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The determinants of trial duration: A preliminary study

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Aim: *To conduct an exploratory analysis of the factors influencing trial duration in the NSW District Criminal Court*

Method: *Bi-variate relationships between trial duration and various offence types were examined using one way analyses of variance, fixed effects modelling was employed to examine the joint effects of offence type, number of concurrent offences, year of case finalisation and registry on trial duration.*

Results: *The average trial in the current study lasted 8.2 days, with a standard deviation of 8.6 days and a range of 138 days. Trials were found to be 20.2% shorter where the charges involve break and enter, 35.2% shorter where the charges involve illegal drugs, 44.8% shorter where the charges involve a traffic offence and 44.3% longer where the charges involve abduction*

The relationship between trial duration and offence type varied from registry to registry. The average sexual assault trial in Dubbo was 2.38 times longer than the average sexual assault trial in Sydney. Similarly, sexual assault trials in Gosford were found to be approximately 1.3 times longer than in Sydney. By contrast, cases involving sexual assault in Newcastle were, on average, only about 76 per cent of the length of such trials in Sydney. Fraud trials in Newcastle were 41 per cent shorter than the non-fraud trials in Newcastle and are only about 35 per cent of the length of the average fraud trial in Sydney.

Conclusion: *Given the substantial variability in trial duration and the adverse consequences associated with insufficient capacity, courts should operate with spare capacity. Effective management of capacity will require improvements in our ability to predict trial duration. Further research should be conducted into the effects on trial duration of number of witnesses and the use of forensic and audio-visual evidence.*

Keywords: *trial duration, court capacity, offence type, multi-level modelling, heterogeneous slopes*

Introduction

The growth in trial court delay in the NSW District Criminal Court over the last few years (Weatherburn & Fitzgerald 2015) raised concerns that the court may not have the capacity to meet the demand for trial court time. In response to this concern, the former NSW Attorney General recently announced the appointment of five new District Court Judges (Upton 2016). While these appointments can be expected to ease congestion in the NSW District Criminal Court, a better understanding of the determinants of demand for trial court time would undoubtedly assist in future management of the court. It would also help in the creation of simulation models that allow us to examine the likely effect on the court of changes in the offence profile of cases proceeding to trial.

The demand for trial court time can be thought of as the product of two factors; the number of cases requiring a trial and the average duration of each trial (Lind, Weatherburn & Packer 1991). It is well known that trial duration varies enormously from case to case; ranging from just a few days to several months. To date, however, little research has been conducted into the factors that affect trial duration. The purpose of this brief is to report the results of a preliminary study into the factors that affect trial duration in the NSW District Criminal Court. The study is preliminary because lack of relevant data means that many important factors (e.g. number of witnesses; use of forensic or tape recorded evidence) are not included in the analysis. We hope, nonetheless, that this initial study might serve as a basis for more thorough investigation of the factors that influence trial duration.

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Method

Data source

The data for the study were drawn from the Justice-link management information system of the NSW Department of Justice and consist of all cases proceeding to trial in the NSW District Criminal Court in the years 2013-2016 (inclusive). In addition to information on the duration of each trial (measured in days), data were also extracted on:

- Finalisation year (coded as three dummy variables and with 2013 set as the reference year)
- Registry (coded as nominal variable with values one to eight representing Dubbo, Gosford, Lismore, Newcastle, Sydney, Sydney West, Wagga Wagga and Wollongong respectively). Note that there is no one-to-one relationship between registries and courts. The 8 registries referred to here are DC regions into which the 29 sitting venues are usually grouped.
- Number of concurrent offences (coded '0' if none, '1' if one and '2' if more than one)
- Offence type (coded as dummy variables for each of the following 14 ANZSOC offence categories: Homicide (HOM), assault (ASS), Sexual assault (SEXASS), dangerous/ negligent acts (DANGNEG), abduction/harassment (ABDHAR), robbery (ROBB), break and enter (BRENT), theft (THEFT), fraud (FRAUD), drug offences (DRUG), weapons offences (WEAP), property damage (PROPDAM), traffic offences (TRAFF) and justice procedure offences (JUST). Appendix 1 provides a more detailed breakdown of the offences included in each of these categories.

