Digital Society (2025) 4:48
https://doi.org/10.1007/s44206-025-00194-7

ORIGINAL PAPER

Smart Justice? Making Sense of the Rise of Algorithm-Based Pre-trial Risk Assessment in Criminal Justice Through 'Legal Models'

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Received: 30 August 2024 / Accepted: 16 April 2025

Abstract
With the increased use of algorithmic tools embedded in software by state actors, scholars from criminology, criminal justice as well as from data science have analyzed the recent wave of 'smart-on-crime'-politics in the US and the political dynamics underpinning this movement. However, while reforms of the US bail system have been studied extensively, we know little about how these reforms, including the recent embrace of digital risk prediction tools, reflect shifting commitments to underlying principles of the CJ system. Therefore, this article interprets the waves of US bail reforms through the application of three legal-theoretical models: 'retributive justice' (RJ), 'actuarial justice' (AJ) and 'preventive justice' (PJ). This conceptual lens enables us to illuminate how the increased use of pre-trial risk assessment tools based on big data can be understood in legal-theoretical terms. Empirically, we find a shift away from censure and retribution towards crime prevention and the use of risk assessment tools, which both AJ and PJ models can accommodate. However, while our analysis demonstrates that these models help draw into sharper focus the principles and values which animated US bail reforms, it also reveals several limitations owing to the nature of these models as witnesses of the time when they were developed.

Keywords Bail reform · Criminal justice · Risk assessment · Algorithmic · Legal models

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Published online: 11 June 2025

1 Introduction

Risk assessment tools based on algorithms have been called 'the new silver bullet of criminal justice reform', because 'they promise to decrease pretrial detention, increase the number of people on probation and parole, and lower the number of incarcerated people—that is, to do more good at less cost' (Feeley, 2018: 690) – features that politicians and lobbyists often describe as 'smart' (e.g. 'smart on crime' (Harris, 2009) or 'smart justice' (see the "Sentencing Project" or the American Civil Liberties Union (ACLU))). As part of a more general debate about the use of 'evidence' in algorithmic systems used by the state (Yeung, 2022; Pruss, 2021), academic, researchers have spilled much ink on the pros and cons of using of algorithms in Criminal Justice ('CJ') in the US (Altheide & Coyle, 2006; Berk, 2017; Fairfax, 2010; Kehl et al., 2017), the political dynamics underpinning their adoption (Dagan & Teles, 2016; Green, 2015; Wenzelburger, 2025; Wenzelburger & König, 2022), their ethical dimensions (Barabas, 2020; Mittelstadt et al., 2016; Tsamados et al., 2022), possible mechanisms to ensure an (allegedly) ethical use of such tools and systems (Donia & Shaw, 2021; Jobin et al., 2019; Segal et al., 2021) and pitfalls for their implementation in public administration (Haeri et al., 2022).

All this work is important, particularly when evaulating the use of these systems in practice. Yet we lack a clear understanding about what is conceptually *new* about these so-called 'smart' tools when considered in their historical context (but Percival, 2016). We still know too little about how these reforms reflect shifting commitments to various underlying principles that inform the CJ system over time, and to what extent those shifts are borne out in empirical reality. Accordingly, this paper asks *how can the recent 'smart-on-crime' wave in the US be interpreted from a broader legal-theoretical perspective when viewed in the context of the last 50 years*? We focus on bail reforms and pre-trial risk assessments, as the sharp end of CJ systems, and is one of the most sensitive touchpoints for human rights, particularly the right to liberty and the presumption of innocence, because defendants are still awaiting trial when these assessments are made to inform bail decision-making (Baradaran, 2011).[1]

To this end, our analysis draws on 'legal models' of the CJ system developed by legal and criminological theorists which attempt to capture important values and principles that animate the nature, scope and operation of the CJ system, proceeding in four parts. In Part I, we examine three models which offer the greatest promise as analytical vehicles for deepening our understanding of US bail reform over time, namely those of (a) retributive justice (Packer, 1964), (b) actuarial justice (AJ) (Feeley, 1983; Feeley & Simon, 1992) and (c) preventive justice (PJ) (Ashworth & Zedner, 2014). Each model is outlined, beginning with Herbert Packer's seminal work, who based his analysis on what we call a conventional 'retributive' justice model albeit in two distinct 'flavours': the 'crime control model' with its concern to prioritise efficiency in processing individual defendants, and the 'due process' model,

[1] Scholars have produced rich empirical accounts of bail reforms (Altheide & Coyle, 2006; Berk, 2021; Eckhouse et al., 2019; Fairfax, 2010), analyzed their underlying political dynamics (Dagan & Teles, 2016; Green, 2015; Wenzelburger & König, 2022), and investigated the alleged tension between the use of statistical tools and the principle of individualised justice and (Binns, 2022). It is also to this work that the article will make a significant theoretical and conceptual contributions.

which prioritises accuracy and integrity in CJ decision-making concerning individuals. Packer's models are then contrasted with the AJ model developed primarily by criminologists writing throughout the 1990s (Feeley & Simon, 1992), and the 'preventive justice' model (Ashworth & Zedner, 2014), proposed by legal scholars and criminologists originating in the late 1990s and becoming more developed in the decade following the millenium.

In Part II, we trace the trajectory of US bail reform from the 1960s onwards, highlighting their policy drivers and accompanying legal changes across three 'waves' of reform (see also Baughman 2018). These begin with (a) precursors to the 1966 bail reform intended to eliminate inequalities produced by the prevailing money bail system, followed by (b) the 'tough on crime' era, when preventive detention was meted out by default, and finally (c) the most recent 'smart' reforms through increasing reliance on statistical risk assessment tools, particularly those created through the application of machine learning techniques (or 'artificial intelligence') and typically embedded into convenient digital tools for front-line users. In Part III, we consider the extent to which the three models illuminate each wave of bail reform in light of empirical data. Our analysis is animated by three questions. First, can the retributive, actuarial and preventive models of CJ help us understand US bail reform over the last 50 years? Secondly, what does an attempt to apply these models to US bail reform reveal about their similarities, differences and comparative strengths, and their relationship to each other? Thirdly, are these models still analytically useful, or are new models needed, including perhaps a model of 'smart justice'?

