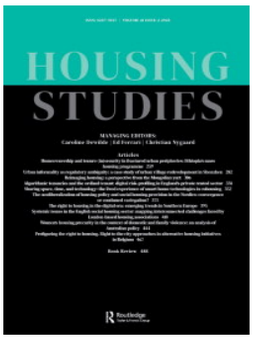

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Algorithmic tenancies and the ordinal tenant: digital risk-profiling in England's private rented sector

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ABSTRACT

This paper examines digital tenant risk-profiling tools in England's Private Rented Sector (PRS) and their influence on housing access and fairness. Based on qualitative data from 50 interviews and a survey of PRS landlords drawn from a larger project, the study analyses adoption patterns, algorithmic biases and the implications for tenant rights. Issues such as data privacy, discrimination, and exclusionary practices affecting marginalised groups are highlighted. The research underscores how digital platforms reshape landlord-tenant relationships and broader housing market dynamics in the light of recent, broader, theorisations of what sociologists Marian Fourcade and Kieran Healy have conceptualised as an emerging ordinal society. In this article, we argue that the logic of such metrics and data-informed algorithmic systems has led to the emergence of an ordinal tenant.

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Private Rented Sector (PRS); England; digital risk profiling; ordinal society; algorithmic systems

Introduction

Since the mid-nineteenth century, specialised credit brokers have developed systematic methods to record financial reputations. Credit bureaus, often known in the UK as credit referencing agencies (CRAs), have traditionally reassured landlords about potential tenants' trustworthiness *via* increasingly quantitative risk assessments (Lauer, 2017). Over time, as Van Hoyweghen (2014) observed in her study of the insurance sector, such 'calculative devices' have become central tools for assessing risk. The broader context for these developments, as Fourcade and Healy (2024) describe, is the emergence of what they call 'the ordinal society', a society defined by intense measurement and classification and where individuals are rendered 'identifiable and auditable' (Fourcade & Healy, 2024, p. 202). This article explores the implications when housing tenancies and risk profiling in the private rented sector (PRS) are

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embedded within the structures and logics of ordinal processes, as well as the broader forces shaping this ordinal society. Today, with the availability of extensive data and advanced algorithmic processing, we appear to be at a critical technological juncture. Emerging digital platforms are significantly transforming risk and opportunity assessments, particularly in finance and housing access. In the context of risk profiling and rented housing, this moment could signal a major shift in access and opportunities, especially as tenants are increasingly assessed based on their digital data traces and through automated systems. Landlords and agents are rapidly evolving their methods to profile prospective tenants using credit market data and other resources.

An industry is emerging that facilitates large-scale calculative risk profiling by drawing on a much wider range of data sources than hitherto. This article specifically examines the changing methods of tenant profiling in England's PRS by investigating the adoption of digital tenant risk profiling tools and exploring their implications. These tools typically use data such as credit histories, electoral rolls, income, bank transaction and employment information (and, in some countries, rental histories) to assess risks, the likelihood of non-payment of rent in particular. In the future, they may also be able to evaluate risks related to property damage, anti-social behaviour and other factors. While risk assessment has always been a key part of landlord practices for managing business risks and selecting suitable tenants, algorithmic evaluations are increasingly playing a significant role and, as we will discuss, have the potential to drive the tenant selection process in particular directions.

The concept of the 'ordinal society' developed by Fourcade and Healy (2024) provides a context in which to explore specific ways in which scoring now occurs. To be profiled and ranked within the structures and logics of algorithmic systems, tenants need to be rendered ordinal. The subjective elements and narratives of these individuals are transformed into 'measurables' that fit into categorised scales. It is not then simply about applying algorithms in digital risk profiling, it is that the tenants themselves need to be calibrated to provide the data and categories that enable the algorithms to function and to perform the role of sorting, filtering and ranking. As such, we argue that algorithmic tenancies require and produce an ordinal tenant. The *ordinal tenant* is a tenant viewed through the logic of metrics and through the lens of the requirements of the algorithm to work with and produce outcomes based on those metrics. The ordinal tenant is judged, sometimes through automated systems, based upon what Lupton (2019) calls their 'data selves' and through the mechanisms used to categorise those properties or attributes. This is a tenant operating within the specifics of the 'regime of recognition' of algorithmic systems (Amoore, 2020; Jacobsen, 2023), in which certain attributes are adapted to enable those individual tenants to be placed within a variety of ordinal scales. These ordinal scales then 'fasten' individuals into certain positions, their 'informational personhood' defining how they are assessed and potentially restricting their possibilities (Koopman, 2019, p. 12).