Our unit of analysis is the individual trial case. Because cases are nested within registries, registry-specific factors (e.g. judges, defence counsel or prosecutors attached to a particular registry) may affect trial duration. A fixed effects model was therefore employed to analyse the nested data while controlling for the unobserved heterogeneity across registries. The fixed effects model with heterogeneous slopes (more on this below) is specified as follows.

$$\begin{aligned} logY_{ij} = {} & b_0 + b_1 Concurr_{2ij} + b_2 Concurr_{3ij} + b_3 Year_{2014ij} + b_4 Year_{2015ij} \\ & + b_5\, Year_{2016ij} + b_{6i}\, Hom_{ij} + b_{7i}\, Ass_{ij} + b_{8i}\, Sexass_{ij} + b_{9i} Danneg_{ij} \\ & + b_{10i} Abdhar_{ij} + b_{11i} Robb_{ij} + b_{12i} BRENT_{ij} + b_{13i}\, Theft_{ij} + b_{14i} Fraud_{ij} \\ & + b_{15i}\, Drug_{ij} + b_{16i}\, Weap_{ij} + b_{17i}\, Propdam_{ij} + b_{18i}\, Traff_{ij} + \\ & b_{19i}\, Just_{ij} + registry_i + e_{ij} \end{aligned} \quad (1)$$

The dependent variable in this model (Y_{ij}) is the logarithm of the trial duration for individual case *i* at registry *j*. Trial duration is measured in days from the date of trial duration to the date of verdict. Where the two dates are identical, a duration of one day has been assigned.

The independent variables (on the right hand side of the equation) capture the influence on trial duration of the number of concurrent offences, the year in which the trial was held, the type of offence(s) involved and the registry where the case was heard. The final term (e_{ij}) captures any unexplained variation. Since most of the independent variables are dichotomous, using logarithm of the dependent variable enables us to calculate the semi-elasticity of trial duration for the binary independent variables. This means that (for any binary variable), a significant positive coefficient of *b* means that the trial duration increases by *b*% in the corresponding group compared to the reference group. Correspondingly, a significant negative coefficient of *b* means that the trial duration decreases by *b*% in the corresponding group compared to the reference group.

The first two independent variables in Equation (1) capture the effect of concurrent charges. The next three capture any effect associated with the year of finalisation. The remaining independent variables are binary indicators of whether at the court appearance involves (1) homicide or a related charge; (2) assault; (3) sexual assault; (4) dangerous or negligent acts endangering persons; (5) abduction, harassment or another related charge; (6) robbery; (7) unlawful entry with intent/ burglary, break and enter; (8) a theft charge; (9) a fraud charge; (10) a drug charge; (11) a weapons or explosives charge; (12) a property damage or environmental pollution charge; (13) a traffic charge and/or a (14) charge involving a justice procedure offence. A detailed breakdown of the component offences in these categories is included as Appendix 1.

In the model described by Equation 1, each registry has a different (fixed) effect on trial duration. In our preliminary analyses, however, it became apparent that the relationship between trial duration and offence type varied substantially across registries. We capture the differential effect of registry on the relationship between trial duration and offence type by allowing the coefficients for the offence variables to be registry-specific (as indicated by the subscript *i* for each offence shown in Equation 1). Thus, apart from the fixed effects for the registry, heterogeneous slopes are also incorporated in the model. Pesaran and Yamagata (2008) delta tests for heterogeneous slopes for each offence type confirmed that the relationship between trial duration and sexual assault and fraud offences differed significantly across registries.

There are three major model assumptions for the fixed effects model: (1) the residual errors are assumed to be normally distributed with constant variance; (2) the unobserved registry effect is independent of the residual errors; and (3) the registry effect is correlated with some independent variables. Robust standard errors were calculated for the coefficients to allow for any intragroup correlation between the observations within a registry.

Interpretation

As already noted, the coefficients from the model can be interpreted as semi-elasticity. For any binary dummy variable, a significant positive coefficient of *b* means that the trial duration increases by *b*% in the corresponding group compared to the reference group. For the fixed registry effects and heterogeneous slopes for the offence types, we set Sydney as the reference registry and calculate the ratio of the exponentiated coefficients ($\exp(u_i - u_{syd})$) of a particular registry over Sydney registry. The resulting ratio *r* reveals that the trial duration of the corresponding registry is *r* times that of the Sydney registry.

Results

Descriptive statistics

Figure 1 provides information on the distribution (right-hand axis, green bars) and cumulative distribution (left-hand axis, blue line) of trial duration along with associated summary statistics.

The median duration of a trial is between five and six days but the distribution of trial durations is highly skewed; with a mean of 8.2 days, a standard deviation of 8.6 days and trial durations ranging from a minimum of one day up to 139 days. More than five per cent of trials take 23 or more days to complete.

