasian meeting in Canberra.

BRETT: What started off as two visitors to Monash and a few of the locals giving a seminar ended up being virtually a two day conference with how many people?

MAX: There were 73 participants and 26 papers were presented. The program was published in the March 1983 issue of *Econometrica*. I presented an early version of my point optimal article [21].

BRETT: And in a day when you had to organise a conference without email. It's kind of hard for us to imagine what that must've been like!

MAX: Yes.

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BRETT: And this was while you were still relatively early and junior in your career. I guess you recognised that being an academic is much more than sitting in your room and working. Networking and relationships are an extremely important part of academia?

MAX: Exactly. You can do a lot of sitting in your room but you can get a lot more ideas through interaction with other people. For me I think it came from living in Christchurch, New Zealand which compared to London at that time, seemed to be close to the end of the world. When something was posted in England to different parts of the world, it reached Christchurch nearly last. So you treasured people coming and you treasured learning from them and hearing about new developments.

BRETT: What role did you take when the Australasian committee was formed?

MAX: One of the requirements of the Standing Committee was that it had to be chaired by a fellow of the Econometric Society. That meant I couldn't be the chair so I became the secretary. I think there were two people who were active fellows in Australia at the time. One of them, Ted Hannan, was prepared to be the chair, but he didn't want to do too much more than what was necessary because he had his own interests. He very graciously accepted the position as chair and helped us get on our way.

BRETT: And you took the role of secretary?

MAX: Yes.

BRETT: Which did the grunt work of the communication in particular?

MAX: Yes, exactly.

BRETT: Finances and everything else?

MAX: That's correct.

BRETT: How long did you hold that role for?

MAX: Until the end of December 2016.

JITI: Thirty-four years.

BRETT: In that time there's been an Econometrics Society Australasia meeting every year except for when there's a world congress?

MAX: Exactly.

BRETT: Grown to 300 plus participants typically?

MAX: It varies. Last year had a lower number of participants so it's up and down.

BRETT: Do you remember any particular challenges in that period as secretary or has it been pretty smooth sailing?

MAX: The first crisis was when a university pulled out of hosting the Econometric Society meeting. There were some difficulties in their Department, so they said they couldn't host it anymore. A year out we suddenly didn't have a host.

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But we gave the University of New England at Armidale a small grant and they stepped in.

BRETT: You've always got that risk when you're awarding the conference to a new institution.

MAX: Exactly, well it's a risk for any institution really. I always wanted to see it get to New Zealand. We made it the Australasian Region instead of just the Australian Region so we could do that. The first one was at the University of Canterbury. David Giles organised it with Richard Manning. Then it's been at Auckland and also Wellington.

BRETT: So periodically it's in New Zealand?

MAX: In 2018 it will be back in Auckland.

BRETT: New Zealand must have the largest percentage of econometricians per head of population if we count the expats?

JITI: Economists in general I guess.

BRETT: Reflecting on that, you can give yourself some credit for what you've achieved. Your goal in establishing the Australasian meetings and Australasian branch was to raise the profile of econometrics and The Econometric Society in this part of the world. Do you feel satisfied that that's actually been achieved?

MAX: I wanted it to be a meeting where people would come from overseas to present papers and we'd have local people and local Ph.D. students also presenting their work. I didn't have the opportunity to go to an Econometrics conference as a Ph.D. student. The first one I went to was the World Congress and I felt that was really great. I wanted to give people an opportunity a bit like that, but obviously not quite as grand as the World Congress, but something with a mix of invited speakers, internationals and locals. So, yes, I think it has served that purpose.

BRETT: Why don't we talk about some specific research matters now?

JITI: If we come back to point optimal testing you have written two survey articles; one was 1987 [34] and then the second one was 2015 [117]. Can you give us a bit of a summary of the area of point optimal testing in the last say 20, 30 years in terms of the development and research directions that people have taken from your early research articles?

MAX: In the early days it was very much small sample point optimal testing, but more recently the idea of point optimal testing has been used to construct tests with asymptotic optimal power properties for much more complicated testing problems. Rather than being point optimal at a particular fixed point regardless of sample size, we're seeing tests that are optimal at a point that actually gradually goes closer to the null hypothesis as the sample grows. This is really what you want to do because typically as the sample size grows the power curve approaches one more quickly. There is no point in optimising power when it is already at its maximum of one. So the area where you want to improve power moves closer to

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the null hypothesis. That's been a very clever use of the point optimal approach pioneered by Elliott, Rothenberg, and Stock (1996). Also, in particular circumstances, unknown nuisance parameters can be replaced by their estimates and the test still has the same asymptotic power properties.