The increasing 'commodification of the tenant experience' has been identified by Rogers *et al.* (2024, p. 4), who describe this commodification as being 'characterised by two forms of extraction: the use of [p]roptech to amplify rent from landed

property, and the trend towards the consolidation of tech and data for market control' (Rogers *et al.*, 2024, p. 4). In addition to these forms of extraction, digital risk-profiling tools are increasingly used, integrating elements of both proptech and fintech. This convergence merges financial services with property market activities to evaluate tenant applicants and their associated letting risks. The integration of these technologies has been explored through various conceptual frameworks within the urban and housing research literature such as 'platform real estate' (Fields & Rogers, 2021; Shaw, 2020), 'proptech platforms' (Wainwright, 2023), 'rental proptech' (Maalsen *et al.*, 2024), 'platform landlords' (Nethercote, 2023), 'the internet of landlords' (Sadowski, 2020) and 'automated landlords' (Fields, 2022). These frameworks provide valuable insights into how proptech and fintech converge to shape tenant experiences and landlord practices.

Given the increasing difficulty in accessing good quality, secure and affordable housing, it is imperative to critically examine these emerging digital housing market *intermediaries*. In the USA and Australia, significant public concern has already arisen over digital tenant referencing, focusing on issues such as rental tenant blacklists, extensive data collection, lack of transparency and data breaches (Fields & Rogers, 2021; Przhedetsky, 2024). Azevedo *et al.* (2024), for instance, note the use of algorithmic affordability assessments in the Viennese rental market. In the UK, while less widely reported, concerns have been raised about the exclusionary nature of tenant screening and the intrusive use of 'open banking'[1] for financial assessments before granting tenancies (Ciocănel *et al.*, 2024). These screening processes are often overlooked but represent a critical, albeit seldom-discussed aspect of the private letting process, with potentially significant implications.

To address this, the paper will first review existing knowledge on digital tenant risk profiling tools in contemporary rental markets, a process – inspired by Fourcade and Healy (2024) – which we refer to as creating the ordinal tenant. Second, we will outline the research methods used to collect data on the tools that generate ordinal tenants. In the third section, we will analyse how landlords and agents assess ordinal tenants by adapting to new technological contexts for risk management. Building on this, the fourth section will examine the degree of automation in these systems and the extent to which they segment ordinal tenants. Using this as a foundation, the fifth section will evaluate the digital data infrastructure that supports these developments. The sixth section will focus on how these systems directly apply ordinality to tenants' attributes, examining the classification and categorisation methods used. Finally, we will shift perspectives to reflect on the tenant's experience within the context of data and algorithms, exploring what it means to be made into an ordinal tenant.

Creating the ordinal tenant: digital risk-profiling in the contemporary PRS

In their recent book, *The Ordinal Society*, Fourcade and Healy (2024) highlight how digital categorisation and evaluation based on data profiles are reshaping cultural life, economic competition and patterns of social stratification. What we suggest here is that risk profiling in housing constitutes what Fourcade and Healy (2024, p. 100–131) call a 'classification situation'. What is this particular classification