Our interdisciplinary analysis, combining normative legal critique with empirical insights over a longer historical frame, demonstrates that legal-theoretical models of the CJ system can illuminate shifts in the role and emphasis of foundational norms and values that animate the architecture and operation of the CJ system. Yet we also show how the models are themselves limited, due to variation in their intended purpose and the particular interests and preoccupations of the scholars who construct them. Accordingly, we argue that these models need to be understood within the specific political and cultural context from which they emerged through which their authors sought to make sense of and critically reflect upon, which these models sought to capture and explain. Through these insights, we evaluate the most recent 'smart on crime'wave, seeking to identify the extent to which they reflect a significant shift in underlying principles from a legal-theoretical perspective. From our perspective it is crucial to more closely investigate how certain changes in empirical reality, e.g. the increased use of algorithmic systems in CJ, can be understood against broader principles of legal theory – a point that was recently reiterated by Pruss (2021) who sees a risk of domain distortion in how the use of algorithms in CJ as a 'value-free' technology is currently discussed (Pruss, 2021, 1107).

2 Legal-Theoretical 'Models' of the Criminal Justice Process

Before considering whether the recent rise of algorithm-based pre-trial risk assessment tools marks a major departure from the historical trajectory of the US CJ system justifying a new monika, such as 'smart justice', this section begins by laying out a

theoretical framework against which these changes – as well as preceding reforms – can be evaluated. We will present three legal-theoretical 'models' in a chronological order, namely Packer's retributive justice model (1964), 'actuarial justice' as proposed by Feeley and Simon (1992) and the preventive justice model by Ashworth and Zedner (2014).

2.1 Packer's Retributive Justice Models: 'Due Process' Vs 'Crime Control'

To explain what we mean by a 'legal-theoretical model', we begin with Herbert Packer's seminal paper (Packer, 1964). Packer developed two heuristic 'models' of the CJ processes: the 'crime control' model, and the 'due process' model, each based on separate value systems that 'compete for attention in the operation of the criminal process'. Each model represents two poles on a spectrum of choices available to public authorities and within which CJ procedures can be situated, encapsulating the 'normative antimony' that runs deep in the life of the criminal law, resulting in processes which, in their day-to-day functioning, involve a constant series of minute adjustments between competing demands of two value systems (Packer, 1964: 5). The 'crime control' model prioritises 'the efficiency with which the process operates to screen suspects, determine guilt and secure appropriate dispositions' of suspects (Packer, 1964: 9) thus placing a premium on the speed of apprehending and convicting individuals while minimising occasions for challenge by suspects. According to this model, the most important function performed by the CJ process is the repression of criminal conduct (Packer, 1964: 9–10). In contrast, Packer's 'due process' model posits that the criminal process should be an 'obstacle course', not an assembly line. Like the crime control model, it also recognises the importance of reducing crime and protecting the public from harms caused by crime, yet the due process model's primary function is to impose 'formidable impediments to carrying the accused any further along in the process' (Packer, 1964: 13–14). Given that loss of liberty is the heaviest deprivation the state can inflict on the individual, the aim of the due process model is to slow down the process through the imposition of 'quality control' safeguards, aimed at securing accurate fact-finding, the prevention and limitation of mistakes, the prevention of abuses of power, and respect for the rights of the accused (including rights to the presumption of innocence, equality of arms and legal counsel) while maintaining scepticism about the utility and morality of the criminal sanction (Packer, 1964: 16–21).

Packer's models enables normative appraisal of both the system as a whole and distinctive powers and practices that occur throughout the CJ system, in terms of their capacity to serve various substantive goals ascribed to specific processes (Packer, 1964: 5). These models also facilitate empirical enquiry into whether the system gives effect to the primary goals and objectives ascribed to it, although Packer himself does not engage in systematic empirical inquiry, confining his observations to trends indicating that, at the time of writing in the mid 1960s as the civil rights movement in the US was just getting underway, the momentum and direction of travel was clearly directed towards the due process model. What unites both Packer's 'crime control' and 'due process' models, however, is that they both proceed on the assumption that the primary goal of the criminal process is to determine whether an individ-

ual defendant should be convicted for the *past* commission of a crime and punished accordingly, and which we therefore refer to collectively as rooted in a 'retributive justice' model of the CJ system.

2.2 Actuarial Justice and the Turn to Statistical Risk Assessment

More than two decades after Packer's paper was published, several criminologists turned their attention to the growing use of statistical tools that purported to generate predictions about the future behaviour of individuals. According to the 'actuarial justice' (AJ) model (which its leading proponents (Feeley & Simon, 1992) also refer to as the 'New Penology') the management of risks within the CJ system, achieved by the *selective incapacitation* of individuals, informed by statistical and actuarial predictions, is prioritised over and above other CJ values and goals, including rehabilitation (transformation of individuals), retribution (directed punishment for the commission of a moral wrong) and deterrence (setting incentives typically in the form of punishment for crime to prompt behavioural change by those who might be tempted to engage in crimal conduct). They highlighted how statistical techniques are employed to predict past, present, and future criminal behaviour, based on a person's shared characteristics with other members of the 'population group' who had previously committed a crime, and to administer a CJ outcome on the basis of probabilistic estimations of future offending. Feeley and Simon argued that the embrace of AJ was reflected in changes to the focus, procedures and logics of the CJ system, including a movement away from an individualised model of CJ focused on the determination of the guilt of the individual in which matters of due process and fair procedure were emphasised, to an aggregated and future-oriented model that emphasised the systemic efficiency of decision-making (Yeung, 2018: 511–512).