Table 1. Mean trial duration by registry and associated statistics

Registry	mean	sd	range	N
Dubbo	7.0	7.9	34	95
Gosford	5.4	3.1	13	43
Lismore	5.0	2.5	11	109
Newcastle	5.6	4.1	28	191
Sydney	10.6	11.4	138	705
Sydney West	7.9	5.5	34	438
Wagga Wagga	4.8	2.9	14	67
Wollongong	6.3	7.7	64	106
Total	**8.2**	**8.6**	**138**	**1754**

Table 1 shows the mean trial duration for each registry, along with the standard deviation, range and number of cases on which these statistics are based.

There is significant variation in trial duration between registries, with Wagga Wagga having the shortest average trial duration (4.8 days) and Sydney having the longest (10.6 days). As one might expect, the standard deviation of trial durations increases with the mean. The average variation around the mean in Sydney is 11.4 days, compared with just three days in Wagga Wagga.

Figure 1: Cumulative distribution of trial duration

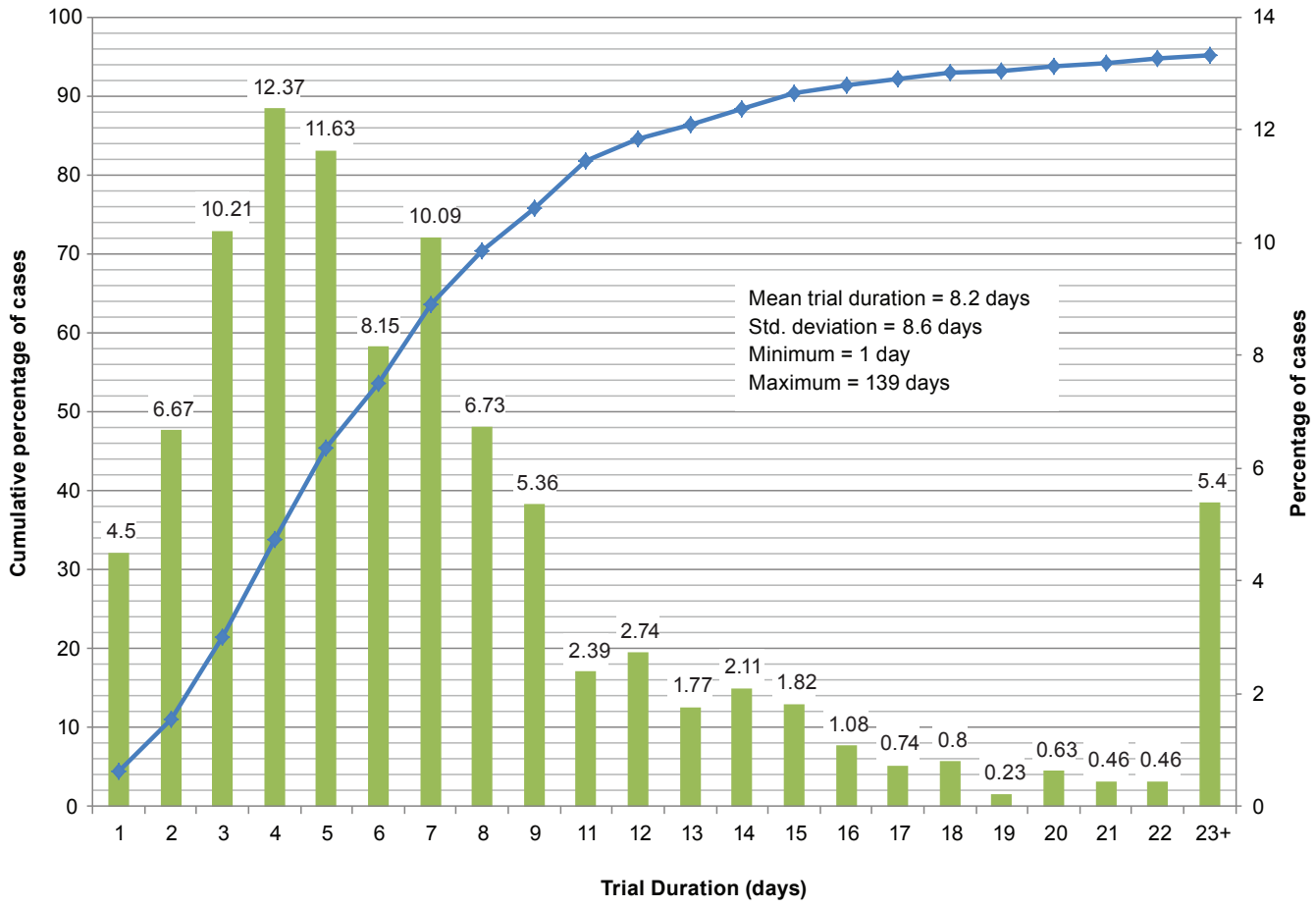

Table 2 shows the relationship between trial duration and offence type, along with associated statistics. Recall that the offences are coded as '1' if present among the charges faced by a defendant (regardless of what other charges may be present) and '0' otherwise.

Significant effects (at 0.05 level) are marked with an asterisk and highlighted in blue.[1] Trials tend to be longer than average where one of the following offences is involved: sexual assault, abduction/harassment, robbery, fraud or property damage. Cases involving drug offences or traffic offences tend to result in shorter trials. Not surprisingly (see last row), the more concurrent charges a defendant faced, the longer the trial. These results make no allowance for changes in other factors that might have lengthened a trial (e.g. number of concurrent offences, year of finalisation).

Table 2. Trial duration by offence type and associated statistics

Variable	Variable value	mean	sd	range	N
Homicide	no	8.2	8.6	138	1736
	yes	9.6	6.9	29	18
Assault	no	8.3	8.8	138	1592
	yes	7.5	5.8	32	162
Sexual Assault*	no	8.1	8.8	138	1533
	yes	9.0	6.8	41	221
Dangerous or negligent acts	no	8.2	8.6	138	1736
	yes	7.5	7.1	31	18
Abduction*	no	8.1	8.6	138	1721
	yes	13.0	9.8	51	33
Robbery*	no	8.1	8.4	138	1647
	yes	10.5	11.2	64	107
Break and enter	no	8.2	8.6	138	1653
	yes	8.0	8.6	64	101
Theft	no	8.2	8.7	138	1674
	yes	8.0	7.2	37	80
Fraud*	no	7.9	7.5	96	1715
	yes	21.3	26.3	138	39
Drug*	no	8.3	8.7	138	1569
	yes	7.4	8.1	49	185
