



# The marginal effect of bail decisions on imprisonment, failure to appear, and crime

**Sara Rahman**

**Aim:** To estimate the effect of bail decisions on the likelihood of receiving a prison sentence, failure to appear and offending on bail.

**Method:** A dataset of 42,362 first bail hearings taking place after the 'show cause' amendments to the Bail Act (2013) was constructed and linked to final case outcomes and offending data. Quasi-random assignment of bail magistrates with differing propensities to grant bail was used to address problems of selection bias and partial observability. Further analyses were undertaken to determine the proportion and characteristics of defendants who were sensitive to magistrate leniency. Robustness checks were conducted to determine the sensitivity of estimates to different specifications.

**Results:** The marginal effect of additional releases is an increase in the rate of offending from 13.2 per cent to 29.2 per cent, a decrease in the rate of imprisonment from 59.0 to 49.0 per cent and an increase in the rate of failure to appear from 2.1 per cent to 11.1 per cent for those defendants. Thus, remanding ten additional defendants increases the number imprisoned by one, and reduces the number of offending and failing to appear by 1.6 and 0.9 on average. These estimates are causal and net of differences in observed characteristics and selection bias, but applicable only to a subset of defendants whose bail status is sensitive to magistrate leniency. The likelihood of failing to appear and of offending on bail for these defendants does not exceed the general rate among those released on bail.

**Conclusion:** Taken together, the results show that bail refusal has a significant incapacitation effect on crime and failure to appear. These benefits should, however, be considered alongside the considerable cost to the correctional system and the individual arising from increased imprisonment rates. There is limited evidence for the influence of selection bias in regards to imprisonment but not in relation to crime or failure to appear.

**Keywords:** bail, magistrate assignment, 2SLS, instrumental variables

## INTRODUCTION

When an individual is charged with an offence in New South Wales (NSW), the police must decide whether to release the accused without bail, dispense with bail, grant bail or refuse bail. If the accused is refused bail, they are held on remand until they can be brought before a court, usually within 24 hours.

The accused can then apply to the court to have the decision reviewed. If the court grants bail, the defendant is released and remains on bail until their matter is finalised or bail is revoked.<sup>1</sup>

In NSW, bail decisions are governed by the *Bail Act 2013* (NSW). Under this legislation, bail authorities are required to assess the

risk that an accused person, if released from custody, will: (a) fail to appear at any proceedings for the offence, or (b) commit a serious offence, or (c) endanger the safety of victims, individuals or the community, or (d) interfere with witnesses or evidence. When assessing these bail concerns the bail authority is required to consider a number of different factors, such as the accused's history of compliance with court orders, prior offending, length of time likely to remain in custody and any special vulnerabilities or needs. They must also consider whether there are any specific bail conditions that could be imposed to mitigate these risks. In cases where there is an 'unacceptable risk' that cannot be mitigated by bail conditions, the accused is refused bail. The Act

was amended in January 2015 to also specify a separate group of offences, known as 'show cause' offences, where there is a presumption against bail unless the accused can demonstrate why their detention would be unjustified.

Bail refusal imposes substantial personal costs on a defendant. Detained defendants are separated from their families and may lose their job or housing. Bail refusal, in and of itself may increase the risk of a custodial penalty if bail status at the time of sentencing is interpreted by the court (consciously or unconsciously) as a signal of their level of criminality. Holding people on remand also adds to correctional costs. Some defendants are held on remand for long periods and do not receive custodial penalties at finalisation. In 2017, such defendants spent an average of 54.3 days in custody (NSW Bureau of Crime Statistics and Research (BOCSAR), 2018), costing the justice system approximately \$9,383.04 per person.<sup>2</sup>

It is therefore surprising that very little research has been undertaken to examine the extent to which bail laws achieve their stated objectives of protecting the community and the integrity of the trial process. The dearth of research in this area of criminal justice is due to two major methodological problems. First, the likelihood that someone will offend on bail, fail to appear in their matter or receive a custodial penalty are all factors that must be considered in bail decisions. Accused persons refused bail are therefore likely to be very different from those who are released to bail on factors highly correlated with the outcomes being measured. If these differences cannot be observed then the estimate of the causal effect of bail refusal will be biased. Second, longitudinal datasets which track offenders from the point of their initial bail decision through to the sentencing of their matter (and beyond) are rare. The impact of bail on crime and absconding has therefore typically been examined at the aggregate rather than individual level.

## PREVIOUS STUDIES

Most studies examining the effect of bail decisions on criminal justice outcomes have focused on sentencing. Williams (2003), for example, used a dataset of 200,000 adult felony cases from Leon County, Florida, sentenced between 1 January 1994 and 31 December 1996, to examine the effect of bail on the likelihood and length of a custodial penalty. Regression analyses indicated that bail refusal significantly increased the odds of a custodial penalty by a factor of six, and the length of a prison penalty by almost an entire year. Oleson, Lowenkamp, Cadigan, VanNostrand, and Wooldredge (2016) used data for 1,707 cases from two U.S. federal districts (New Jersey and Pennsylvania Eastern) to examine the effect of pre-trial release on prison length. They estimated that remand was associated with an average increase in sentence length of 39 months and that revocation of pre-trial supervision increased average sentence

length by 14 months. The large correlations estimated by these studies are unsurprising (and unreliable) as neither study used appropriate methods to correct for factors influencing both bail and sentencing outcomes.

One way to properly estimate the effect of bail refusal on outcomes such as offending, absconding and imprisonment is using a factor that influences the likelihood of bail refusal but has no effect on these outcomes other than through bail refusal. Three recent studies have sought to achieve this by exploiting plausibly random variation in the assignment of magistrates (who have different propensities to grant bail). Gupta, Hansman, and Frenchman (2016) used data from 203,188 bail hearings in Philadelphia and 57,145 bail hearings in Pittsburgh. By exploiting variation across judges in their propensity to impose money bail, they found remand to have increased the probability of a conviction by six percentage points, whilst having no effect on recidivism following the index charge.<sup>3</sup> No statistically significant effects of monetary bail on failure to appear were found in any of their samples. Dobbie, Goldin, and Yang (2018) employed the same strategy to examine the effect of bail decisions on a wider range of outcomes related to case resolution, imprisonment, recidivism and employment using a sample of 328,492 cases from Philadelphia courts and 93,358 cases from Miami-Dade courts. They estimated that pre-trial release (via bail) reduced the likelihood of pleading guilty by 10.8 percentage points and reduced the likelihood of a prison penalty by 1.2 percentage points. Pre-trial release, however, was found to increase the likelihood of failure to appear by roughly 15 percentage points. They also examined re-offending in more detail than Gupta et al. (2016) by examining re-offending between the bail hearing and case disposition, and subsequent offending. While they found that release increased the likelihood of re-offending before disposal by 18.9 percentage points, it also reduced the likelihood of re-offending post-disposal by 12.1 percentage points. Combining the two outcomes, the net effect of release was a non-significant one percentage point increase in recidivism. Didwania (2018) applied the same strategy to federal felony cases in the United States to examine sentencing outcomes. Their results indicated that pre-trial release caused a 66.9 per cent reduction in a defendant's eventual sentence length. Furthermore, a defendant's probability of receiving a below-guidelines sentence was reduced by 67.6 percentage points. The only estimates of the causal effect of bail on crime indicate that detention has an incapacitative effect before finalisation.

There are two potential reasons for disparities in the significance and size of the findings from the three studies described above. The first is that effects are likely to be highly specific to the jurisdiction and sample. The second is that each study used slightly different methods for constructing the measure of judge leniency/severity. These factors would not only impact the size of the estimated effects, but also the types of defendants who

were sensitive to the exogenous measure and upon whom the estimates are derived. The former is supported by the fact that federal defendants in the United States are charged with more serious crimes and tend to face harsher penalties than those in state courts, explaining Didwania's (2018) findings. In relation to the latter, Gupta et al. (2016) acknowledge that their measure of magistrate severity derived from the amount of money bond imposed may mean that their results largely pertain to defendants who face severe liquidity constraints.

So far in NSW, there have been few statistical analyses of the relationship between remand and criminal justice outcomes. Galouzis and Corben (2016) examined the judicial outcomes experienced by 976 inmates remanded in NSW in March 2011. The main findings of this report were that: 1) four in ten (39.7 per cent) defendants initially remanded were released on bail at finalisation; 2) more than half (53.0 per cent) received a custodial sentence; and 3) 18 per cent spent less than 30 days on remand before being released on bail and did not receive a custodial sentence. Chilvers, Allen, and Doak (2002) used a sample of all defendants in the NSW Local and Higher Courts between 1995 and 2000 to examine rates of failure to appear and the characteristics of defendants who were more likely to fail to appear. Defendants were served with warrants for failing to appear in 14.6 per cent of case finalisations in 2000. Failure to appear was more common among defendants with priors and several concurrent offences. There is also evidence from NSW which suggests that tightening access to bail may reduce rates of failing to appear. Fitzgerald and Weatherburn (2004) evaluated the change in rates of failure to appear after amendments to the NSW Bail Act 1978 which removed the presumption in favour of bail for various classes of repeat offender. They found that the overall rate of absconding in the Local Court fell by 18.4 per cent after the changes when compared to the 18 months before the change. However as a descriptive analysis at the aggregate level, this could not identify the specific effect of bail refusal on an individual's likelihood of failure to appear. These descriptive studies did not aim to identify causal relationships between bail and criminal justice outcomes in NSW. While international research provides evidence for a significant causal effect of bail on offending, absconding and sentencing, the size of the effects estimated varied considerably across different jurisdictions and the bail system in US jurisdictions operate very differently from the NSW bail system (e.g. in NSW there is an option to dispense with bail and sureties are not always required). The extent to which these results can be generalised to the NSW context is therefore worthy of further investigation.