situation like? Automated measurement systems can rationalise hierarchical structures, embedding moral considerations within operational logic and often disadvantaging certain groups. Technological innovations have significantly enhanced data collection and analysis, driving firms to adopt new digital processes, often mimetically following others. This shift has led to increasingly granular classifications of individuals based upon digital social capital, or, what Fourcade and Healy (2024, p. 120–129) term, *eigencapital*, derived from our online footprints. Individuals are increasingly 'responsibilised,' becoming 'entrepreneurs of themselves', forced to manage their digital profiles to ensure positive outcomes. Vulnerable citizens, referred to by Fourcade and Healy (2024, p. 131) as the 'lumpenscoretariat,' are often filtered into poorer areas of provision, illustrating the stratifying effects of *eigencapital*. Our study explores these ideas within digital tenant risk profiling tools, which increasingly use rich data to classify and sort prospective tenants in the mainstream PRS. These tools allow markets to understand individual behaviours ever more precisely, rather than relying on more aggregated statistical characterisations. In this context, managing *eigencapital* becomes crucial, as algorithmic risk profiling determines tenant value, raising ethical concerns about privacy, fairness and bias reinforcement.

The UK has been viewed as a liberal welfare regime with a dualist rental housing system, with homeownership valorised and the balance between social and profit rental housing such that social housing becomes residualised (Stephens, 2020). Housing is a devolved matter in the UK and, in England particularly, we have observed an expansionist private rental market and declining social housing sector due to limited new supply and the sale of existing homes to sitting tenants. Private renting in the UK has grown significantly since the 1990s, now encompassing approximately one-fifth of households. This growth has been driven by limitations in homeownership opportunities and the availability of social housing, making the PRS a crucial housing option for a diverse array of demographics, including high-income households, students, benefit recipients and young professionals (Rugg & Rhodes, 2008). At the same time, regulatory scrutiny has heightened due to concerns over affordability, security and property standards. In Wales, Scotland and Northern Ireland, measures such as extended tenancies, landlord registers and rent controls have been introduced to address these issues (Marsh & Gibb, 2019). In contrast, England has implemented reforms requiring landlords to actively manage properties, meet stricter energy efficiency standards and has phased out mortgage interest tax relief for non-business landlords (Rugg & Wallace, 2021). At the time of writing the *Renters' Rights Bill*, formerly the *Tenant Reform Bill*, is making its way through Parliament to strengthen English tenants' rights to a secure home and professionalise property management in the sector (Çakır, 2024).

The prevalence of poverty among PRS tenants highlights its critical role in housing low-income individuals (Kemp, 2011), while increasing homelessness, driven in part by rising rents and evictions, underscores ongoing challenges (Fitzpatrick *et al*., 2023). The pandemic exacerbated these issues further, with a moratorium on evictions complicating landlords' ability to reclaim possession legally, alongside welfare reforms that reduced housing benefits, impacting landlords' willingness to rent to lower-income households (Rugg & Wallace, 2021).

The UK PRS has been likened to a 'cottage industry' due to the dominance of individual landlords with small property portfolios (Rugg & Rhodes, 2008), confronting significant challenges in risk management. The recent piecemeal or incremental reform of the English PRS has created churn within the market as these small-scale individual investors sell up and the stock becomes slightly more concentrated among professional business landlords with larger portfolios (Grayston *et al*., 2024). Large landlords, like those supported by institutional investors in the *Build to Rent* market, have emerged as an important component of new supply but remain peripheral to the main private rental market accounting for only 120,000 out of 4.6 million private rented homes (MHCLG, 2023; Savills, 2024). The size of the PRS been stable over the last decade despite fears of significant contraction (Grayston *et al*., 2024; MHCLG, 2024). The PRS remains competitive for tenants. Although pent up demand following the pandemic has abated, fewer letting opportunities have arisen than prior to 2020, and demand remains high and rents have subsequently risen.