Weapon	no	8.2	8.6	138	1721
	yes	8.0	6.0	32	33
Property damage*	no	8.2	8.5	138	1725
	yes	12.1	12.7	64	29
Traffic*	no	8.3	8.6	138	1737
	yes	4.7	2.5	9	17
Justice	no	8.2	8.6	138	1701
	yes	8.7	8.3	41	53
Concurrent offences group*	0	7.5	7.5	96	874
	1	7.9	7.1	52	412
	2	9.9	11.2	138	467

Tables 3 and 4, which summarise the results for the fixed effects model, address this issue. In Table 3, variables that exert a significant effect on trial duration are marked with an asterisk. A positive coefficient indicates that the variable in question increases trial duration (relative to the reference group). A negative coefficient indicates that the variable reduces trial duration (relative to the reference group). The reference group for concurrent offences is group 1 (no concurrent offences). The reference category for finalisation year is 2013. The reference categories for each offence are cases without that offence. As before, significant results are marked with an asterisk and shaded in blue.

The coefficient for concurrent group 3 (2 or more concurrent offences) is positive and significant, indicating that cases with two or more concurrent offences take longer to finalise than cases with no concurrent offence. The parameter value of 0.212 indicates that trial duration is 21.2% longer in a case involving two or more concurrent offences than in a case involving none. The coefficients for finalisation year, on the other hand, are negative; indicating that trial duration (holding other factors constant) is lower in each year than it was in 2013, however only the result for 2015 is significant. All else held constant, trial cases in that year were 11.9 per cent shorter than they were in 2013. There are some similarities and some differences between the results in Table 2 (which do not control for finalisation year and concurrent offences and those in Table 3 (which do control for these factors). As in Table 2, Table 3 shows substantially shorter trials where the case involves illegal drugs or traffic offences. Again, as in Table 2, Table 3 shows longer trials where cases involve abduction. No significant differences are found, however, between cases involving sexual assault, robbery, fraud or property damage and cases that do not involve these factors. It would seem the effects of these factors shown in Table 2 are due to their association with the number of concurrent offences or the year of finalisation.