## THE PRESENT STUDY

The aim of this study is to estimate the marginal effect of bail refusal on receiving a custodial penalty, failure to appear in court,

and offending prior to finalisation for NSW offenders. As in Gupta et al. (2016), Dobbie et al. (2018), variation in each magistrates' leniency is used as a source of exogenous variation in bail status to address problems of selection bias relating to bail decisions and criminal justice outcomes, and the inability to observe outcomes for defendants while they are on remand.

## METHOD

### DATA SOURCES

The dataset used in this study was constructed in several steps. In the first step, data relating to the first police and court bail decision pertaining to 1,015,349 persons appearing in court between 1 January 2011 and 30 June 2018 was extracted from the NSW JusticeLink database. The second step involved aggregating these (charge level) data so that they could be merged with BOCSAR's Re-offending Database (ROD). This was done by selecting the earliest bail hearing within a finalised case where a decision was made (i.e. the bail was not deferred). This ensures that the bail decisions examined were unaffected by further offending or breaches committed prior to case finalisation. The final step involved merging the JusticeLink and ROD datasets together. The final dataset was used to identify further offending and convictions for failure to appear at case disposition by imputing the dates between the first court bail hearing and case finalisation.

The main analysis focuses on the period after the 'show cause' amendments to the Bail Act came into effect (i.e. the *Bail Amendment Act 2014* (NSW)). The final dataset used in the analysis contained 42,362 first bail hearings occurring between 20 January 2015 and 30 June 2018 where the court made a bail decision (i.e. bail was not dispensed with or deferred). Only adult defendants who had different magistrates at first bail hearing and finalisation were included.<sup>4</sup> The decision to exclude cases with the same magistrate at first hearing and finalisation is further discussed in the section relating to the use of magistrate leniency as an instrumental variable.

### OUTCOME AND TREATMENT VARIABLES

There are three main outcome variables used in this study.

1. **Sentenced to imprisonment:** Coded 1 if the person was sentenced to full-time imprisonment and 0 otherwise;
2. **Failure to appear:** Coded 1 if a person was convicted of an offence under lawpart 1239 (Fail to appear in accordance with bail undertaking) or 82098 (Fail to appear in accordance with bail acknowledgment) at finalisation and 0 otherwise, and;<sup>5</sup>
3. **Crime committed before finalisation:** Coded 1 if a person committed a proven offence while on bail and 0 otherwise.<sup>6</sup>

The main explanatory variable of interest in this study is the outcome of the bail hearing. That is, a binary variable indicating whether an offender was granted (coded 1) or refused bail (coded 0) at their first bail hearing.<sup>7</sup>

One drawback of using the first bail hearing is that it is not determinative of a defendant's final bail status. This is because those who are initially remanded may be later released, and similarly, those who are released may be detained prior to disposal. Recall that in Galouzis and Corben's (2016) study, approximately 40 per cent of defendants who were initially remanded were on bail at finalisation. A consequence of this is that those who were initially bail refused may be observed to re-offend or fail to appear prior to finalisation. While bail refusal at the first hearing is an imperfect indicator of incapacitation, it is still preferable to using bail status at finalisation, which could be affected by further offending (rather than only factors observable at the index charge). That is, using final bail status as the treatment indicator may underestimate the incapacitative effects of remand. This is because defendants granted bail at their first hearing, that are then subsequently caught re-offending whilst on bail, would likely be held on remand until their matter was finalised. In these cases, remand would appear to cause offending, rather than the opposite.

## CONTROL VARIABLES

The following variables in relation to the person's first bail hearing are available in this study:

- Offence characteristics, which are hereafter referred to as **offence fixed effects**:
    - ♦ Principal charge: ANZSOC (ABS, 2011a) category of principal offence at index charge;
    - ♦ Maximum penalty of all offences at most serious charge.
  - Concurrent proven and unproven offences at index charge:
    - ♦ Violent offences: The number of proven and unproven homicide, acts intended to cause injury, sexual assault and related offences, abduction and harassment, and robbery and related offences at index charge, coded as 0, 1-2 or 3 or more;
    - ♦ Property offences: The number of proven and unproven theft, break and enter and fraud offences at index charge, coded as 0, 1-2 or 3 or more;
    - ♦ Drug offences: The number of proven and unproven drug offences at index charge, coded as 0, 1-2 or 3 or more;
    - ♦ Traffic offences: The number of proven and unproven traffic and driving offences at index charge, coded as 0, 1-2 or 3 or more, and;
  - Other offences: The number of proven and unproven weapon, public order and miscellaneous offences at index charge, coded as 0, 1-2 or 3 or more.
- The following variables in relation to the person at their finalised court appearance are also used in the analyses.<sup>8</sup>
- Demographic characteristics:
    - ♦ Age: coded as 18-24, 25-34, 35-44, 45 and above;
    - ♦ Gender: coded 0 for males and 1 for females;
    - ♦ Indigenous status: coded 0 for non-Indigenous, 1 for Indigenous, otherwise missing or unknown;
    - ♦ Socioeconomic disadvantage: ABS (2011b) Socioeconomic Indexes for Areas (SEIFA) quartiles for person's postcode of residence (i.e. most disadvantaged, disadvantaged, less disadvantaged, least disadvantaged);
    - ♦ Remoteness of area of residence: Remoteness of area of residence as classified by the ABS (2011c) Australian Statistical Geography Standard (ASGS), coded into major cities, inner regional, outer regional, remote or very remote.
  - Court appearances prior to index appearance:
    - ♦ Prior finalised court appearances with at least one proven offence: coded as 0, 1-2, 3-5, 6 or more, and;
    - ♦ Finalised Children's Court appearances with at least one proven offence: coded as 0, 1-2, 3 and more.
  - Penalties received in the 5 years prior to the index appearance:
    - ♦ Imprisonment: coded as 0, 1, or 2 or more;
    - ♦ Community orders: coded as 0, 1, or 2 or more, and;
    - ♦ Other penalties: coded as 0, 1, or 2 or more.
  - Court appearances in the 5 years prior to the index appearance where an offence of the following type was proven:
    - ♦ Violent offences: Number of prior convictions for violent offences, coded as 0, 1, 2 or more;
    - ♦ Property offences: Number of prior convictions for property offences, coded as 0, 1, 2 or more;
    - ♦ Drug offences: Number of prior convictions for drug offences, coded as 0, 1, 2 or more;
    - ♦ Breach offences: Number of prior convictions for breach of justice procedures offences, coded as 0, 1, 2 or more;
    - ♦ Traffic offences: Number of prior convictions for driving, traffic and exceed the prescribed concentration of alcohol offences, coded as 0, 1, 2 or more, and;

- Other offences: The number of prior convictions for weapon, public order and miscellaneous offences, coded as 0, 1 or 2 or more.

The dataset also contains the dates of the first charge, the first court bail hearing (if there was one), and the finalisation date of the court appearance relating to the index charge. Other available items are the magistrate at the first bail hearing and the location of the court where the first hearing was held. These allow us to construct the following fixed effects:

- **Bail hearing date fixed effects:** day-of-week and month fixed effects for the bail hearing date, and;
- **Court-by-year fixed effects,** which account for magistrate rotation between different courts over time.<sup>9</sup>

### INSTRUMENTAL VARIABLES ANALYSIS

The effect of a treatment for individual  $i$  ( $T_i$ ) on an outcome ( $Y_i$ ) controlling for observed factors ( $X_i'$ ) can be estimated using a linear model.

$$Y_i = c_i + \delta T_i + \beta X_i' + \varepsilon_i \quad (1)$$

This would be an adequate approach to estimate the effect of bail decisions if all differences between those refused and released could be observed and included as control variables in the regression model. However, in this case it is quite likely that defendants who are granted bail systematically differ from those refused bail, in ways unobservable to the researcher. Consider the case where situational factors (e.g. the accused has a cognitive or mental health impairment) lower the risk of both bail refusal and a prison sentence. This analysis would overestimate the effect of granting bail, as it would reflect these unobserved correlations along with any causal effect. A further problem arises when examining failure to appear and offending on bail, as defendants on remand cannot offend or fail to appear while detained. Thus a single-equation analysis cannot disentangle the causal effect of bail from that of selection bias and the partial observability of outcomes.

Instrumental variables (IV) (two-stage) analyses can address these problems. IV analyses hinge on the presence of a third factor that is both correlated with treatment and unrelated to the outcome of interest (Imbens & Angrist, 1994). IV analyses allow the researcher to obtain a consistent estimate of the Local Average Treatment Effect (LATE) provided that the following four assumptions are met.