I think point optimal is also being combined with work on how to construct a test when you've got a complex null hypothesis—so one that has multiple distributions under the null hypothesis. That's a very tricky problem and one I don't think we have really resolved yet. The recent article by Elliott, Müller and Watson (2015) is a good example of progress being made in this area.

JITI: I also like some of the ideas used in many of your articles about how to deal with composite alternatives. I myself in particular think that it was a nice way of eliminating nuisance parameters by either maximizing or integrating the test over a set of nuisance parameters.

MAX: Invariance arguments are very useful to eliminate them. They work very well in the regression context. In other nonlinear areas they don't work that well, so they suit some problems but not others.

BRETT: So then you just have an approach which averages across the parameters under test.

MAX: Yeah, so everything is based on maximizing some element of power whether it be a point or an average. These days there is increased emphasis on maximizing average power. Unfortunately, maximizing average power can sometimes actually give you an adverse test so that doesn't always work well. It has to be done with some care and I don't know that we know fully how to do that yet. It's certainly an area for more research.

JITI: From your experience do you think that optimal testing literature can still have a long way to go in the next ten years? What does the future hold for point optimal testing?

MAX: When I did the last survey article with Gowry Srianantha kumar [117], I did come up with some ideas that I would like to work on with somebody. So yes, I can foresee areas where point optimal testing will see further development. One area involves testing against a vector of parameters, but integrating the vector up into one parameter so that you're doing something a bit like an F test, where an F test maximises power at a certain distance out from the null hypothesis. You optimise the average power at a certain ringed ellipse contour around the multidimensional parameter space under test. That's something that might work. On the other hand, it might have bad properties—we just don't know—but it's something that I think needs to be explored.

There's also the average power question—so working out how best to calculate a test statistic. Basically integration is required and integration is summation over a series of points. The computer can do that quite well, so there are numerical methods available, but we don't always know the best way to approach it. Sometimes it's a waste of time integrating something that's virtually always zero, so

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there's quite a bit to be done working out how this can be done in practice. Maybe there are other areas of mathematics that we need to use to make that work. I think there are plenty of areas to work on. Multidimensional and averaging power are the two areas that I can think of.

Then there is an age old problem that is coming to the fore these days as we work with very big data sets. How should the significance level of a test be set as the sample size increases? I think the point optimal framework may be able to help with an answer to this question. For example, could we somehow balance the significance level with the probability of a Type II error at the chosen point under the alternative?

JITI: A related issue is something I was motivated by when you presented an article in Shanghai at The World Congress of the Econometric Society about how to determine exact critical regions using kernel density estimation when testing is based on a vector of statistics. I really like the article but I haven't seen that the article has been published yet. Can you tell me a little bit more about the original motivation for combining density estimation and hypothesis testing ideas together?

MAX: The first motivation comes from thinking about the Wald test and how it's so unsatisfactory. Basically you've got a vector of parameters that you think might be zero but you've estimated them and because of estimation error the estimates are not zero. The Wald test combines the individual parameter estimates via a quadratic form using the estimated information matrix. That information matrix in some circumstances can really destroy the test, so the question is how can we combine the parameter estimates without using the estimated information matrix? We could essentially simulate the distribution of those estimates in order to control size and that would actually be a better test; it would probably also have better power. The issue of how to simulate when the null hypothesis is made up of multiple distributions is solved via a bootstrap approach—estimating under the null hypothesis and then simulating the estimated model under the null hypothesis multiple times. The next step involves nonparametric estimation of the resulting joint density of the estimated parameters and using an idea that Hyndman (1996) came up with of looking at the height of that estimated density at the point where the actual estimated parameter vector is. The proportion of simulated estimates with lower heights than that of the actual estimated vector is an estimate of the p-value. This is a nice way to estimate the p-value for multiple tests. I like to think of these things as being a bit like a court case. If you're going to reject a model you need evidence. The evidence is actually in the data so you need to measure that against something else. The measuring against something else is actually estimating the model assuming the null hypothesis is true, like assuming the person's innocent. If they're innocent, is what we have observed a likely occurrence or is it an unlikely occurrence? By comparing it with the distribution you get from simulation you can pretty much make that decision.