Landlords with fewer properties face heightened vulnerability, where a single non-paying tenant can result in substantial income loss, unlike landlords with larger portfolios (Rugg & Wallace, 2021). In response, landlords increasingly prioritise stringent tenant screening to mitigate risks such as rent arrears and property damage (Rugg & Wallace, 2021). Meanwhile, concerns persist regarding housing access inequalities. Meers (2024; 2024), for example, highlights the prevalence of 'professionals only' advertisements on digital platforms, which have come to replace overtly discriminatory analogue 'No DSS'[2] policies that effectively exclude marginalised households, which we will return to when considering how ordinal tenants are assessed. Similar to the research findings from Vienna (Azevedo *et al*., 2024), Wainwright (2023) discusses English landlords' preference for 'ideal tenants,' typically resembling young urban professionals, thereby perpetuating disparities in housing access. Thus, despite improvements in equality legislation, subtle discrimination persists, disproportionately affecting groups such as benefit recipients and minorities (Wolifson *et al*., 2024). These challenges are exacerbated by welfare reforms like Universal Credit, which have narrowed housing benefit eligibility and worsened rent shortfalls (Rugg & Wallace, 2021), and created problems with the direct payment of housing allowances to the tenant and not the landlord (Hickman, 2021), influencing further discriminatory practices in tenant selection.

Real estate agents serve a crucial role as intermediaries in the housing market, leveraging technology to augment their services rather than supplant them (Sawyer *et al*., 2014). The advent of proptech has digitised property, land and housing data extensively, enabling algorithmic processing and fostering the growth of new real estate products and services. Platforms such as *Rightmove*, *Zoopla* and *Zillow* offer comprehensive data resources and real-time insights, influencing automated models for landlord property acquisition (Fields, 2022). Within this digital landscape, technologies like automated landlord management functions (such as concierge services, rent recovery, repairs and so on) and deep customer insights through aggregated digital data have gained prominence in build-to-rent markets (McElroy, 2024; Nethercote, 2023).

Central to the study to be reported on here are digital tenant risk-profiling tools, often integrated *via* APIs with automated landlord management platforms. These tools use algorithms to streamline tenant selection, replacing traditional judgement-based methods (Schneider, 2020). This shift has led to CRA data from financial services being transferred to private rental markets, notably accelerating after the 2019 tenant fees ban in England (Wainwright, 2023). Major CRAs like *Experian*, *Equifax/Clearscore*, and *TransUnion/CallCredit* provide tenant reference checking products used by firms such as *Homelet*, *Van Mildert*, and *Lettings Hub* in the UK. These services combine identity verification and credit checks with other data sources to offer comprehensive tenant screening and risk scoring (Wainwright, 2023).

Concerns have arisen regarding algorithmic decision-making and digital discrimination, highlighting potential biases in tenant selection (Przhedetsky, 2024; Wolifson *et al.*, 2024). These tools often prioritise characteristics associated with the 'ideal tenants', noted above, potentially excluding marginalised groups (Wainwright, 2023). Such biases are exacerbated by historical data reflecting existing inequalities. Regulators in the USA and UK have expressed concerns over the reliability, fairness and volume of data collected by these tools, citing errors in housing eviction data and disparate impacts on protected groups (CFPB, 2022; CMA, 2023). Additionally, privacy concerns and questions about data validation and model transparency have been raised. While digital technologies promise efficiencies and innovations in the rental market, the adoption of digital tenant risk-profiling tools, and the *eigencapital* that results, requires careful consideration of their impacts on fairness, discrimination and tenant rights.

Methods: understanding the application of algorithms in the PRS

The study[3] we report on here involved building a comprehensive qualitative dataset through 122 in-depth interviews across all tenures. Of these, 50 interviews were undertaken in the PRS with technology firms providing tenant referencing (TR) services ($n = 10$), landlords ($n = 7$), agents ($n = 5$), insurers ($n = 1$), industry stakeholders ($n = 7$) and private tenants ($n = 20$). Tenant referencing firms were recruited by direct approaches. Landlords were recruited through a professional trade body, who also distributed a survey to a sample of landlords on our behalf. Letting agents and insurers active in offering landlord rental guarantee insurance were invited to participate *via* direct approaches and private tenants were recruited *via* a private tenant advocacy organisation distributing research invitations on our behalf. Private tenants were awarded a £20 shopping voucher as an acknowledgement of their time. After obtaining ethical clearance from the host university, interviews were conducted *via* Zoom, transcribed professionally and subjected to thematic analysis.