To the extent that the AJ model sought to enhance administrative efficiency, it had considerable affinity with Packer's 'crime control' model. Unlike the former, however, it emphasised the central role of *risk*, which was assuming a growing role across many areas of public administration. As such, it was *future*-directed, concerned primarily with the prediction and prevention of risky criminal behaviours that might result in wrongful harm to others, rather than with addressing historic crimes. Accordingly, its central preoccupation was with 'crime control' and 'offender mangement' strategies, departing from the 'rehabilitative ideal' that characterised the post-war penal welfarist consensus up until the early 1970s (Garland, 2001). As an analytical framework, however, the AJ model was limited in two respects. Firstly, it focused on statistical techniques, tools and technologies used within the criminal process, rather specifying the substantive policy goals or underpinning values these techniques were intended to serve, other than enhancing administrative efficiency generally. Stanley Cohen offers the clearest statement of the model's substantive purpose, namely not to transform the individual, but to 'neutralise' (Cohen, 1985) the individual's risk of re-offending to minimise harm and reduce resource expenditure. Hence, crime is seen primarily as a technical problem within a set of processes and procedures concerned with the pursuit of systemic efficiency and 'rationality' offering a 'scientific' and 'objective' approach to decision-making through reliance on statistical risk assessment techniques (Feeley & Simon, 1994).

Yet the model does not clarify how the aim of 'neutralising risk' translates into particular substantive *interventions*. By emphasising risk management techniques untethered to any substantive CJ goals and values, this dilutes the power of AJ as an analytical model for describing and offering a touchstone for normative evaluation of specific intiatives. Secondly, the preponderance of AJ scholarship made general claims about the rationalities and logics associated with the turn towards risk management techniques in CJ contexts, but offered relatively little by way of engagement with specific programmes or real-world practices, programmes and CJ interventions.[2] Without extensive engagement with real-world 'use cases' this limits the analytical power of AJ model to deepen understanding of real-world CJ policies and practices.

2.3 Preventive Justice and Dangerousness

Preventive justice ('PJ') models of the CJ system are rooted in the goal of 'wrongful harm prevention' which serves as the critical touchstone for characterising measures and interventions falling within its scope. Although academic interest in the use of preventive measures grew throughout the 1990s as many Western democracies began to implement preventive measures on a programmatic basis (Roberts & Grossman, 1990; Hughes, 1998; Streiker 1998; Carvalho, 2017), the first major, sustained theoretical account of PJ was propounded by Ashworth and Zedner in 2014, building on the work of Carol Streiker (Streiker, 1998). They describe PJ as a 'conceptual tool that aims to identify significant developments in CJ and to deepen our understanding of them' as well as a 'descriptive device' that identifies apparently diverse 'laws, measures, policies and practices' that share a common justification and purpose in seeking to enhance security, public safety or public protection by minimising risks and forestalling wrongful harms, rather than to censure the person subjected to the measure (Ashworth & Zedner, 2014: 21).

Ashworth and Zedner (2014) focus on coercive measures, namely, those 'intended to impose sufficient pressure on a person to force or make that person act in a certain way' (Ashworth & Zedner, 2014: 6). Well-known examples introduced in many parts of the CJ system in Western nations[3] include anti-terrorism measures entailing the deprivation of liberty of suspected terrorists to prevent them from committing attacks (Janus, 2004), anti-social behavior orders that prohibit persons to go to certain places (Ramsay, 2012), or preventive offenses, such as criminal conspiracy or attempt (Ashworth & Zedner, 2014, Chap. 5). Because the preventive aim of these measures operates in 'acute tension' with respect for the agency and freedom of the individual which underpin the liberal criminal law, Ashworth and Zedner argue for principled limits that mediate between these goals in a manner consistent with the constitutional principles of liberal democratic orders. Accordingly, they formulate a series of guiding principles which they argue should inform and constrain the use of such measures (and which they later developed in a critical literature review Ashworth & Zedner, 2019), drawing attention to both the remoteness and gravity of the

[2] Although there are exceptions, for example Stevenson (2018); Hannah-Moffatt (2015) Maurutto and Hannah-Moffat (2007); Feeley (1983).

[3] See for example, a special issue on preventive justice edited by Duff (2015) and Ashworth et al. (2013)

crimes to be prevented, on the one hand, and the impact of the proposed coercive measure exerted upon an individual, on the other. Measures which interfere with an individual's liberty for the sake of prevention – e.g. in the case of pre-trial preventive detention – must be subject to particularly powerful limits and restrictions (Ashworth & Zedner, 2014: 259–260) including what they refer to as the 'principle of the least restrictive appropriate alternative.' (Ashworth & Zedner, 2014: 259).

Common to all coercive preventive measures, they argue, is the need to assess the 'potential harm' that can be done by an individual to society against which restrictions must be weighed. Although Ashworth and Zedner highlight the role of risk assessment within the preventive endeavour, arguing for contestability in the assessment of an individual's future dangerousness as a precondition for justifying the imposition of preventive measures (particularly restrictions on individual rights), they make no attempt to evaluate how such assessments are, or should, be carried out.[4] In relation to preventive detention, for example, they confine themselves to the following guidance:

> Any judgement of dangerousness in this context must be approached with strong caution. It should be a judgement of this person as an individual, not simply as a member of a group with certain characteristics and with an overall probability rating. The state should bear the burden of proving that the person presents a significant risk of serious harm to others and the required level of risk should vary according to the seriousness of the predicted harm. Decision-makers should bear in mind the contestability of judgements of dangerousness and the scope for interpretation that they leave and individuals should have rights of challenge and appeal (Ashworth & Zedner, 2014: 169).

Given the central role they ascribe to assessments of an individual's dangerousness as a necessary pre-condition for imposing coercive preventive measures, it is surprising that Ashworth and Zedner devote so little attention to the calculative and evidential basis upon which these risk assessments are produced. AJ scholars tended to sidestep attempts to identify its underpinning substantive goal by focusing instead on the procedural goal of enhancing systemtic efficiency, but Ashworth and Zedner's account of PJ avoids an in-depth interrogation of the calculative logics, processes, data sources and organisational procedures through which risk assessments are generated. They do, however, offer a thorough account of specific preventive measures in use within the contemporary CJ system in England and Wales, offering 'use cases' that demonstrate how the PJ model can be applied to specific CJ measures and practices, serving as an an analytical framework to aid understanding and establish normative limits to their acceptable use.