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BRETT: We talked earlier about Ph.D. students. You started with one or two early on and then had a bit of a gap and then the department was encouraged to build the Ph.D. cohort. You built your flow of students quite significantly from the early 1990s. In addition to that over time you took on some leadership roles in the university around Ph.D. students or graduate students, doing supervision and management. Why don't we talk about that for a little while? Perhaps first of all let's look at your experience of supervising students; how did that grow and what motivated you? What was most rewarding about supervising students?

MAX: I found it very rewarding—it was essentially doing joint research. You'd have some ideas and the student would go off and work on those ideas and it was great seeing the result of the work. Sometimes things weren't working out so there was a need to help work out why. It was great just going through a journey with somebody else to solve problems that we were both interested in.

BRETT: How many students have you had supervisor responsibility for?

JITI: Forty-five.

BRETT: That might not sound as impressive in other parts of the world where there might be a committee. But in most cases you would have been the sole supervisor or perhaps the main supervisor with one other associate on the committee?

MAX: Yes. The majority of those I was the sole supervisor but more lately there was some joint supervision. There were also a number of students who had other arrangements and then I took over at the end that somebody else like Grant Hillier had a greater influence on.

BRETT: But you had a significant role with the vast majority of those?

MAX: Yes.

BRETT: That must be a fairly large volume of work to keep track of that many students at once and all the different research projects that they're working on?

MAX: It wasn't too hard. Having ten or so was not too hard but once it got beyond 12 I found it tricky. When Grant Hillier left the department I inherited quite a few of his and I didn't know much about their projects. I had to learn about their projects as well as supervising and that really got hard. So I pulled it back a bit as time went on.

BRETT: You won a few supervisor awards at different times?

MAX: I won the Vice Chancellor's award for supervision in 1996.

BRETT: And that's an award that's nominated by some of your students?

MAX: Yes, it was a university award. A dossier is submitted that requires staff members to write things, as well as past students and current students.

BRETT: At what point did you start getting involved in the university's administration of the Ph.D. programs around the university?

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MAX: I always had a preference for being a member of the university committee that looked after the Ph.D. degree and its various scholarships, but there were other people who wanted to be on it too and they were more senior than me. Every now and again I'd be allowed to go along because our faculty's rep couldn't make it and I was his back-up. Then I came back from sabbatical in 1991 and I was given that committee for 1992. During 1992 I was able to make some useful contributions and help solve some of the problems the committee faced so they decided to ask me to be the chair in 1993.

BRETT: Of the university-wide committee?

MAX: Yes. The committee had a history of spending a lot of time arguing about the allocation of scholarships so the first thing I did as chair was instigate a review of the scholarship allocation system. The review helped me understand the issues and work out a formula. I also worked out that we should make an over-offer of scholarships. They'd never done this before but statistically the percentage of people who turned down the scholarship was pretty much the same every year. So we got special permission to over-offer. The formula had quite a few elements in it; that is where my mathematical skills were very useful.

There was also an issue of whether or not to give scholarships to students with a masters degree from different parts of Asia. So we decided to develop a first class equivalence system to determine which masters students were worthy of a scholarship. It was a bit more work but it actually served the university quite well. We set that up in the first year and it continues to run more than 20 years later.

BRETT: So you were chair of this committee within only a year or two of joining the committee. How long did you stay in that role?

MAX: Twenty years.

BRETT: The role of chair of this committee evolved into a more substantial role?

MAX: Yes. I became the first Director of The Monash Research Graduate School in 1999. Then in 2004 the position became one of Pro-Vice Chancellor.

BRETT: You've referred to a couple of the changes you were able to make early in your role. What are some of the other things you'd consider to be achievements through that period in terms of the contributions that you were able to make?

MAX: A very early controversy was whether there should be coursework in the Ph.D. Some areas of the university wanted to have some and others were against it, so that was a very major debate at Academic Board. I was able to create a formula that people could live with and they agreed to follow it.

There are a variety of other things too, such as growing the scholarship system. We went from having a few overseas students to having close to a third of the students being international students. This required providing a system that allowed departments to easily offer scholarships to cover international students' fees.

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BRETT: I think there's been quite a transformation over that 20 year period. I mean, there wasn't a research graduate school when you started. You were part of the creation of that and the first director. There was a quite dramatic change in how the university viewed its graduate students and you were part of that significant journey right from the beginning.