1. Relevance: The IV must strongly influence the probability of treatment;
2. Monotonicity: The IV should not affect treatment differently for different observations;
3. Randomisation: The IV should not be influenced by an observation's characteristics;

4. Exclusion restriction: The IV must have no influence over outcomes outside of its effect on treatment.

The validity of these assumptions in the context of my study is addressed in the proceeding section.

### Magistrate leniency

Variation between magistrates in their willingness to grant bail (hereafter referred to as magistrate leniency) potentially meets the four assumptions outlined above. This variation is as good as random because magistrates do not get to choose which cases they will hear. In a single court the presiding magistrate deals with all cases brought before the court by police. In a multi-court complex, the senior magistrate simply assigns a court to each magistrate, and then the magistrate deals with all cases coming before that court. Hence, the allocation of cases to magistrates is for all practical purposes as good as random, or at the very least, unrelated to case characteristics. Defendants have no influence over the magistrate they receive at the bail hearing. Further, as long as they are sentenced by a different magistrate, the bail magistrate's leniency should not affect their outcomes except through its impact on the initial bail decision. The exclusion restriction is thus satisfied in all cases where the bail hearing and sentencing magistrate differ. For this reason, only such cases are included in the study sample.

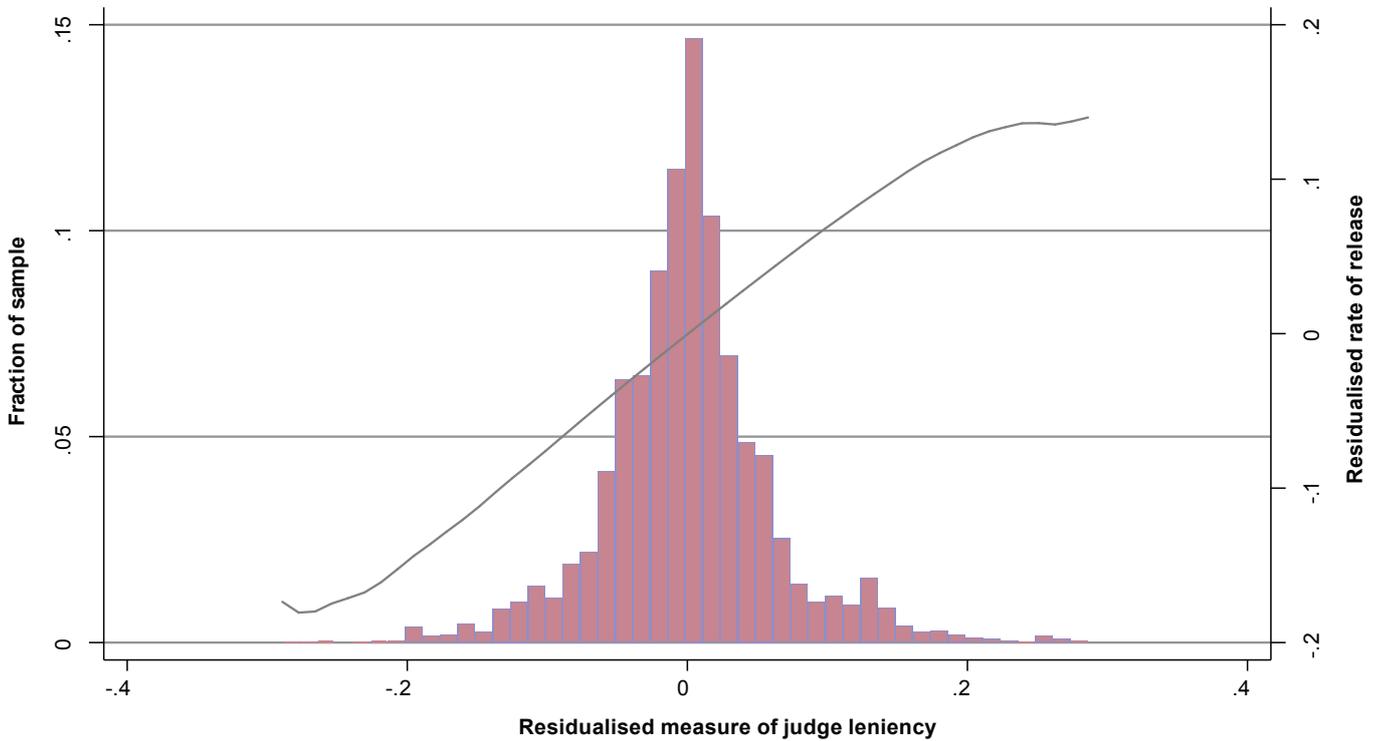
It is worth specifying how magistrate leniency is measured in this study before testing its validity as an IV. A simple measure of leniency is the proportion of all decisions made by a magistrate where bail was granted. In this case the value of the IV would be the same for all defendants appearing before a particular magistrate. However, at the individual level, this measure of a magistrate's leniency would include the outcome of each individual's own bail hearing. This creates endogeneity between the IV and the treatment variable. One solution is to recalculate each magistrate's leniency whilst excluding the hearings involving the index individual as defined in the equation below:<sup>10</sup>

$$L_{ij}^E = \frac{R_j - R_{ij}}{D_j - D_{ij}} \quad (2)$$

In this equation,  $R_j$  and  $R_{ij}$  are the number of cases in which magistrate  $j$  made a release decision (i.e. granted bail), and made a release decision for individual  $i$ , respectively.  $D_j$  and  $D_{ij}$  are the total number of decisions made by magistrate  $j$ , and the total number of decisions made by magistrate  $j$  for individual  $i$ .

However, one problem with using  $L_{ij}^E$  as an instrument is that bail decisions are also influenced by case characteristics. For example, a magistrate who receives more serious cases may appear more severe according to the above measure. The procedure used by Dobbie et al. (2018) is adopted in this study to remedy this.

Figure 1. Distribution of magistrate leniency measure and relationship with likelihood of release



This procedure involves regressing the bail decision on to the court-by-year, bail hearing date, and offence fixed effects to obtain the residuals. This removes part of the variation in bail decisions caused by non-magistrate factors and therefore yields a more precise measure of a judge’s underlying leniency. Summing the residuals at the magistrate and individual level and substituting each quantity in the numerator yields the IV defined below.

$$IV_{ij} = L_{ij}^{E*} = \frac{R_j^* - R_{ij}^*}{D_j - D_{ij}} \quad (3)$$

Hence,  $IV_{ij}$  measures the average leniency of the magistrate in all cases unrelated to the index individual, after controlling for the characteristics of cases assigned to the magistrate and fixed effects. This measure is also better suited to the policy setting. Recall that defendants who are charged with particular offences must be refused bail unless they can justify their release. Controlling for types of cases a magistrate receives adjusts for this aspect of the bail decision-making process. The next step is to test whether this measure satisfies the aforementioned assumptions, commencing with the relevance assumption. Figure 1 presents the distribution of the proposed measure of leniency and its relationship with the likelihood of release, as measured by average rates of release after accounting for fixed effects.<sup>11</sup> The IV is distributed following a normal distribution, and

ranges from -0.3 to 0.3. Moving from the lowest to the highest value of the IV increases the likelihood of being released on bail.

The tests of the IV’s ability to meet the randomisation, relevance and monotonicity assumptions are presented in the Appendix Tables A1-A2. The test of randomisation (Table A1) was conducted as follows: the value of the IV was regressed on the control variables and fixed effects. The joint significance of the control variables was then tested using an *F*-test. The lack of significance of this test indicates that leniency did not vary based on individual characteristics. The coefficient of the IV on release when estimated on the whole sample is strongly positive, corroborating the graphical evidence of relevance presented in Figure 1. Next is the test of monotonicity. The effect of the IV on release on bail on a variety of subgroups was estimated using regressions which included all controls and fixed effects. The coefficient of the IV on being granted bail is presented in Table A2 for each subgroup. This table shows that: (i) the IV is non-negative for each subgroup; (ii) the effect of the IV on release is positive and significant for most subgroups and; (iii) no significant negative coefficients were found. Together these results suggest that the monotonicity assumption is satisfied. Each assumption is satisfied and thus the measure of magistrate leniency can be used in an IV analysis.

### Local Average Treatment Effect estimation and interpretation

IV analyses were conducted using two-stage-least-squares (2SLS). The first stage of the IV analysis estimated the probability of being granted bail based on magistrate leniency ( $IV_{ij}$ ) and other control variables  $X_i'$ . This stage is summarised in Equation 4 where  $T_{ij}$  is a binary variable taking value 1 for defendants granted bail, zero otherwise, and  $v_{ij}$  is the error term.

$$\widehat{T}_{ij} = T_{ij} - v_{ij} = \alpha_0 + \alpha_1 IV_{ij} + \zeta X_i' \quad (4) \quad \text{(First-stage)}$$

The resulting predicted probabilities denoted as, ( $\widehat{T}_{ij}$ ), were then used in place of bail status in the second stage equation. The following equation was estimated for each of the three outcomes ( $Y_{ij}$ ).<sup>12</sup>

$$Y_{ij} = \beta_0 + \beta_1 \widehat{T}_{ij} + \gamma X_i' + u_{ij} \quad (5) \quad \text{(Second-stage)}$$

Hence, the parameter of interest,  $\beta_1$ , represents the Local Average Treatment Effect (LATE) of being granted bail. The definition of the LATE for a continuous IV (Imbens & Angrist, 1994) is given by the equation below.

$$LATE = E(Y|T_{\bar{z}} = 1) - E(Y|T_{\bar{z}} = 0) \quad (6)$$

The LATE is the effect of being granted bail for those whose treatment status would change if they moved from the most severe magistrate ( $\bar{z}$ ) to the most lenient magistrate ( $\bar{z}$ ). The analyses do not estimate the effect of bail decisions on defendants who have no chance of release ('never-takers') even if they were to appear before the most lenient magistrate. Similarly, those who would not be refused bail even by the most strict magistrate ('always-takers') are not included in the LATE.