[4] In Ashworth and Zedner (2014) Chap. 6 (entitled 'Risk Assessment and the Preventive Role of the Criminal Court') focuses primarily on the role of risk assessment. But rather than interrogating how risk assessment is conducted, it examines the labelling of individuals following such assessments and the difficulties faced by a clinical expert who may be asked to provide the court with assessments of an individual's risk.

3 From 'Flight Risk' to 'Recidivism Risk': Data, Predictions and Risk Assessments in US Bail Reforms

To what extent does the recent data-driven wave toward 'smart justice' constitute a major departure from existing practices in the US bail system? To answer this question, this section offers an historical overview of the trajectory of reform (see also Baughman 2018), analysing the main developments through the legal models presented above. This tracing of the policy drivers and accompanying changes to the legal basis and underpinnings of pre-trial custodial treatment of arrested individuals at federal and state levels from the 1960s onwards allows us to identify precursors of the recent reforms and examine the extent to which current 'smart justice' reforms represent a substantial shift in the underlying principles of the CJ system encapsulated by the three legal models described above.

We begin with the foundational and historically entrenched principle of Anglo-American law that every person has a right not to be detained without being brought before an appropriate legal authority (e.g. a judge) and to be released on bail until the commencement of trial. It reflects the basic presumption that a person is innocent unless and until convicted of a criminal offence in accordance with the due process of law. Since the 17th century, granting bail was the norm in US criminal practice, at least for non-capital cases (Carbone, 1983: 530). The only valid purpose of setting money bail (that is, to require the defendant to lodge a stipulated sum of money to the court as a condition of release pending trial) was to ensure the defendant's presence at trial.

However, the setting of money bail became a source of injustice in the late 19th century, when the commercial bail industry started to flourish following the 1872 US Supreme Court decision *Taylor vs. Taintor*, which 'recognized the common-law right of bail bondsmen and their agents to arrest persons for whom they have undertaken bail at any time during the existence of their relationship without resort to any new judicial process' (Barsumian, 1998: 878). This allowed these businessmen who loaned funds to a (mostly poor) defendant to post their bail ('bail bondsmen') to recapture those who failed to appear at trial via their 'bounty hunters'. Together with an enlargement of capital offences eligible for bail, *Taylor* facilitated a lucrative business model allowing bondsmen to charge defendants a bail bond 'premium' or a fee as an exchange for their service (Dabney et al., 2017; Fisher, 2009). Bail bonding most likely emerged in the late 19th century, conceived by two San Franciso lawyers (Schnacke et al., 2010: 7), becoming a booming industry by the early 20th century as the number of defendants increased and money bail was set at increasingly high levels.

3.1 First-Wave Reforms: The VERA Scale and Beyond

By the 1960s, the bail system – with its extensive reliance on money bail – had become dysfunctional. First, the setting of money bail created social injustice because poor defendants could not afford the amounts required. Consequently, wealth determined whether defendants could avail themselves of their basic rights to due process, including the presumption of innocence, resulting in 'wealth-based pretrial incar-

ceration' (Van Brunt & Bowman, 2018: 723). Secondly, money bail was sometimes set extremely high, effectively ensuring that defendants would remain in custody awaiting trial, particularly when the judge considered a defendant a danger to public safety (Mayson, 2018: 503). This 'sub rosa' detention was widely used, effectively undercutting the defendant's rights to due process and the presumption of innocence (Goldkamp, 1983: 1559) by linking the bail decision to a judge's informal forecast of the defendant's future behavior (see also: Sommerer, 2018). Thirdly, the growth of the bail bond industry created new injustices as bail bondsmen took commercial advantage of poor defendants. With preventive detention as the alternative, poor defendants willingly paid premia to bondsmen in exchange for a loan to cover the stipulated bail amount (Dabney et al., 2017).

These deficiencies provoked pushback within the legal system and from civil society activists during the 1950s and 1960s. In *Stack vs. Boyle*, the Supreme Court clarified in 1951 that excessive bail was unconstitutional under the Eighth Amendment and held that bail should be set at an amount to assure the presence of the defendant at court.[5] During that time, various 'bail projects' emerged to tackle these injustices. Some gathered systematic empirical information about defendants and pinpointed social and racial inequalities generated by the system (e.g. Foote's project in Philadelphia (Foote, 1954)). Other more applied initiatives sought to reduce the wealth-bias in pre-trial bail decisions. Chief among them was the Vera Foundation's 'Manhattan Bail Project' which entailed gathering information about defendants' community ties to predict their likelihood of appearing at trial (Kohler, 1962). A controlled experiment found that these estimates were impressively accurate at predicting who would appear at trial, only failing in 1.6% of all cases (Kohler, 1962; LaHoud, 1981). Based on this research, the Vera Institute developed a 40-item 'scale of rootlessness' – a simple instrument to assess the chances of a defendant failing to appear at trial based on a number of background characteristics taken to reflect a defendant's 'community ties' (e.g. whether the defendant was married, had children, had stable employment, was a member of a union, had savings or debts, had been arrested before, etc. (Roberts, 2009: 57)) – probably, one of the first historic attempts to develop a 'risk assessment tool' for an individual's likelihood of appearing at trial (Makowiecki, 2015; VanNostrand & Lowenkamp, 2013).

The 1966 Federal Bail Reform Act illustrated the relevance of the movement. Inspired by discussions at the 1964 National Conference on Bail and Criminal Justice, it provided that 'all persons, regardless of their financial status, shall not needlessly be detained, pending their appearance to answer charges, to testify, or pending appeal, when detention serves neither the ends of justice nor the public interest'.[6] It maintained the clause that all non-capital defendants should obtain bail. It included a provision for setting money bail in case of flight risk (Gouldin, 2017: 845), and allowed judges to weigh evidence against defendants when deciding about their

[5] "The modern practice of requiring a bail bond or the deposit of a sum of money subject to forfeiture serves as an additional assurance of the presence of an accused. Bail set at a figure higher than an amount reasonably calculated to fulfill this purpose is 'excessive' under the Eighth Amendment." (Stack v. Boyle, 342 U.S. 5 (1951).