MAX: There were a couple of other changes I can think of. In that first year there was a student who got into some difficulty with his thesis because the statistical analysis had been done incorrectly. The examiners pointed this out and I could see that there was a need for a statistical consulting service for students. We got it going relatively inexpensively and it provided some support for the Departments of Mathematics and Statistics, as well as for Econometrics. It was very important for the students. I remember manning the service in the very early days and getting a number of students from the Arts faculty with quite elementary questions. Their research was going to have a small statistical element in it and they wanted to know how to take a sample. It was quite a simple thing but they needed to do it correctly so that examiners wouldn't disagree with what they'd done. That was something that I still think is very important.

Another early change—and this was quite controversial—was surveying the Ph.D. students university-wide about their supervision and about their departmental/faculty support. Finding out through the survey what students thought of what was going on was absolutely fascinating and I was fortunate to be able to publish an article about it [60]. There were some departments that were treating their students very badly and it was reflected very clearly in the survey, but others were doing very well. In fact we discovered Econometrics was doing exceedingly well so that was interesting! I used a method to rank departments and that allowed us to celebrate the departments that were at the top of the list. We invited them to a special lunch and asked them to talk about the sort of things that they did. We had a quiet word through the deans to those at the bottom of the list. Engineering was a problematic faculty and I remember going to a Friday evening meeting with the heads of department and it felt like going into a lion's den.

BRETT: To deliver the bad news?

MAX: Yes, to some degree. They didn't believe the survey results but fortunately I had my knowledge of statistics and econometrics to fall back on so I was able to convince them. And there was one department in Engineering that was very good in the faculty so I was able to say "This department's doing well. You need to look to them and what they do." Initially we repeated the survey every four years and then it became every two years. It was great to see the improvement overall and also in the poorly performing departments. The bottom ranked department in the first survey became a top 10 department by the time of the third survey.

BRETT: I recall also the Department of Econometrics adopted student evaluation of teaching at all levels way before the rest of the university did and probably led Australia in that respect?

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MAX: Yes but I am not sure we led Australia. I recall there was some unease in the department about doing this. I allowed everybody to have a say in what the questions should be. That allowed everybody to feel they had some ownership of the survey instrument. That helped me get agreement in the department.

Another really nice thing that came out of this concerned the tutors. Some of the tutors had weak English, and you'd think they might be weak teachers; but when you actually saw the students' survey results, you saw that many of these tutors had done a fantastic job. Other tutors had great English but teaching was just not for them. We also got the good tutors to tell us what they did and we learnt about how to conduct a tutorial in our discipline in a smart way. From there we were able to provide some training for the up and coming tutors. After doing this over a number of years, we built up a very solid knowledge base on the art of conducting a tutorial.

BRETT: Yes, that is some significant changes. And, again, it's quite interesting to hear how even in that management role most of your contributions actually reflect your training. If you want to know how things are being done, collect some data.

MAX: Yes.

BRETT: And use that data in smart ways, as a management tool, to persuade the weak ones to improve and to celebrate and get some knowledge dissemination from the successes. That's just an example of how with everything you were still using your training and using your technical skills.

MAX: Yes.

BRETT: You were director of the Monash Research Graduate School for close to 20 years, and in the later years you made a contribution nationally. Do you want to tell us a little bit about what that involved?

MAX: In 1995 an invitation came to the university to attend an inaugural meeting of Australian deans and directors of graduate studies. Each university was invited to send someone, often it was a deputy vice chancellor, but Monash sent me. That was the first meeting of what became the Council of Deans and Directors of Graduate Studies which became known as DDoGS. It met twice a year and I went to those meetings until I retired in 2012. We got people to come and talk about research supervision and a range of issues concerning the Ph.D. degree. We also got some people from the government to come and talk about what changes were coming, like the Research Training Scheme (RTS). The RTS was a formula to allocate Ph.D. and research masters' money around the system based on performance measures, but when it was first introduced it seemed to be doing perverse things. At one of those meetings we had a Government official on the line from Canberra and he gave his view of how the formula worked. I was able to ask a number of technical questions that helped clarify the problem. Later I was able to run some simulations looking at a number of hypothetical universities with different types of cohorts of Ph.D. students—part-time, full-time, those that finish

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early, those that take a long time to finish, those with a lot of master's students. I was able to show that the formula actually rewarded those that took a long time to complete and those that had lots of part-time Ph.D. students on their books. It was actually skewed against universities that got their students through quickly and had a lot of full-time students. As a consequence of releasing that article [86], the Government changed the formula fairly quickly.

BRETT: The University recognised a lot of these contributions with the Sir John Monash chair. Tell us when that was.