Given that magistrate leniency was randomly distributed, defendants whose bail status varied because of the magistrate they received should not otherwise differ in their unobserved or observed characteristics. Hence, estimating treatment effects only on this group eliminates the problem of selection bias simultaneously affecting treatment and the outcomes. This also deals with the problem of partial observability, as the behaviour of remanded defendants can be inferred from the behaviour of defendants who were granted bail within this group.

A disadvantage of the LATE is that (by definition) its applicability to the broader population is limited. It only estimates the treatment effect on marginal defendants, or the 'compliers'. Thus, the LATE may differ from the Average Treatment Effect (ATE) obtained from single-equation estimations (in this case ordinary least squares, or OLS) because marginal and average defendants respond differently to bail decisions. If heterogeneity in treatment effects is present, the difference between the OLS and 2SLS results cannot be attributed solely to selection bias or partial observability. To test for this, OLS analyses were re-weighted to fit the distribution of compliers in the population. If the re-weighted OLS analyses mirror the unweighted analyses, the differences between the

ATE and the LATE are not caused by heterogeneous treatment effects. The difference-in-Sargan C-statistic (Baum, Schaffer, & Stillman, 2003) can be used to test for the endogeneity of the treatment variable or that the estimates from OLS and 2SLS differ significantly. The full procedure for deriving complier weights is outlined in Dahl, Kostol, and Mogstad (2014).

For this reason, there is utility in understanding the characteristics of compliers. If evidence of heterogeneous treatment effects is found, the characteristics of compliers are useful in considering the external validity of the 2SLS estimates. If there is no heterogeneity, identifying which defendants are currently considered marginal under the current bail regime may still be useful as marginal individuals tend to be those who are most affected by policy changes.

While there is no way to identify the individual compliers in the sample in an IV analysis, the proportion of marginal defendants can be estimated after the first-stage regression (Dahl et al., 2014). Taking  $\widehat{\alpha}_0$  as the constant of the estimated first-stage regression,  $\widehat{\alpha}_1$  as the coefficient on the IV from the first-stage regression,  $\bar{z}$  as the value of the IV for the most lenient magistrate, and  $\underline{z}$  as the value of the IV for the most severe magistrate, the proportion of compliers is approximately:

$$P_c = \widehat{\alpha}_1 (\bar{z} - \underline{z}) \quad (7)$$

The proportion of always-takers (those who would always be released even if they received the most severe magistrate) is:

$$P_a = \widehat{\alpha}_0 + \widehat{\alpha}_1 \underline{z} \quad (8)$$

The proportion of never-takers (those who would not be released even by the most lenient magistrate) is:

$$P_n = 1 - \widehat{\alpha}_0 - \widehat{\alpha}_1 \bar{z} \quad (9)$$

This method can be applied on subgroups within the sample to examine the specific characteristics of marginal defendants as in Dahl et al. (2014) and Dobbie et al. (2018). The proportion of those IV-sensitive defendants in the subgroup is obtained by re-estimating the first-stage equation on the subgroup and using the coefficients to calculate the proportion of compliers as in the procedure above. The distribution of compliers across different characteristics is then obtained by adjusting these proportions for the relative size of each subgroup. A comparison of the sample and complier distribution across all control variables indicates whether compliers were over-represented in some categories. Standard errors for each measure were derived in order to test the significance of over-representation.

In summary OLS, complier-weighted OLS and 2SLS estimates are presented. These allow for the identification of the causal effect of bail on the outcomes and the significance of selection bias and control variables. Furthermore, they provide evidence as to whether or not any differences in OLS and 2SLS estimates derive from behaviour specific to marginal defendants.

Then, analyses of the proportion and characteristics of marginal defendants are presented to identify subgroups for whom bail outcomes were most affected by variations in magistrate leniency.

## RESULTS

### DESCRIPTIVE STATISTICS

Table 1 compares the demographic, charge, and criminal history characteristics of defendants granted and refused bail at first bail hearing. The average defendant was roughly 34 years old in both the bail refused and released groups. The largest age group in the sample were those aged 25-34, who were over-represented among those refused bail. A majority of the bail decisions pertained to men, but the proportion of men was larger among those refused bail compared with those granted bail. Indigenous defendants were also over-represented among those refused bail by the court. The patterns in terms of remoteness of residence were similar across both groups. Approximately seven in 10 defendants resided in major cities, 20 per cent in inner regional areas, and the remainder in outer regional, remote or very remote areas. The largest subcategory of socioeconomic disadvantage among both bail refused and released was the most disadvantaged quartile.

Defendants refused bail and defendants released to bail differed significantly on their index charge. As might be expected, a larger proportion of those refused bail (68.0 per cent) had two or more concurrent offences compared with those released (61.0 per cent). Unsurprisingly, bail refusal was more common among defendants with two or more violent offences, two or more property charges or two or more drug offences at the index bail hearing.

Prior offending behaviour was also correlated with bail status. Those with 3-5 or 6 or more prior court appearances with a proven offence were overrepresented among those refused bail. Similarly there was a higher proportion of defendants who had two or more custodial penalties in the 5 years prior to the index appearance among those refused bail (30.3 per cent) relative to those released (12.4 per cent). Having two or more appearances with violent, property, drug, breach and other convictions was also correlated with bail refusal.

The final bail status is also presented separately for those initially bail refused and later granted. As seen here (and previously noted) bail status at first hearing does not perfectly correlate with bail refusal at finalisation. Among those refused bail at their first hearing, 22.9 per cent were on bail at finalisation and 24.0 per cent were imprisoned for a prior offence. Among those granted bail, nearly three in four remained on bail at finalisation. A sizeable proportion (15.6 per cent) of defendants who were initially released was on remand at finalisation.<sup>13</sup>

The bottom of the table shows descriptive statistics relating to each study outcome for the bail refused and released groups. The sentencing outcomes of the groups differed significantly, with nearly six in 10 (56.7 per cent) of those refused bail at their first hearing eventually sentenced to imprisonment, compared to only 18.4 per cent among those released. As expected, those released on bail were more likely to be found guilty of a failure to appear offence at finalisation. A higher proportion of those released on bail re-offended before their matter was finalised (27.7 per cent) compared to those who were refused bail at their first hearing (13.3 per cent). At least part of the observed disparities in the outcomes for defendants refused and granted bail is likely due to significant differences in each group's observable characteristics. It is also conceivable that other unobservable differences may exist. These group differences are dealt with in the multivariate analyses presented in the next section.

### MULTIVARIATE ANALYSES

#### Estimation results

Table 2 presents OLS and 2SLS estimates of the parameter of interest (i.e. the effect of bail refusal) on the study outcomes. Each column presents a particular specification and each row presents a different outcome. Column (1) shows estimates obtained from OLS regressions with no controls but adjusted for fixed effects. Column (2) shows estimates from an OLS regression with all controls and fixed effects. Comparing the results of these two columns provides an indication of the extent to which control variables influence the outcome. Column (3) shows estimates from the complier-weighted OLS analyses, which also include the full set of controls. These estimates are presented to test for the presence of heterogeneous treatment effects; if the estimates in Columns (2) and (3) are similar then heterogeneity is not present. Columns (4) and (5) are 2SLS estimates; first with no controls, then with a full set of controls. Any differences in these estimates are caused by the effect of control variables in influencing the treatment and outcome variables.