The survey of PRS landlords obtained 113 usable responses, and captured both quantitative and qualitative data. It used open text fields to gather detailed perspectives on digital tenant risk-profiling in practice. Some 38 per cent of landlords in the survey had between 1 and 4 properties, and 62 per cent over 5 properties. Due to the nature of the survey distribution the respondents skewed more towards business portfolio landlords than to individual side-line investors. This aligns with the

landlords of most properties in the market, although not most landlords (MHCLG, 2024).

Several authors suggest that studies of algorithmic decision-making such as this should include the entire 'socio-technical assemblage' (Kitchin, 2017) and the full 'regime of recognition' (Amoore, 2020), considering the constellation of people and institutional contexts surrounding digital platforms or tools, their application and their impact. Thus, this study went beyond examining technology and proptech firms alone. Instead, it explored encounters with digital risk-profiling tools from diverse perspectives, including individuals involved in producing these tools at tech start-ups and established tenant referencing companies. It also included landlords and agents actively utilising these systems, as well as tenants reflecting on their experiences with digital risk-profiling and its impacts.

By integrating multiple viewpoints and considering the broader socio-technical contexts surrounding these technologies, the study aimed to provide a comprehensive understanding of how digital tenant risk-profiling tools shape interactions within the PRS and influence housing market dynamics in England more broadly. Space here precludes the presentation of extensive verbatim extracts from these interviews, which can be found elsewhere (Wallace *et al*., 2024). Instead, we have mostly summarised the data in the form of descriptive narratives (Corden & Sainsbury, 2006), with the inclusion of only some brief interview data where necessary to exemplify or clarify key points.

How landlords and letting agents manage risk: assessing the ordinal tenant

A key problem within the PRS is how to create the conditions to be able to assess tenants. Tenant referencing practices form part of landlords' mitigation of their business risks and vary substantially, with many landlords using external data firms to supplement qualitative assessments. However, referencing, whether digital or automated, does not solely determine tenancy approval. In the UK, formal tenant referencing follows pre-screening processes, including affordability checks and initial viewings, combined with evaluations of applicants' traits. Our data indicate that formal referencing is crucial but remains frequently only a part of the decision-making process. Azevedo *et al*. (2024) noted the range of landlord approaches and the subjectification of tenant selection practices, and tenants' requirement to respond to informal and unexplained codes regarding their presentation. Similarly, our study found that ultimately, granting tenancies often involves qualitative as well as quantitative judgments.

Landlords face significant risks in the housing market, balancing decisions on market segments, property location, acquisition, repairs, finance and tenant selection. These risks drive a push to render tenants as ordinal as possible, even in subjective decisions. Risk dynamics shift with market and regulatory changes. In weaker markets, oversupply historically led to tenant vacancies (Wallace & Rugg, 2014). Post-pandemic, high demand has given landlords more power, with tenants competing and rent bidding becoming common. This competition fosters differentiation based on tenant attributes. While pandemic-driven demand has eased, landlords generally enjoy broader tenant selection, though this varies.

Landlords vary in their tolerance for tenants receiving benefits, balancing risks with potentially higher yields (Rugg & Wallace, 2021). As already noted, the UK PRS's structure, where many landlords own only one or two properties, heightens risks from tenant issues compared to those with larger portfolios. Longer tenancies and regulatory reforms, such as the *Renters' Rights Bill*, have intensified the need for careful tenant selection practices. Experienced operators leverage local market knowledge for decision-making, supplemented by data services to enhance risk appraisal and due diligence. Platforms like *Lendlord* assess asset portfolios and the buy-to-let mortgage market, while *OpenRent* and *Yardi* aid in tenant onboarding, regulatory compliance, rent collection, managing repairs, facilitating uploads of safety certificates and ensuring deposit protection.