[6] See Bail Reform Act of 1966, Pub. L. No. 89–465, 80 Stat. 214 (1966).

release, such as their physical and mental condition, family and community ties, employment, criminal history or financial resources (Baradaran, 2011: 740–741; Makowiecki, 2015: 19). These reforms were intended to reduce the use of money bail in pre-trial custody decisions and regarded as a progressive step. It also paved the way toward the Speedy Trial Act of 1974 which allowed pre-trial service agencies to gather data on defendants and recommend release conditions to inform the weighing of evidence instead of simply setting money bail (Makowiecki, 2015: 19).

How can we interpret these changes against the three legal-theoretical models? With respect to the core concern of the 'first wave' reforms to address injustices of the money bail system by allowing the weighing of evidence about defendants (e.g. their community ties), none of the three legal-theoretical models of CJ discussed above help explain these progressive reforms. Although indicators that assess a defendant's 'community ties' and thereby 'flight risk' allow simple risk assessments, the actuarial justice model was predicated on a concern to incarcerate those identified as a threat to public safety, justifying the public resources needed to hold them in prison. In contrast, concerns about 'flight risk' are primarily related with due process, to help ensure that those who have committed criminal offences are duly brought to trial, convicted and punished accordingly.

Furthermore, none of these models consider the defendant's socio-economic position. Although both the AJ and the 'crime control' variant of Packer's retributive justice models are concerned with the CJ systems' efficiency, they seek to minimise the use of public resources devoted to maintaining the CJ system, rather than social-economic inequalities generated by the unjust detention of defendants who cannot afford bail. This, in turn, highlights how a commitment to 'equality before the law' encapsulated by contemporary understandings of the rule of law is reflected on the construction of legal-theoretical models within academic scholarship which typically fail to account substantive injustice rooted to deeper structural inequalities affecting those who encounter the CJ system.

3.2 Second-Wave Reforms: Dangerousness as a Legal Criterion for Pre-Trial Custody

Originally, allowing the weighing of evidence by judges at the pre-trial stage was intended to reduce the use of money bail. Yet by authorising judges to consider additional 'risk factors' that need not be linked to the defendant's likelihood of failing to appear at trial, the 1966 Bail Reform Act opened a Pandora's box. As Baradaran (2011: 740–741) notes:

> While the Act favored release and, by some estimates, increased the release rate of federal defendants by as much as 40%, it inadvertently paved the way for limits on defendants' release rights. In defending the 1966 Act, the Department of Justice made it clear that the presumption of innocence would have no application pretrial as it was purely a rule of "evidence." With a declining emphasis on the presumption of innocence and courts now possessing more discretion in pretrial decisions, the 1966 Act paved the way for courts to consider additional factors, besides flight risk, in deciding whether to release someone on

bail. Given this increased discretion, the 1966 Act also led to public scrutiny of violent crimes by people released pretrial. This scrutiny led to some jurisdictions enacting laws that permitted judges to consider the dangerousness of the defendant, even though the 1966 Act expressly prohibited such considerations.

The first state to explicitly allow judges to detain in custody persons charged with a 'certain limited categories of non-capital defendants on grounds of dangerousness' (Rauh & Silbert, 1970: 289) was the District of Columbia (Court Reform and Criminal Procedure Act of 1970). These categories included (1) a list of 'dangerous crimes' (e.g. robbery) and (2) a list of 'violent crimes' which allowed pre-trial detention of defendants with a criminal record. Moreover, defendants who threaten, injure, intimidate or attempt to threaten, injure, or intimidate any prospective witness or juror could also be ordered to remain in pre-trial detention (Rauh & Silbert, 1970: 293). However, several specific due process protections in the decision-making process were included, such as the right to a hearing and to legal counsel.

The motives underpinning this reform were political and fundamentally different from those motivating the 1966 Act and marked the beginning of the Nixon Administration's new 'tough on crime' agenda (Wiseman, 2009: 139). With the Republicans successfully politicising high violent crime rates to garner favour with the electorate (Simon, 2007; Tonry, 2004) and the end of the liberal idea of 'penal welfarism' (Garland, 2001), pre-trial release of defendants came under attack for threatening public safety, prompting politicians to call for the introducton of dangerousness as a legal ground for pre-trial detention, in addition to flight risk (Howard, 1989: 645).

More than a decade later, the conferral of legal authority allowing a defendant to be detained pending trial on grounds of dangerousness (along with flight risk) was introduced at the federal level with the Bail Reform Act of 1984.[7] It identified four options for judges in making bail decisions, either to: '(1) release the defendant on personal recognizance or unsecured bail; (2) release the defendant on conditions; (3) temporarily detain the defendant under certain circumstances; or (4) detain the defendant entirely in court' (Van Brunt & Bowman, 2018: 734). These provisions authorised the continued detention of a defendant pending trial if that person posed a threat to the 'safety of any person or of the community'.

The constitutional validity of the Bail Reform Act provoked intense legal debate (Alschuler, 1986; Howard, 1989; Natalini, 1985) which was eventually resolved by the Supreme Court. In *United States vs. Salerno and Cafaro* the Court ruled that the 'dangerousness clause' was not 'facially unconstitutional' (a U.S. legal term used to refer to statute, or component of a statute, alleged by the plaintiff to be unconstitutional in all instances) on the basis that pre-trial detention was intended to 'manage risks rather than punish' and did not therefore require the same level of procedural protection as other forms of penal detention, nor did it violate the constitutional right to due process (for an interpretation of the full argument, see e.g. Youtt, 1988: 817–820). Since then, legal debates concerning the inclusion of dangerousness have

[7] In law practice, assessing the potential dangerousness of a defendant was not a new phenomenon and mostly done by setting extremely high money bail (see above and also Gouldin (2017) or Kalhous & Meringolo (2012).