The first outcome (in row 1) is the likelihood of being sentenced to imprisonment. The OLS estimate (in Column 1) indicates that there is a 30 percentage point disparity between the bail and remand groups before the inclusion of controls. At face value, this implies that those who are remanded appear to be much more likely to receive prison penalties. However, including controls (in Column 2) attenuates this estimate to a 20 percentage point difference. This suggests that at least some of the difference in the likelihood of a prison sentence between those refused and those granted bail is driven by case characteristics. The complier-weighted OLS estimates (in Column 3) are almost identical to those obtained from the fully-controlled OLS estimate, which indicates that the compliers in the sample do not respond differently to release compared to average defendants. The 2SLS

Table 1. Descriptive statistics for defendants refused and granted bail

Factor	Level	Bail refused by court (n=23,871)	Granted bail by court (n=18,491)	p-value
<b>Control variables</b>				
Age at index contact, mean (SD)		33.6 (10.1)	34.3 (10.7)	<.001
Age groups	18-24	4987 (20.9%)	3929 (21.2%)	<.001
	25-34	8857 (37.1%)	6198 (33.5%)	
	35-44	6476 (27.1%)	5083 (27.5%)	
	45+	3551 (14.9%)	3281 (17.7%)	
Gender	Male	21697 (90.9%)	15698 (84.9%)	<.001
	Female	2174 (9.1%)	2793 (15.1%)	
Indigenous status as recorded by NSW Police for any contact	Indigenous	8909 (37.3%)	5782 (31.3%)	<.001
	Non-Indigenous	14740 (61.7%)	12629 (68.3%)	
	Unknown	222 (0.9%)	80 (0.4%)	
Remoteness of postcode of residence	Major cities	12865 (71.2%)	12647 (73.1%)	<.001
	Inner regional	3821 (21.1%)	3346 (19.3%)	
	Outer regional	1205 (6.7%)	1067 (6.2%)	
	Remote/very remote	184 (1.0%)	251 (1.4%)	
Socioeconomic disadvantage quartiles	Most disadvantaged	6250 (34.6%)	5498 (31.8%)	<.001
	Disadvantaged	5299 (29.3%)	4866 (28.1%)	
	Less disadvantaged	4439 (24.6%)	4437 (25.6%)	
	Least disadvantaged	2083 (11.5%)	2500 (14.5%)	
Concurrent offences	One offence	7643 (32.0%)	7093 (38.4%)	<.001
	Two or more offences	16228 (68.0%)	11398 (61.6%)	
Violent offences at index charge	0	11931 (50.0%)	9182 (49.7%)	<.001
	1-2	8579 (35.9%)	7183 (38.8%)	
	3 or more	3361 (14.1%)	2126 (11.5%)	
Property offences at index charge	0	14182 (59.4%)	12834 (69.4%)	<.001
	1-2	7500 (31.4%)	4729 (25.6%)	
	3 or more	2189 (9.2%)	928 (5.0%)	
Drug offences at index charge	0	19607 (82.1%)	16409 (88.7%)	<.001
	1-2	3082 (12.9%)	1602 (8.7%)	
	3 or more	1182 (5.0%)	480 (2.6%)	
Traffic offences at index charge	0	21571 (90.4%)	17248 (93.3%)	<.001
	1-2	1434 (6.0%)	689 (3.7%)	
	3 or more	866 (3.6%)	554 (3.0%)	
Other offences at index charge	0	18602 (77.9%)	15410 (83.3%)	<.001
	1-2	4163 (17.4%)	2633 (14.2%)	
	3 or more	1106 (4.6%)	448 (2.4%)	
Number of prior court appearances with a proven offence	None	3557 (14.9%)	3646 (19.7%)	<.001
	1-2	5908 (24.7%)	6228 (33.7%)	
	3-5	8474 (35.5%)	5620 (30.4%)	
	6 or more	5932 (24.9%)	2997 (16.2%)	

Table 1. Descriptive statistics for defendants refused and granted bail - continued

Factor	Level	Bail refused by court (n=23,871)	Granted bail by court (n=18,491)	p-value
Number of prior finalised Children's Court appearances with a proven offence	None	21651 (90.7%)	17158 (92.8%)	<.001
	1-2	1061 (4.4%)	734 (4.0%)	
	3 or more	1159 (4.9%)	599 (3.2%)	
Prior detention or imprisonment penalties	0	10932 (45.8%)	13574 (73.4%)	<.001
	1	5042 (21.1%)	2517 (13.6%)	
	2 or more	7897 (33.1%)	2400 (13.0%)	
Prior community orders	0	8832 (37.0%)	7434 (40.2%)	<.001
	1	3044 (12.8%)	2789 (15.1%)	
	2 or more	11995 (50.2%)	8268 (44.7%)	
Prior other penalties	0	7185 (30.1%)	6003 (32.5%)	<.001
	1	4406 (18.5%)	3656 (19.8%)	
	2 or more	12280 (51.4%)	8832 (47.8%)	
Prior violent offences	0	10996 (46.1%)	9753 (52.7%)	<.001
	1	6796 (28.5%)	5489 (29.7%)	
	2 or more	6079 (25.5%)	3249 (17.6%)	
Prior property offences	0	12848 (53.8%)	12694 (68.6%)	<.001
	1	4773 (20.0%)	2972 (16.1%)	
	2 or more	6250 (26.2%)	2825 (15.3%)	
Prior drug offences	0	15127 (63.4%)	13198 (71.4%)	<.001
	1	5104 (21.4%)	3261 (17.6%)	
	2 or more	3640 (15.2%)	2032 (11.0%)	
Prior breach offences	0	9171 (38.4%)	8986 (48.6%)	<.001
	1	5287 (22.1%)	4101 (22.2%)	
	2 or more	9413 (39.4%)	5404 (29.2%)	
Prior traffic offences	0	14007 (58.7%)	11963 (64.7%)	<.001
	1	5176 (21.7%)	3655 (19.8%)	
	2 or more	4688 (19.6%)	2873 (15.5%)	
Priors - other offences	0	14118 (59.1%)	12964 (70.1%)	<.001
	1	5252 (22.0%)	3379 (18.3%)	
	2 or more	4501 (18.9%)	2148 (11.6%)	
<b>Bail status at finalisation</b>				
Bail dispensed with		560 (2.3%)	684 (3.7%)	<.001
Bail refused		11821 (49.5%)	2917 (15.8%)	
In custody for a prior offence		5785 (24.2%)	649 (3.5%)	
On bail		5579 (23.4%)	13883 (75.1%)	
Police custody		126 (0.5%)	358 (1.9%)	
<b>Outcome variables</b>				
Sentenced to imprisonment at index finalisation		14101 (59.1%)	3628 (19.6%)	<.001
Charged with a failure to appear offence at finalisation		511 (2.1%)	1684 (9.1%)	<.001
Re-offended before finalisation		3162 (13.2%)	5123 (27.7%)	<.001

model that excludes controls (in Column 4), estimates a non-significant difference of 2 percentage points in favour of released defendants. In the preferred model specification (where controls are included) in Column 5, the estimate rises to a ten percentage point difference in the likelihood of a prison penalty in favour of those released to bail. This indicates that there is a significant influence of these factors on imprisonment. In sum, these results indicate that bail status has a causal effect on the likelihood of a custodial penalty even after accounting for observed and unobserved characteristics. That is, a person refused bail is 10 percentage points more likely to be imprisoned than a released defendant. This means that 49.0 per cent of additional released defendants would be imprisoned compared to 59.1 per cent otherwise.

Turning to failure to appear (in row 2), all of the OLS estimates (presented in Columns 1-3) indicate that on average, a released defendant is six percentage points more likely to fail to appear compared to those who were remanded. Both of the 2SLS estimates (in Columns 4 and 5), show that the likelihood of failing to appear increases by nine percentage points as a consequence

of release. The distance between the OLS and 2SLS estimates is negligible, judging from the C-statistic. Hence the incapacitative effect of bail refusal on failure to appear also does not appear to be influenced by selection bias. Taking the current rate of failure to appear among those refused bail at first hearing as a baseline, the rate of failure to appear among additional released defendants would average 11.1 per cent.

The final outcome presented on Table 2 is the probability of offending on bail. The OLS estimates (presented in Columns 1-3) suggest that those who are released are 15 percentage points more likely to re-offend on bail. The 2SLS estimates without controls (in Column 4) suggest that granting bail increases the risk of offending on bail by 21 percentage points. When controls are included (in Column 5), the estimate indicates that those released are 16 percentage points more likely to re-offend on bail. The lack of significance of the C-statistic suggests that there is little evidence for selection bias. All else equal and assuming the current baseline re-offending rate of 13.2 per cent among those refused bail at first hearing, additional releases would incur rates of offending on bail of 29.2 per cent.

**Table 2. OLS and 2SLS estimation results of the effect of bail refusal on imprisonment, failure to appear and reoffending, main sample**

Outcome	(1)	(2)	(3)	(4)	(5)
Imprisonment	-0.30 *** (0.00)	-0.20 *** (0.01)	-0.21 *** (0.01)	-0.02 (0.06)	-0.10 * (0.05)
Failure to appear	0.06 *** (0.00)	0.06 *** (0.00)	0.06 *** (0.00)	0.09 *** (0.03)	0.09 ** (0.03)
Offending on bail	0.15 *** (0.00)	0.15 *** (0.00)	0.16 *** (0.01)	0.21 *** (0.05)	0.16 *** (0.05)
Partial F				273.01	291.84
C-statistic (p-value)					
Imprisonment				29.46 (0.00)	4.86 (0.02)
Failure to appear				1.42 (0.23)	1.27 (0.26)
Offending on bail				2.00 (0.15)	0.03 (0.86)
Estimation method	OLS	OLS	OLS	2SLS	2SLS
Controls	No	Yes	Yes	No	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes
Complier weights	No	No	Yes	No	No
N	39535	33018	33018	39610	33092

Note. \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$

Robust standard errors clustered at both the defendant and magistrate level in parentheses.

All variables in Table 1 are used as control variables with the exception of bail status at finalisation and the three outcome variables.

All specifications are estimated with court-by-year, offence, month of bail hearing and day of week of bail hearing fixed effects.