As noted earlier, the delta test for heterogeneous slopes revealed that the impact of sexual assault and fraud offences on trial duration varies significantly across registries. For the moment, therefore we set these results aside. The remaining results in Table 3 can be summarized as follows. Trial duration is:

- 17.4% shorter where the charge or charges include assault
- 20.2% shorter where the charge or charges involve break and enter
- 35.2% shorter where the charge or charges involve illegal drugs
- 44.3% longer where the charge or charges involve abduction
- 44.8% shorter where the charge or charges involve a traffic offence

We turn now to the effects of individual registries and the different effects on trial duration they exhibit in connection with fraud and sexual assault offences. These results are shown in Table 4. The column to focus on is the column labelled 'ratio', which shows the length of trial at a given registry, relative to

Table 3. Parameter estimates for the fixed effects model

Variable	Coefficients	Standard errors	*p*-value
Concurrent offences group1			
Concurrent offences group2	0.105	0.062	0.093
Concurrent offences group3	0.212*	0.082	0.009
Finalisation year 2013			
Finalisation year 2014	-0.043	0.045	0.342
Finalisation year 2015	-0.119*	0.044	0.008
Finalisation year 2016	-0.077	0.058	0.189
Homicide	0.278	0.143	0.052
Assault	-0.175*	0.069	0.012
Dangerous or negligent acts	0.074	0.161	0.646
Abduction	0.443*	0.106	<0.001
Robbery	0.063	0.091	0.491
Break and enter	-0.202*	0.088	0.022
Theft	-0.148	0.101	0.145
Drug	-0.352*	0.081	<0.001
Weapon	0.028	0.131	0.832
Property damage	0.221	0.170	0.193
Traffic	-0.448*	0.154	0.004
Justice	0.058	0.105	0.582

Table 4. Fixed registry-specific effects and interactions by offence

	Unobserved heterogeneity		Sexual Assault		Fraud	
Registry	Fixed effect	ratio	Fixed slope	Ratio	Fixed slope	Ratio
Dubbo	-0.236	0.625	0.971	2.380		
Gosford	-0.347	0.559	0.353	1.265		
Lismore	-0.357	0.554	0.025	0.943		
Newcastle	-0.292	0.591	-0.202	0.758	-0.413	0.353
Sydney	0.234	1	0.060	1	0.667	1
Sydney West	0.055	0.836	0.053	0.984	0.313	0.655
Wagga Wagga	-0.396	0.533	0.179	1.099		
Wollongong	-0.291	0.591	0.177	1.059	0.448	0.608

Sydney (the reference category). Using Dubbo as an example, the first entry (0.625) in the column marked 'ratio' tells us that trials in Dubbo are on average only around 62-63 per cent of the length of trials in Sydney. In general, with the exception of Sydney West, trials at all registries tend to be shorter than trials in Sydney, even after controlling for offence type, year and number of concurrent offences. In some registries the difference is quite marked. Trials in Wagga Wagga, for example, are only a little over half as long as those in Sydney.

The panels labelled 'sexual assault' and 'fraud' in Table 4 highlight the interaction between registry and offence type. Focussing first on the column labelled 'fixed slope', the value of 0.971 tells us that (other things being equal) sexual assault trials in Dubbo take almost twice as long as non-sexual assault trials in Dubbo. Similar, though less extreme effects for sexual assault trials can be seen in Gosford (35.3% longer than trials in Gosford not involving sexual assault), Wagga Wagga (17.9% longer than trials in Wagga Wagga not involving sexual assault) and Wollongong (17.7% longer than trials in Wollongong not involving sexual assault).

Similarly interesting comparisons can be made with Sydney. Focussing now on the column labelled 'ratio' the first value (2.38) tells us that the average sexual assault trial in Dubbo is 2.38 times longer than the average sexual assault trial in Sydney. Similarly, sexual assault trials in Gosford are approximately 1.3 times longer than in Sydney. By contrast, cases involving sexual assault in Newcastle are, on average, only about 76 per cent of the length of such trials in Sydney (i.e. they are 24 per cent shorter). Sexual assault trials in other registries are near the overall average and similar to Sydney.

Fraud presents a similarly complex picture. Fraud trials in Newcastle are 41 per cent shorter than the non-fraud trials in Newcastle and are only about 35 per cent of the length of the average fraud trial in Sydney. Fraud trials in Sydney are about 67 per cent longer than the non-fraud offences in Sydney. Similar disparities in the length of fraud trials can be seen in Sydney West (31% longer) and Wollongong (45% longer), though note that fraud trials in these locations are shorter than fraud trials in Sydney (65% shorter in Sydney West, 39% shorter in Wollongong).