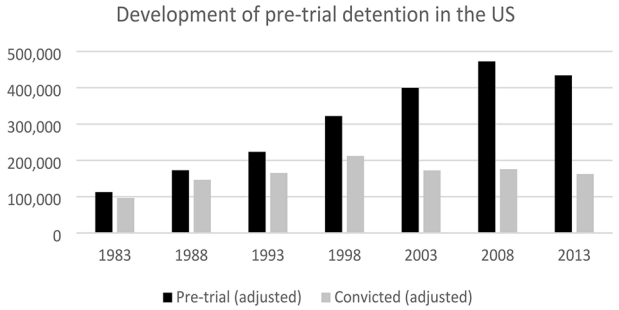

Fig. 1 Pre-trial detention in the US. Note: Source: https://www.prisonpolicy.org/reports/jailsovertime_table_1.html

been effectively settled with many state legislatures following the federal example by including dangerousness as criterion for bail decisions in state legislation (Goldkamp, 1985; Youtt, 1988).

In sum, the 1984 Act marked a significant departure from the existing legal grounds for pre-trial detention based on 'flight risk' by placing a stronger emphasis on 'dangerousness' while the principle of granting bail for non-capital offenders was no longer the default option (Wiseman, 2009). It also marked a turning point in CJ practice as the use of risk assessments in pre-trial decision-making, in vogue throughout the 1960s, fell out of fashion as public safety became the central preoccupation of public discourse (Garrett & Monahan, 2020: 448; Tonry, 2019). Although risk assessment tools remained in use throughout *post*-trial decision-making (Gottfredson & Gottfredson, 1980) with some local pre-trial services continuing to rely on risk scales, the 'new statutes and constitutional provisions gave judges broad range to decide who was and was not dangerous, and to impose detention based on those judgments' (Van Brunt & Bowman, 2018: 738). In this political climate, pre-trial detention on the grounds of dangerousness was increasingly used *alongside* money bail, which was still commonly imposed. Thus, despite progress made in the 1960s through the use of evidence to reduce bias and discrimination against those who could not afford bail and were thus deprived of it, the 1980s reforms reintroduced substantial judicial discretion which, paired with the tough-on-crime culture, resulted in pre-trial incarceration as the default strategy (Garrett, 2022). This is also reflected in Fig. 1, which shows that the number of defendants detained pre-trial increased sharply after 1983 for more than 20 years, before declining between 2008 and 2013 – but still remaining at high levels.

From the perspective of legal models, the 'second wave' bail reforms appear consistent with both the AJ model and the PJ model, which share several common features. Both models rely on risk assessment through which the 'dangerousness' of an individual defendant can be evaluated; both are future-oriented rather than concerned primarily with retribution; neither model is concerned with defendant 'rehabilitation'; and although both models have focused on state incarceration as the substantive intervention applied to those assessed as 'high risk', including pre-trial detention, both provide scope for a wider range of interventions, provided that they comport with the models' overarching goals.

However, there are significant differences between these models which an analysis of US bail reforms does not bring to light, rooted in differences in their aims and orientation. On Feeley and Simon's account, AJ seeks to rationalise the management of 'risks' posed by individuals identified as dangerous who come into contact with the CJ system to enhance system-wide efficiency. Like the PJ model, the AJ model is also concerned with protecting 'public safety and security' for those assessed as 'high risk'. However, for those assessed as 'low' risk, the goal of efficient system administration suggests that prevention by incarceration would be an unduly costly intervention and best reserved for those who pose the greatest threat to public order. Instead, an AJ model would favour the imposition of other, cheaper interventions that could reasonably be expected to 'neutralise' the offender (through, for example, release on condition that they wear an electronic geolocation tag). In other words, the most 'efficient' system-wide strategy will not always entail the prevention of future crime, given that the costs of 'incapacitation' or other forms of 'neutralisation' may not be an efficient response to low levels of risk associated with a given defendant.

In contrast, the PJ model developed by Ashworth and Zedner (2014) is preventive in its ambition, and its very scope is defined by the goal of preventing those deemed 'dangerous' from committing crimes in future, rooted in the state's duty to protect public safety. Although Ashworth and Zedner would likely agree that those identified as 'low' risk ought not be subject to coercive detention, their underlying reasoning is rooted in the need to ensure respect for the defendant's right to liberty, which is justified only if that person poses a 'serious risk of substantial harm' – a level of risk which 'low risk' offenders do not pose. In other words, unlike the AJ model, their concern to avoid pre-trial incarceration of 'low risk' individuals is not rooted in concerns about the inefficient consumption of public resources on unnecessary detention, but with ensuring respect for the defendant's right to liberty. However, when these models are applied to bail reforms, which concern pre-trial detention, the differences between the two models are not brought to light. Both models entail the same intervention (pre-trial detention) for individuals of the same status (i.e. defendants assessed as 'dangerous' or 'high risk'), thereby revealing limitations associated with applying these two models to one specific CJ practice/site of decision-making.

3.3 Third-Wave Reforms: The Use of Risk Assessment in'Smart on Crime' Policies

As 'mass incarceration' (Gottschalk, 2006) increased thoughout the 1990s, jail overcrowding became an important political issue (Welsh et al., 1990). Driven by budgetary concerns and judicial decisions ordering the release of prisoners due to overcrowding (Harris Jr, 1990), policy-makers sought strategies to release those regarded as less dangerous. This provoked a renewed interest in statistical techniques which promised to differentiate between violent and non-violent individuals – first in post-trial decision-making, then to inform pre-trial bail decisions (Wenzelburger & König, 2022). Often supported by bipartisan consensus, reforms sought to address two goals: (1) reduce high public expenditure on the CJ system; and (2) for the majority of prison inmates who had committed trivial and/or non-violent crimes, to reduce or avoid the adverse effects of incarceration which brought them into contact with the 'wrong' people (see for instance Dagan & Teles, 2016; Harris, 2009; Percival, 2016).