*Table 3. Distribution of compliers, always-takers and never-takers in the sample*

Threshold	1%	1.5%	2%
Compliers	26.2%	23.3%	21.6%
Always-takers	5.0%	6.3%	7.0%
Never-takers	68.8%	70.4%	71.4%

### Marginal defendants

Marginal defendants are those whose bail status would change as a result of being assigned to a strict rather than a lenient magistrate or vice versa in the first-stage model. Table 3 presents the distribution of compliers, always-takers and never-takers in the sample at various thresholds for the upper and lower bound values of the measure of magistrate leniency estimated using the procedure implemented by Dahl et al. (2014) and Dobbie et al. (2018). At the 1 per cent threshold, where the highest value of the IV is set at the 99th percentile, and the lowest value of the IV is set at the 1st percentile, 26.2 per cent of the sample are compliers. This is equivalent to roughly 11,098 hearings. To check whether the measure is sensitive to the choice of threshold, the comparable figures for the 1.5 per cent and 2 per cent thresholds are also shown. The proportions of compliers, always-takers and never-takers are robust to variations in the extreme values of the IV. Roughly 5 per cent are always-takers (those who would be released regardless of receiving the most severe magistrate) and 69 per cent are never-takers (those who would not be released if assigned the most lenient magistrate). Note that this does not mean that the defendants in the former group are always released and everyone in the latter group are always detained; rather this represents groups who are more and less likely to be released and detained regardless of their magistrate assignment according to the model estimated in the first stage regression (see Appendix Table A3).

Table 4 shows analyses of the distribution of marginal defendants within different subgroups compared to the proportion of defendants with that particular characteristic in the sample. In terms of demographic characteristics, Non-Indigenous defendants were more likely to have their bail status affected by magistrate leniency, as were defendants who reside in major cities and remote areas. Marginal defendants were also less likely to come from the disadvantaged socioeconomic quartile.

Fewer significant differences in terms of the index charge were observed. Marginal defendants were less common among those who were not charged with any violent offences, those charged with three or more property offences and three or more other offences. Those who were charged with one or two violent offences (as opposed to none or 3 or more) were over-represented among marginal defendants. Marginal defendants were more easily characterised by the extent of their prior criminal history. Those with no prior convictions, no prior prison sentences, no prior community orders, no other penalties and no prior breach offences were less likely to be marginal. Marginal defendants were more common among those with three or more prior convictions, one prior prison sentence (as opposed to none or 2 or more), one prior conviction for a property offence, two or more prior drug convictions, one prior traffic conviction, and two or more prior convictions for breaches of justice procedures. In sum, marginal defendants appear to be those who are at an intermediary risk level of offending, as opposed to those who have a low level (e.g. no prior convictions or penalties) or high level of risk (e.g. more property offences at index charge). Despite this, the 2SLS estimates uncovered little evidence for higher re-offending risk (after adjusting for covariates) when compared to average released defendants.

Table 4. Comparison of distribution of marginal defendants within each subgroup to distribution of sample

Subgroup	Proportion in sample	Proportion of compliers	Ratio of complier proportion to sample proportion
<b>Age groups</b>			
18-24	0.21	0.22	1.02
25-34	0.36	0.38	1.08
35-44	0.27	0.26	0.95
45+	0.16	0.16	0.99
<b>Gender</b>			
Male	0.88	0.90	1.02
Female	0.12	0.10	0.83
<b>Indigenous status</b>			
Indigenous	0.35	0.28	0.80 *
Non-Indigenous	0.65	0.70	1.09 *
<b>Remoteness of postcode of residence</b>			
Major cities	0.72	0.82	1.14 *
Inner regional	0.20	0.16	0.79 *
Outer regional	0.06	0.01	0.20 *
Remote/very remote	0.01	0.02	1.46 *
<b>Socioeconomic disadvantage quartiles</b>			
Most disadvantaged	0.33	0.35	1.06
Disadvantaged	0.29	0.23	0.80 *
Less disadvantaged	0.25	0.24	0.94
Least disadvantaged	0.13	0.15	1.13
<b>Concurrent offences</b>			
One offence	0.35	0.32	0.91
Two or more offences	0.65	0.69	1.06
<b>Violent offences at index charge</b>			
0	0.50	0.43	0.87 *
1 to 2	0.37	0.43	1.15 *
3 or more	0.13	0.15	1.13
<b>Property offences at index charge</b>			
0	0.64	0.65	1.02
1 to 2	0.29	0.32	1.10
3 or more	0.07	0.04	0.52 *
<b>Drug offences at index charge</b>			
0	0.85	0.85	1.00
1 to 2	0.11	0.10	0.91
3 or more	0.04	0.05	1.19
<b>Traffic offences at index charge</b>			
0	0.92	0.93	1.02
1 to 2	0.05	0.05	0.99
3 or more	0.03	0.02	0.74
<b>Other offences at index charge</b>			
0	0.80	0.80	1.00
1 to 2	0.16	0.18	1.13
3 or more	0.04	0.01	0.22 *

**Table 4. Comparison of distribution of marginal defendants within each subgroup to distribution of sample (continued)**

Subgroup	Proportion in sample	Proportion of compliers	Ratio of complier proportion to sample proportion
<b>Number of prior finalised court appearances with a proven offence</b>			
None	0.17	0.13	0.76 *
1-2 prior appearances	0.29	0.27	0.95
3-5 prior appearances	0.33	0.37	1.11 *
6 or more prior appearances	0.21	0.24	1.16 *
<b>Number of prior finalised Children’s Court appearances a with proven offence</b>			
None	0.92	0.91	1.00
1-2 prior appearances	0.04	0.04	1.04
3 or more prior appearances	0.04	0.05	1.28
<b>Prior detention or imprisonment penalties</b>			
0	0.58	0.52	0.90 *
1	0.18	0.24	1.34 *
2 or more	0.24	0.23	0.96
<b>Prior community orders</b>			
0	0.38	0.30	0.78 *
1	0.14	0.16	1.13
2 or more	0.48	0.56	1.16 *
<b>Prior other penalties</b>			
0	0.31	0.27	0.86 *
1	0.19	0.19	0.99
2 or more	0.50	0.55	1.11 *
<b>Prior violent offences</b>			
0	0.49	0.41	0.85 *
1	0.29	0.34	1.16 *
2 or more	0.22	0.25	1.13
<b>Prior property offences</b>			
0	0.60	0.58	0.96
1	0.18	0.22	1.18 *
2 or more	0.21	0.22	1.04
<b>Prior drug offences</b>			
0	0.67	0.64	0.96
1	0.20	0.21	1.09
2 or more	0.13	0.16	1.22 *
<b>Prior breach offences</b>			
0	0.43	0.36	0.84 *
1	0.22	0.24	1.08
2 or more	0.35	0.40	1.14 *
<b>Prior traffic offences</b>			
0	0.61	0.60	0.97
1	0.21	0.25	1.18 *
2 or more	0.18	0.15	0.87
<b>Priors - other offences</b>			
0	0.64	0.64	1.00
1	0.20	0.19	0.96
2 or more	0.16	0.17	1.06

Note. \* Significant at .05 level, i.e. upper and lower bounds of confidence interval exceeds or does not exceed 1.

## DISCUSSION

The purpose of this study was to identify the impact of bail refusal on imprisonment, failure to appear, and offending on bail. To answer these research questions I exploited plausibly exogenous variation in bail decisions arising from magistrate leniency to address issues of selection bias and partial observability. The findings suggest that there is a trade-off in remanding defendants. On one hand, refusing bail was found to be associated with a 9 percentage point decrease in the likelihood of a defendant failing to appear for future hearings and a 16 percentage point decrease in the likelihood of offending on bail. However, bail refusal was also found to be associated with a 10 percentage point increase in the likelihood of the court imposing a custodial sentence for that charge. These estimates are causal and net of differences in observed characteristics and selection bias. These translate into the following marginal effects of release: an increase in the rate of offending from 13.2 per cent to 29.2 per cent, a decrease in the rate of imprisonment from 59.0 to 49.0 per cent and an increase in the rate of failure to appear from 2.1 per cent to 11.1 per cent. Thus, remanding ten additional defendants increases the number imprisoned by one, and reduces the number offending and failing to appear by 1.6 and 0.9 on average. Note that these are marginal effects and thus represent the effects on the additional released defendants. The effects of additional releases on overall rates of failure to appear, imprisonment and offending on bail would depend on the number of additional released defendants relative to the population of all released defendants, including those who were dispensed with bail, who represent the majority of defendants in the NSW criminal court system and were not included in this study.

The finding that bail decisions influence sentencing independent of case characteristics is consistent with previous research. Furthermore, the differences between the OLS and 2SLS estimates when examining sentencing are also consistent with the general pattern of findings in past literature, which find that bail outcomes exert an independent effect on sentencing despite the significant influence of observed and unobserved characteristics. The increase in the likelihood of failure to appear as a consequence of release is also consistent with Dobbie et al. (2018) findings and confirms Fitzgerald and Weatherburn's (2004) findings that bail refusal reduces failure to appear in NSW. In terms of re-offending, the estimates are best compared to Dobbie et al. (2018) as this is the only one which also measures re-offending prior to finalisation. The estimates found in the current study are similar in magnitude and direction to those they obtain, but due to most observations having insufficient follow-up time to measure re-offending post-finalisation, replication of their analyses in this respect could not be undertaken.