MAX: I became a Sir John Monash Distinguished Professor in 2003. The University had this prestigious chair award for people who had been there a long time and had made a major contribution to the University. They made a round of new appointments in 2003 and I was lucky to be one of those appointed.

JITI: Over your career you have received a number of honours. Which one has been the most satisfying?

MAX: The Australian Learning and Teaching Council (ALTC) Career Achievement Award, 2009. That was a lifetime achievement award. It was presented alongside the Prime Minister's awards for university teaching that the ALTC administered at a dinner at the Old Parliament House in Canberra. John Hay, who at that time was the Vice Chancellor at the University of Queensland, presented the award to me as the Chair of the ALTC. I first met him when he was the Dean of Arts at Monash and worked with him when he later became our Deputy Vice Chancellor at Monash.

A second honour that I found very humbling was Monash University creating the Maxwell King Ph.D. Scholarship for the top Ph.D. scholarship applicant each year across the whole university.

JITI: Back to your role as a Pro-Vice Chancellor for research and graduate research. You also played a role in terms of research evaluation/research quality during the last part of your appointment?

MAX: When I was PVC, the Australian Government was planning to introduce a research evaluation. It ended up being called ERA, Excellence in Research for Australia, but it started out under a different name under the conservative coalition government. I was involved in doing pilots and I was also on a committee in Canberra to work out what metrics could be used in the system. I did that for probably five years in total.

BRETT: That also involved collecting some data from different disciplines within the university. You wandered around visiting different departments, giving them the good news or the bad news about their performance?

MAX: There was a little bit of that, but mostly what I had to do was go round and get them to help us put in a good submission. We would get them to work out what their best publications were, and do certain things like allocate different research codes to their publications. That was tricky but it was enjoyable too.

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BRETT: You learnt more about the university's research performance than anybody I suspect!

JITI: You mentioned your sabbatical at Trinity College at Cambridge. I also noted you had a half a year sabbatical at Auckland and UC San Diego. Can you say a few words about how you started with UC San Diego? You produced a very good article there with Clive Granger in 1995 [56]?

MAX: Clive was somebody I met very early on at the World Congress of the Econometric Society in 1980 and we'd kept in touch. He actually comes from Cambridge, and one day when I was visiting Trinity College, he turned up at High Table. He was able to offer me a visiting fellow position for a quarter at UC San Diego. We had a young family and I thought it would be nice to also visit Auckland, so I organised a sabbatical of six months. We went to Auckland for three months and then to San Diego for three months. While in San Diego I gave a number of seminars around the United States and Canada so I did quite a bit of travelling. That was in the early days of email so the first hour in the office was spent on the computer arranging these visits. It was a seminar a week, sometimes it was two. We drove up as a family to Stanford and stayed there a couple of nights. On a separate trip, we drove up to Berkeley and stayed near Berkeley. We also stayed in Hollywood when I gave a seminar at the University of Southern California. A lot of people that had come to give seminars at Monash returned the favour in a sense and that was very nice.

BRETT: What year was that?

MAX: 1991.

JITI: You also taught a course at UC San Diego?

MAX: Yes, I taught two courses.

JITI: I think some of my friends were Ph.D. students then, so they would have been your students. They're now quite reputable scholars already.

MAX: It was a great program. I also learnt a lot from Clive Granger. He had a large number of Ph.D. students and he would see each student for 20 minutes or half an hour. He'd set aside a particular day for students to see him and so I adopted that approach. They also had the brown bag seminars. Those who were around would go and buy lunch, bring it to a particular room and we'd talk. People would talk about a research problem they were working on and couldn't quite solve and get some help and suggestions from others. That sometimes ended up as joint articles and that's where that joint article with Clive Granger and Hal White [56] was born.

BRETT: I have one more closing question. What three pieces of advice would you give a junior academic based on your experience?

MAX: I think the first thing is definitely try and publish in good journals. Second, successful academics have often had very good collaborations, so collaborate with somebody who's very good. But remember for a collaboration to be

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successful you've got to put quite a bit of effort in. The third thing is that teaching is important, so learn, practice, and think about communication skills. I think that's very important. That classroom experience will also help with conference and seminar presentations.

JITI: Finally thank you so much for your time.

MAX: Thank you.



Recipient of the Australian Learning and Teaching Council Career Achievement Award, 2009.



International Conference on Econometrics in Celebration of the 65th Birthday of Professor Maxwell King, 8–9 December 2016.

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