The return of statistical tools for risk assessment was also driven by the increasing availability of larger administrative datasets from the CJ system[8] (including offender data and arrest data) paired with more sophisticated modelling techniques that allowed a wider range of possible risk predictors. However, unlike earlier statistical tools such as the Vera-scale in 1960s which was used to assessed flight risk and aimed to correct unfair discrimination arising from money bail, later tools promised to differentiate between dangerous and non-dangerous persons, detaining in custody only those deemed to pose a 'high' risk of committing a violent offense, thereby purporting to maintain public safety while lowering rates of incarceration (Beckett et al., 2016: 252–254). At the same time, concerns about bias in underlying data and possible unjust discrimination (Brantingham et al., 2018; Haeri et al., 2022) of the tools surfaced and the way of reducing the wealth of information gleaned from the statistical analysis (e.g. the metric of the score or anomalies in the data) in simple ordinal scales or risk categories lumping together different outcomes such as flight risk and dangerousness was critised (König & Krafft, 2021; Mayson, 2018: 509–514). Furthermore, whether the use of tools actually reduces pre-trial detention significantly remains unknown (Stevenson, 2018) – arguably the most important empirical question requiring an answer (Feeley, 2018).

Do these most recent changes depart significantly from the use of statistical tools in the first wave or the focus on dangerousness in second wave reforms if evaluated through the lens of legal-theoretical models? On the one hand, changes in the underlying methods employed to create these risk assessment tools do not appear to have been motivated by changes in the underlying goals and values prevailing during the second wave reforms. As a result, both the AJ and PJ models continue to provide a comfortable fit with the practice of retaining defendants assessed as 'dangerous' in custody pending trial. However, in comparison with the actuarial tools employed during 'first wave' reforms, advanced statistical tools are typically portrayed as more 'scientific' offering more objective 'evidence' in assessing a specific individual's dangerousness (Hannah-Moffatt, 2019). As such, they appear to provide a firmer evidential basis to justify pre-trial custody decisions, whether to retain in custody individuals assessed as 'high risk' and thus helping to satisfy the tests of 'necessity and proportion' justifying state interference with an individual's right to liberty, or conversely, to justify the release of those evaluated as 'low risk'. Whether these outputs can be appropriately characterised as 'scientific' or 'objective' warranting their description as 'evidence' is seriously contestable (Koepke & Robinson, 2018; Gitelman and Jackson, 2013; Yeung, 2023b), especially when it comes to the underlying values that promote 'a certain conception of justice' (Ratti & Russo, 2024, p. 18). Nevertheless, these tools have fostered a belief by front-line decision-makers that their outputs improve their epistemic position, moving them from a situation of fundamental uncertainty ('I don't know whether a person will re-offend') to a situation of calculable statistical risk ('The tool gives a risk-score of 4.8 on a 6-point scale for

[8] In Virginia, the first state to introduce risk-assessment on a state-wide level, data collection had started with the automation of "presentence investigation reports" (PSI) in the mid-1980s. In 1986, a commission started to run analyses of historical sentencing practices based on data from around 18,000 felony sentences (Farrar-Owens, 2013).

re-offending') (Hartmann & Wenzelburger, 2021). Yet, neither the AJ nor the PJ models are able to account for this change. Much depends, then, on whether these tools actually deliver on their promise of accurately predicting future dangerousness and reducing unnecessary incarceration. Given that dearth of available evidence, Tonry (2019) therefore speaks of 'Déjà Vu All Over Again' when discussing the recent re-emergence of predictive tools in CJ, reflecting deep scepticism expressed by Feeley (2018) who is credited with jointly developing the AJ model in the 1990s.

However, one important difference sets the current use of predictive tools in pre-trial decision-making apart from their use during the first wave of penal reform. During the first wave, for example in the VERA project, statistical data were used to assess 'flight risk' rather than so-called 'recidivism risk'. From a legal perspective, this is a crucial difference. It suggests that first wave tools fit more comfortably with Packer's 'due process' model of retributive justice, authorising the retention of a defendant in custody pending trial to secure the due process of law. In contrast, the tools currently used are primarily configured to offer predictions about the likely 'dangerousness' of an individual if publicly released, rather than flight risk, and hence better located within either the AJ or PJ models.[9]

4 Discussion: How New Is 'Smart Justice'?

This article has discussed whether the most recent reform wave in the US pre-trial CJ system with algorithmic risk assessments being used to predict flight risk and/or dangerousness of defendants constitutes a major departure from the historical trajectory of the US CJ system which would justify a new label such as 'smart justice'. To answer this question, we have sought to interpret bail reforms in the US since the 1960s through the lenses of three legal-theoretical models: 'retributive justice', 'actuarial justice' and 'preventive justice'. Our analysis demonstrates that these three legal-theoretical models can illuminate some aspects of US bail reform, by drawing into sharper focus the principles and values which animated them while highlighting continuity and change over time. Empirically, we find that the recent third wave of reforms can be seen in continuity with a clear shift away from censure and retribution towards prevention and the use of risk assessment tools, which both AJ and PJ models can accommodate. Continuity can also be seen, for instance, in the use of risk assessments tools fashionable throughout the 1960s which later regained attention in the 2000s thanks to the advent of machine learning techniques and the availability of larger datasets for risk prediction.

Yet, legal-theoretical models also enable us to identify critical changes and turning points. This is particularly true for the shift from 'flight risk' to individual 'dangerousness' as the decisive criterion for bail decisions, which sets the early statistical instruments used in the 1960s apart from today's tools which often consider dangerousness. In short, the legal-theoretical models we have examined provide uesful analytical vehicles, helping to explain empirical developments and facilitate critical

[9] Although some of them do offer 'flight risk' assessments while others offer a composite score purportedly based on both (König & Krafft, 2021).

reflection about the perceived social purposes of the CJ system and their influence on specific interventions and practices such as pre-trial detention.