The IV methods used in this analysis produce causal estimates based on the subset of the sample sensitive to magistrate leniency. That is, defendants for whom bail may or may not be granted, depending on the leniency of the presiding magistrate. These 'marginal defendants' represented around 26 per cent of the hearings included in the sample (approximately 11,089 hearings) and, as one might expect, tended to be those at intermediate levels of risk. For example, marginal defendants were found to be over-represented among those with one or two violent offences at index charge, three or more prior convictions, one prior prison sentence (as opposed to none or two or more), one prior conviction for a property offence, two or more prior drug convictions, one prior traffic conviction, and two or more prior convictions for breaches of justice procedures. Complier-weighted analyses suggest that differences in OLS and 2SLS estimates were unlikely driven by heterogeneity in treatment effects. Furthermore little evidence was found to suggest they were inherently more risky than the average released defendant in terms of risk of re-offending or failure to appear, after controlling for observed differences and selection into treatment.

The study suffers from two main limitations. First, initial bail refusal does not determine final bail outcomes. While the LATE is robust to this confounding factor, it means that the estimates do not represent total incapacitation. Rather, they simply reflect the incapacitation effect of the current system of remand where some defendants are released to bail after initially being refused bail by the police and the courts, and others are returned upon committing further offences.

The second limitation is that I was unable to examine a number of other outcomes relevant to an assessment of bail policy, including the effect of bail decisions on sentence length and offending severity, as well as the effect of bail decisions on the likelihood of witness tampering, victim safety, re-offending after finalisation and socioeconomic outcomes. It is worth noting in this context that Dobbie et al. (2018) find that remand adversely affects re-offending post-finalisation and a suite of socioeconomic outcomes. These are all important considerations when framing bail policy.

In summary, the results show that remanding defendants in custody until their matter is determined has a significant incapacitation effect but these benefits come at a significant cost to the correctional system and the individual in terms of an increased likelihood of a prison sentence. Whether these costs outweigh the benefits achieved in terms of reduced offending and absconding is ultimately a political matter. Having said this, there are clearly a number of important empirical issues to be resolved to obtain a full understanding of the impact of bail decisions on both individuals and the criminal justice system.

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## NOTES

1. Bail decisions for defendants who are not bail refused by the police are usually made by courts at the offender's first appearance in court.
2. The average cost of incarceration is estimated to be \$172.80 per day (Corrective Services NSW, 2018).
3. This variable is unconstrained by the finalisation date, and these regressions are run as a yearly panel in order to measure the 'yearly effect'. A significant effect in a combined sample of the Philadelphia and Pittsburgh data was also evident but this result has since been deemed unreliable (Roodman, 2018) as magistrates were not randomly assigned in Pittsburgh.
4. Restricting to bail hearings involving adult defendants after the show cause amendments to the Bail Act (2013) came into effect yields 429,045 hearings. Further excluding those where bail was dispensed with yields 59,914 hearings. Excluding those with the same magistrate at sentencing and those which were dealt with in courts other than the Local and District courts yields 51,706 cases, and restricting it to cases where magistrates made at least 20 decisions in a year yields 42,362 bail decisions. Note that the restriction to cases with different bail and sentencing magistrates did not significantly change the composition of types of cases.
5. Lawparts are maintained by the Judicial Commission of NSW.
6. Unlike Dobbie et al. (2018) crime after finalisation cannot be analysed as most defendants in the sample have insufficient follow-up time to examine re-offending within 12 or 24 months after finalisation.
7. As this is a binary variable, it should be noted that any estimates of the effect of granting bail can simply be reversed to indicate the effect of bail refusal.
8. It should be noted that these are unlikely to change between the bail decision and case disposal, thus making them valid for use in first-stage analyses of the likelihood of bail refusal.
9. While time effects for the finalisation date may impact sentencing, these are not included as they succeed the first bail decision and are thus invalid for inclusion in a model predicting the outcome of a bail decision. Regardless, re-running the main results with these fixed effects included yielded virtually identical estimates.
10. This measure of leniency is calculated over all cases where a bail decision was made (i.e. not dispensed with), rather than calculated within the selected sample. It is also possible to exclude only the index appearance, however, excluding all cases where the magistrate dealt with the index individual helps to account for a potential correlation between multiple bail decisions made by the same magistrate.
11. The residualised rate of release is the probability of release after accounting for court-time fixed effects. It is calculated first by regressing release decisions on the court-year fixed effects and then plotting the residuals in a scatterplot. The local polynomial fitted to the scatterplot is used to depict the residualised rate of release in Figure 1.
12. I report robust standard errors clustered at both the individual and magistrate level.
13. Note that the LATE is robust to this as it simply measures the marginal effect above and beyond existing rates observed among released after accounting for the baseline level of risk among those remanded.
14. The occurrence of failure to appear is relatively low, thus 2SLS may not be suitable (as probabilities are likely close to zero). Bivariate probit models were estimated in light of this. While the rest of the estimates are robust to this, bivariate probit models estimated an average treatment effect of six percentage points for failure to appear.

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## APPENDIX

### RANDOMISATION OF MAGISTRATE ASSIGNMENT

The first test of validity for the IVs is the randomisation test. The purpose of this test is to ensure that particular defendants do not systematically differ in their tendencies to receive more lenient or severe magistrates. This test is implemented by regressing the IV against all observed characteristics and fixed effects and conducting a joint  $F$ -test on the significance of the observed variables. Table A1 presents the results of this test. The coefficients for each of the observed variables on the IV are small, if not close to zero and none are statistically significant. The  $F$ -test of the joint significance of explanatory variables on the IV confirms that magistrate leniency is not correlated with the defendant characteristics.

### RELEVANCE AND MONOTONICITY OF LENIENCY MEASURES

To test for relevance and monotonicity, the first stage regression was conducted on the whole group, and then each subgroup as defined by the control variables. The coefficient of the IV on court release for the whole group and various sub-samples is presented in Table A2. The positive and significant coefficient of the IV for the whole sample confirms the expectation that leniency increases the likelihood of release. Note however that the partial  $F$ -statistic (presented in the main text) is the preferred measure of relevance. The rest of the coefficients are used to test the

Table A1. Regression of magistrate leniency instrumental variable on all observed characteristics

Variable	Coefficient	Standard error	p-value
<b>Age at index contact (continuous)</b>	0.000	0.000	0.242
<b>Age at index contact (relative to 18-24)</b>			
25-34	0.001	0.001	0.344
35-44	0.000	0.002	0.959
45+	-0.001	0.003	0.673
<b>Gender (relative to male)</b>			
Female	0.000	0.001	0.891
<b>Indigenous status (relative to Indigenous)</b>			
Non-Indigenous	0.001	0.001	0.404
Unknown	-0.011	0.009	0.225
<b>Remoteness of postcode of residence (relative to major cities)</b>			
Inner regional	-0.002	0.002	0.107
Outer regional	-0.001	0.002	0.670
Remote/very remote	-0.001	0.003	0.714
<b>Socioeconomic disadvantage quartiles (relative to most disadvantaged)</b>			
Disadvantaged	-0.001	0.001	0.424
Less disadvantaged	0.001	0.001	0.317
Least disadvantaged	0.002	0.001	0.193
<b>Concurrent offences (relative to 1)</b>			
Two or more offences	0.000	0.001	0.946
<b>Violent offences at index charge (relative to 0)</b>			
1	0.001	0.001	0.211
2 or more	0.001	0.002	0.343
<b>Property offences at index charge (relative to 0)</b>			
1	0.001	0.001	0.433
2 or more	0.002	0.002	0.299
<b>Drug offences at index charge (relative to 0)</b>			
1	-0.002	0.002	0.178
2 or more	-0.001	0.003	0.571
<b>Traffic offences at index charge (relative to 0)</b>			
1	-0.003	0.002	0.090
2 or more	0.000	0.003	0.903
<b>Other offences at index charge (relative to 0)</b>			
1	0.003	0.001	0.024
2 or more	0.002	0.002	0.296
<b>Number of prior finalised court appearances with proven offence (relative to 0)</b>			
1-2 prior appearances	0.001	0.001	0.494
3-5 prior appearances	0.003	0.002	0.196
6 or more prior appearances	0.002	0.002	0.478
<b>Number of prior finalised Children's Court appearances with proven offence (relative to 0)</b>			
1-2 prior appearances	-0.002	0.002	0.269
3 or more prior appearances	0.003	0.002	0.129
<b>Prior detention or imprisonment penalties (relative to 0)</b>			
1	0.001	0.001	0.266
2 or more	0.000	0.001	0.734

*Table A1. Regression of magistrate leniency instrumental variable on all observed characteristics (continued)*

Variable	Coefficient	Standard error	p-value
<b>Prior community orders (relative to 0)</b>			
1	0.001	0.001	0.590
2 or more	0.000	0.001	0.757
<b>Prior other penalties (relative to 0)</b>			
1	0.000	0.001	0.822
2 or more	0.001	0.001	0.331
<b>Prior violent offences (relative to 0)</b>			
1	0.000	0.001	0.626
2 or more	0.001	0.001	0.587
<b>Prior property offences (relative to 0)</b>			
1	0.001	0.001	0.183
2 or more	0.002	0.001	0.079
<b>Prior drug offences (relative to 0)</b>			
1	0.000	0.001	0.661
2 or more	-0.001	0.001	0.521
<b>Prior breach offences (relative to 0)</b>			
1	-0.001	0.001	0.263
2 or more	-0.001	0.001	0.318
<b>Prior traffic offences (relative to 0)</b>			
1	-0.003	0.001	0.011
2 or more	-0.002	0.001	0.092
<b>Priors - other offences (relative to 0)</b>			
1	-0.001	0.001	0.496
2 or more	0.001	0.001	0.273
<i>N</i>	33018		
<i>F</i> -statistic	1.186		
<i>p</i> -value	0.179		

monotonicity assumption. This assumption is that the IV should be non-negative across all subgroups. The coefficients for both IVs are positive and significant for the vast majority of subgroups. Thus the IV appears to monotonically increase the probability of release.