Summary and discussion

The aim of this brief was to present the results of an exploratory analysis of the determinants of trial duration in the NSW District Criminal Court. We find substantial variation in trial duration across both registries and across offence types, even after controlling for other factors. Trials tend to be shorter in courts outside Sydney, in some cases by a large margin. Trials in Wagga Wagga, for example, are only about half as long as those held in Sydney. Offence type also has significant effects. We find, for example, that trials, on average, are

- 20.2% shorter where the charge or charges involve break and enter
- 35.2% shorter where the charge or charges involve illegal drugs
- 44.3% longer where the charge or charges involve abduction

- 44.8% shorter where the charge or charges involve a traffic offence

The effects of some offences, however, vary from registry to registry. The average sexual assault trial in Dubbo, for example, is 2.38 times longer than the average sexual assault trial in Sydney. Similarly, sexual assault trials in Gosford are approximately 1.3 times longer than in Sydney. By contrast, cases involving sexual assault in Newcastle are, on average, only about 76 per cent of the length of such trials in Sydney (i.e. they are 24 per cent shorter). Fraud presents a similarly complex picture. Fraud trials in Newcastle are 41 per cent shorter than the non-fraud trials in Newcastle and are only about 35 per cent of the length of the average fraud trial in Sydney.

It would be wrong to assume on the basis of the evidence presented here that registries where trial duration is longer are simply less efficient. The longer trials in the Sydney registry, for example, are at least partly due to the fact that complex trials are more likely to be sent to courts attached to this registry (holding long trials in circuit courts presents logistic difficulties) and partly due to the fact that Commonwealth prosecutions, which tend to involve more complex evidentiary issues, are by convention dealt with in the Sydney District Court. There are also a number of other factors that might account for variation in trial duration in courts attached to different registries outside of Sydney.

Firstly, the nature of the cases dealt with in different courts may vary, even where they nominally involve the same offence. Sexual assault cases in courts attached to one registry, for example, may involve a high proportion of child sexual assault allegations. In another, they may most involve allegations of adult sexual assault. Fraud cases in Sydney may involve a large proportion of corporate frauds. Courts in other parts of NSW, may mainly deal in simpler (e.g. social security) frauds. The variation in trial duration across registries may also be due to a host of other factors, including variation in the work practices of individual judges or in the work practices of prosecution and/or defence counsel

Accurate estimates of trial duration are critical to decisions about when to list successive trials. They are also critical to reliable modelling of the effects of changes to court capacity or to factors affecting trial court demand. The present results improve our ability to predict trial duration but there is considerable room for improvement. We were unable to measure several key factors that are likely critical determinants of trial duration, such as the number of witnesses called and whether forensic or audio-visual evidence was used in the case. Estimation of these effects of these factors should be considered a high priority. It would also be interesting to compare differences in the way judicial officers and defence and prosecution counsel approach the management of different cases.

Despite its limitations, the present study highlights the difficulties involved in planning trial court capacity. We find that, while the average trial takes 8.2 days, the standard (average) variation around this mean is 8.6 days and the range 138 days. With variation such as this, estimates of trial duration are fraught with risk. An estimation of demand for trial court time based on average trial duration may be reliable in the long run (because the variations would cancel out) but would carry the risk of significant underestimation of demand in any given year. Given the wide variation in trial duration court administrators would be well advised to maintain some level of spare trial court capacity. Lind, Weatherburn and Packer (1991) developed a model that allows the user to determine the trial court capacity required (measuring in terms of trial court time) for any specified level of risk of having insufficient capacity. The estimates obtained during that project, however, are now quite old and would need to be updated.

Fortunately, Thorburn (2016) developed a simulation model of the NSW District Criminal Court which allows a user to determine what capacity (in terms of judges) would be required to arrest the growth in pending trial cases or bring it down to some specified level by some specified date. It would be a straightforward matter to extend the Thorburn (2016) model in a way that would allow the user to determine the financial costs associated with various trial court capacity alternatives. This is not to say that judgements about court capacity should be determined solely by reference to financial considerations. As the saying goes 'justice delayed is justice denied'. The question of what constitutes an unacceptable delay in bringing a case to trial however, is ultimately a political, not an empirical issue.

Notes

The mean comparisons were carried out by running a one way ANOVA on the log of trial duration

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