Yet our analysis also reveals limitations in these models. Firstly, none of them capture the animating motivations which underpinned the early first wave reforms (e.g. VERA scale), of addressing socio-economic inequalities produced by the money bail system. Abstract models are insensitive to defendant's socio-economic position: this may simply be the consequence of the claimed universality of the rule of law, in which 'justice is blind' to socio-economic status and power of those who come into contact with the legal system. Yet, in this case, such blindness is a source of injustice, failing to recognise the relevance of economic inequality in the administration of bail. Secondly, none of these models can account for the embrace of more advanced risk assessment tools that claim to offer 'more accurate predictions', due to their perceived 'scientific' basis. As we have seen, the most recent reforms can still be captured by both AJ and PJ models, but fail to offer analytical hooks for investigating the portrayal of these tools as 'evidence-based', encased in a convenient, user-friendly software interface which frontline bureaucrats perceive as decreasing their epistemic uncertainty (Hartmann & Wenzelburger, 2021; Yeung, 2023b). Thirdly, important features are not brought to light by applying the AJ and PJ models to the same practice (pre-trial custody). Both models arrive at the same prescription that high-risk individuals should be detained, and low-risk released, but for different reasons: on an AJ account, this is due to the need for system-wide efficiency. But on a PJ account, this is to ensure a human-rights compliant balance between the state's duty to protect the public (Cole, 2015; Duff, 2013; Dyzenhaus, 2013; Sommerer, 2018) and respect for the defendant's right to liberty.

How can we make sense of these limitations? Thinking of models as heuristics aimed at helping us to understand the empirical world in response to their prevailing political culture and context, we suggest that these limitations can be understood in light of (1) salient public concerns and activities prevailing at the time of their development, and (2) the authors' aims and objectives, what they were interested in and sought to respond to, when constructing these analytical models. Hence, the AJ model can be seen as a response to the crisis in mass incarceration due to 'tough on crime' policies, reflected in the attention Simon and Feeley (1992) devoted to the centrality of risk assessment as a vehicle to selectively distribute and ration prison places as the costs of default imprisonment mounted. Similarly, Ashworth and Zedner's PJ model (Ashworth & Zedner, 2014) reflects the moral panic after the 9/11 terrorist attacks which spawned many preventive and often draconian counter-terrorism measures. Hence they highlight due process concerns which these preventive, public safety oriented interventions downplayed, animated by fears of terrorist attacks that were not amenable to statistical risk assessment and a 'better safe than sorry' policy mantra.

Whether these models, as 'witnesses of their time', offer analytical value for making sense of, and critically reflecting upon, contemporary 'smart justice' reforms in the United States and elsewhere is an open question. We have seen that both the AJ and PJ models can accommodate these developments because the legal norms on which 'smart justice' initiatives have proceeded have not altered since their introduction during secondwave bail reforms. However, we also observed that neither

models attribute any significance to the qualitative change associated with the ease and convenience through which front-line officers are now able to generate risk predictions via their smart devices which have become ubiquitous in daily life. The models are also blind to changes in organisational practices in which 'techno-solutionism' has gained traction within public administration which one of us dubs the 'New Public Analytics' (Yeung, 2022, 2023a). The advent of advanced risk-based approaches aimed at assisting front-line decision-makers is a key driver of the most recent reforms, but existing legal-theoretical models do not account for them.

Finally, existing models fail to combine both cost-efficiency and due process considerations. While the AJ model highlights efficiency concerns, it excludes normative concerns for due process. Although the PJ model is centrally concerned with due process, it largely avoids engaging with efficiency and cost concerns. In short, the need to bring both efficiency and due process arguments into the frame brings us back to the two aims of CJ systems in Packer's retributive justice model. This classical model offers little explanatory power in terms of US bail reform, yet the two 'flavours' depicted by Packer elegantly highlight the importance of both efficiency and due process values, given the gross injustice arising from mistaken convictions of the innocent.

It does not, however, follow that a new 'smart justice' model is needed to account for the most recent changes associated with the third wave of bail reform. Indeed, they appear to be motivated primarily by a desire to increase efficiency in bail decision-making and heightened concerns with racial prejudice and discrimination rooted in the right to freedom from unfair discrimination. However, affixing the label 'smart' to describe this trend is not, in our view, analytically helpful. It evokes a contemporary fixation on technosolutionist ideology (Yeung, 2023a) rather than accurate description. On closer inspection, these tools are far from 'smart' in the sense denoted by 'smart' technologies, the latter referring to the ability of a networked digital system to automatically perceive and respond to its environment in a way that sustains its own endurance in the face of uncertainty (Hildebrandt, 2020). Rather, their designation as 'smart' is better understood as political rhetoric, its very elasticity allowing it to serve a wide variety of ideas to support specific political agenda, serving to obscure more than it illuminates.

Acknowledgements We are indebted to the Volkswagenstiftung for funding this research (Grant Az. 95 438). Wenzelburger developed the narrative account of the 'waves' of US bail reform, drawing on empirical research conducted by Hartmann. Yeung developed the analysis of these waves through the three retributive, actuarial and preventive 'models' of criminal justice. Wenzelburger and Yeung jointly contributed to the paper's structure and arguments. Special thanks to Adam Harkens for research assistance in conduct of early stage literature reviews and project administration as well as to the Fatal4Justice-team for insightful comments on earlier versions of this paper, and Adam Green for editorial assistance.

Author contributions Wenzelburger and Yeung were the primary authors of this paper. Wenzelburger and Yeung wrote Sect. 1 (Introduction) and Sect. 4 (Discussion) together, Wenzelburger and Hartmann wrote Sect. 3 (From 'Flight Risk' to 'Recidivism Risk': Data, Predictions and Risk Assessments in US Bail Reforms) and Yeung wrote Sect. 2 (Legal-Theoretical 'Models' of the Criminal Justice Process).

Funding Open Access funding enabled and organized by Projekt DEAL.

Data Availability As this is a conceptual article without data analysis, there is no data available related to this article.

Declarations

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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