### FIRST STAGE REGRESSION

The results of the first-stage regression used in the 2SLS analyses are presented in Table A3. It is a linear probability model predicting the likelihood of being granted bail. As previously mentioned, judge leniency asserts a significant influence on bail outcomes, as judged by the sizable coefficient compared to other factors. Particular demographic factors seem to affect bail outcomes: female defendants were more likely to be granted bail, residing in a disadvantaged area reduced the likelihood of

release, and non-Indigenous defendants were slightly more likely to be released. Unsurprisingly, having more offences at the index charge reduces the likelihood of release, as does having a more extensive criminal history.

*Table A2. Coefficient and significance of magistrate leniency in first-stage regressions of bail refusal for whole sample and subsamples*

Group	Coefficient	p-value
<b>Whole sample</b>	0.79	0.00
<b>Age groups</b>		
18-24	0.81	0.00
25-34	0.85	0.00
35-44	0.75	0.00
45+	0.78	0.00
<b>Gender</b>		
Male	0.81	0.00
Female	0.66	0.00
<b>Indigenous status as recorded by NSW Police for any contact</b>		
Indigenous	0.63	0.00
Non-Indigenous	0.86	0.00
<b>Remoteness of postcode of residence</b>		
Major cities	0.90	0.00
Inner regional	0.62	0.00
Outer regional	0.16	0.48
Remote/very remote	-1.15	0.22
<b>Socioeconomic disadvantage quartiles</b>		
Most disadvantaged	0.84	0.00
Disadvantaged	0.63	0.00
Less disadvantaged	0.75	0.00
Least disadvantaged	0.89	0.00
<b>Concurrent offences</b>		
One offence	0.72	0.00
Two or more offences	0.84	0.00
<b>Violent offences at index charge</b>		
0	0.69	0.00
1 to 2	0.91	0.00
3 or more	0.90	0.00
<b>Property offences at index charge</b>		
0	0.81	0.00
1 to 2	0.87	0.00
3 or more	0.41	0.05
<b>Drug offences at index charge</b>		
0	0.79	0.00
1 to 2	0.72	0.00
3 or more	0.94	0.00
<b>Traffic offences at index charge</b>		
0	0.81	0.00
1 to 2	0.78	0.00
3 or more	0.58	0.05
<b>Other offences at index charge</b>		
0	0.79	0.00
1 to 2	0.89	0.00
3 or more	0.17	0.56

*Table A2. Coefficient and significance of magistrate leniency in first-stage regressions of bail refusal for whole sample and subsamples (continued)*

Group	Coefficient	p-value
<b>Number of prior finalised court appearances with proven offence</b>		
None	0.60	0.00
1-2 prior appearances	0.75	0.00
3-5 prior appearances	0.88	0.00
6 or more prior appearances	0.91	0.00
<b>Number of prior finalised Children’s Court appearances with proven offence</b>		
None	0.79	0.00
1-2 prior appearances	0.82	0.00
3 or more prior appearances	1.01	0.00
<b>Prior detention or imprisonment penalties</b>		
0	0.71	0.00
1	1.06	0.00
2 or more	0.76	0.00
<b>Prior community orders</b>		
0	0.62	0.00
1	0.90	0.00
2 or more	0.92	0.00
<b>Prior other penalties</b>		
0	0.68	0.00
1	0.78	0.00
2 or more	0.88	0.00
<b>Prior violent offences</b>		
0	0.67	0.00
1	0.92	0.00
2 or more	0.90	0.00
<b>Prior property offences</b>		
0	0.76	0.00
1	0.94	0.00
2 or more	0.82	0.00
<b>Prior drug offences</b>		
0	0.76	0.00
1	0.86	0.00
2 or more	0.96	0.00
<b>Prior breach offences</b>		
0	0.67	0.00
1	0.85	0.00
2 or more	0.90	0.00
<b>Prior traffic offences</b>		
0	0.77	0.00
1	0.94	0.00
2 or more	0.69	0.00
<b>Priors - other offences</b>		
0	0.79	0.00
1	0.76	0.00
2 or more	0.84	0.00

Note. All variables in Table 1 excluding bail status at finalisation are used as control variables.  
 Fixed effects used are court, offence, and time fixed effects  
 Robust standard errors are clustered at the defendant-magistrate level.

Table A3. First-stage estimates of the probability of being granted bail

Variable	Coefficient	Standard error	p-value
Measure of judge leniency	0.791	0.046	0.000
Age at index contact (continuous)	0.000	0.001	0.915
<b>Age at index contact (relative to 18-24)</b>			
25-34	-0.043	0.010	0.000
35-44	-0.045	0.015	0.003
45+	-0.040	0.023	0.083
<b>Gender (relative to male)</b>			
Female	0.089	0.008	0.000
<b>Indigenous status (relative to Indigenous)</b>			
Non-Indigenous	0.013	0.006	0.036
Unknown	0.150	0.053	0.005
<b>Remoteness of postcode of residence (relative to major cities)</b>			
Inner regional	0.001	0.011	0.927
Outer regional	-0.005	0.018	0.758
Remote/very remote	0.024	0.032	0.462
<b>Socioeconomic disadvantage quartiles (relative to most disadvantaged)</b>			
Disadvantaged	-0.003	0.007	0.669
Less disadvantaged	0.016	0.008	0.058
Least disadvantaged	0.028	0.010	0.003
<b>Concurrent offences (relative to 1)</b>			
Two or more offences	-0.013	0.007	0.065
<b>Violent offences at index charge (relative to 0)</b>			
1 to 2	-0.038	0.009	0.000
3 or more	-0.072	0.012	0.000
<b>Property offences at index charge (relative to 0)</b>			
1 to 2	-0.023	0.008	0.002
3 or more	-0.055	0.014	0.000
<b>Drug offences at index charge (relative to 0)</b>			
1 to 2	-0.022	0.012	0.065
3 or more	-0.025	0.019	0.198
<b>Traffic offences at index charge (relative to 0)</b>			
1 to 2	-0.077	0.015	0.000
3 or more	-0.063	0.019	0.001
<b>Other offences at index charge (relative to 0)</b>			
1 to 2	-0.009	0.001	0.281
3 or more	-0.005	0.018	0.003
<b>Number of prior finalised court appearances with proven offence (relative to 0)</b>			
1-2 prior appearances	-0.024	0.011	0.032
3-5 prior appearances	-0.045	0.015	0.002
6 or more prior appearances	-0.045	0.019	0.018

Table A3. First-stage estimates of the probability of being granted bail (continued)

Variable	Coefficient	Standard error	p-value
<b>Number of prior finalised Children's Court appearances with proven offence (relative to 0)</b>			
1-2 prior appearances	0.020	0.015	0.170
3 or more prior appearances	0.018	0.016	0.285
<b>Prior detention or imprisonment penalties (relative to 0)</b>			
1	-0.128	0.008	0.000
2 or more	-0.183	0.010	0.000
<b>Prior community orders (relative to 0)</b>			
1	-0.001	0.009	0.874
2 or more	-0.022	0.008	0.009
<b>Prior other penalties (relative to 0)</b>			
1	0.030	0.009	0.001
2 or more	0.037	0.010	0.000
<b>Prior violent offences (relative to 0)</b>			
1	-0.005	0.007	0.475
2 or more	-0.035	0.009	0.000
<b>Prior property offences (relative to 0)</b>			
1	-0.015	0.008	0.059
2 or more	-0.011	0.010	0.234
<b>Prior drug offences (relative to 0)</b>			
1	0.004	0.007	0.535
2 or more	0.002	0.010	0.870
<b>Prior breach offences (relative to 0)</b>			
1	-0.022	0.008	0.004
2 or more	-0.044	0.009	0.000
<b>Prior traffic offences (relative to 0)</b>			
1	-0.007	0.008	0.356
2 or more	0.012	0.010	0.214
<b>Priors - other offences (relative to 0)</b>			
1	-0.003	0.007	0.641
2 or more	-0.019	0.009	0.037
<i>N</i>	33018		
<i>F</i> -statistic	53.68		
<i>p</i> -value	0.000		

Note. All specifications estimated with court-by-year, offence, month of bail hearing and day of week of bail hearing fixed effects and robust standard errors clustered at the defendant-magistrate level.

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