Tenant referencing tools play a crucial role in tenant selection, reducing risks such as rent defaults and property damage, and ensuring compliance with regulations like *Right to Rent* legislation.[4] Formal referencing not only assures robust tenant selection but also mitigates risks for mortgage lenders, insurers offering rental guarantees or local authorities enforcing property standards. Agents, major clients of referencing firms, rely on tenant verification to manage their risks and obligations to landlords, despite potential liabilities for referencing errors. Landlords also use these firms, albeit less frequently than agents. Approximately 82 per cent of the 113 landlords surveyed for this project employed referencing firms, directly or through agents. Self-managing landlords, constituting 36 per cent of the total, often forgo such tools, trusting in their own tenant assessment capabilities.

Agents and landlords utilise referencing firms to save time and money. While some maintain long-term relationships with a single firm post-digitisation, many have encountered multiple digital referencing providers. Switching between firms often results from unmet expectations, subpar reports, IT failures, inadequate employment verification and/or poor customer support. Agents favour firms that integrate seamlessly with existing management systems or within comprehensive proptech solutions. Nonetheless, engaging a referencing firm does not entirely transfer risk. Pre-screening and affordability assessments before formal referencing are crucial in tenant selection and influence the impact of digital tenant profiling on housing access. This ensures that only applicants likely to pass formal referencing are put forward. In some countries, this screening is done through letting platforms, but in England pre-screening processes generally tend to be more basic and analogue (Beer *et al.*, 2024a).

During pre-screening, landlords or agents gather basic information such as job status, employment, household circumstances, pet ownership and desired tenancy length. The main criterion is stable employment with earnings sufficient to meet industry thresholds, typically 30 times the monthly rent (Wainwright, 2023). This initial stage uses ballpark figures to avoid showing properties to unqualified candidates and reserving formal affordability checks for later in the referencing process. Landlords sometimes view benefit-dependent tenants as higher risk, although some specialise in these lets as they offer high yields and are often mediated by third-party agencies such as the DWP or local authorities (Rugg & Wallace, 2021). Tenants on benefits reported difficulties accessing housing due to being filtered out at this pre-screening stage, despite believing their benefits could cover the rent. Some

landlords cited concerns over unpaid housing benefits, though direct payments to landlords can mitigate risks associated with benefit income. However, some landlords reportedly used the prospect of failing tenant referencing to deter low-income benefit recipient and other financially vulnerable tenants. For instance, one landlord explained to us:

> 'You put on [Open Rent platform rental advert] […] what your bullet points are. Maybe no dogs, or pets, I should say. No 'DSS,' which I don't think you can say that now, but how I get around that is they've got to pass the credit finance.' (PRS, Landlord 5)

The use of these categories within the promotion on the platform establishes who can apply and who is likely to have a chance of success, acting also to provide some mitigation. The ordinal tenant can be established, in imagined form, before the application processes even begin.

Before the *Tenant Fees Act 2019*, which reduced the allowable charges to tenants, multiple applicants who passed initial screening would often pay for referencing. Now, landlords cover referencing costs, typically permitting only one applicant who clears screening to go forward for tenant referencing. At this stage, subjective assessments of tenants remain crucial, even for large build-to-rent landlords. Tenants who present themselves as agreeable and accommodating are valued by agents and landlords. Additionally, tenants benefit when their preferences align with the landlord's wishes regarding the property and contract. Formal tenant referencing extends beyond qualitative assessments of a prospective tenant's character or demeanour, providing landlords reassurance across a broader spectrum of risk factors. Nonetheless, landlords place significant value on informal evaluations of tenants' 'soft' attributes gleaned from personal interactions. This process of assessment is exemplified by the following account provided to us by a letting agent:

> 'There's that screening when they first apply, and then when we do the viewings that's one-to-one with the person, and a lot comes out in conversation […]. We're also doing some […] soft checks as well on that viewing. […] We're giving the landlord a long-term relationship with a person that they don't know, so we need to be sure that the person's going to be nice to deal with. Sometimes you go on a viewing and somebody's obnoxious. Then you do just think, why would I want to recommend you to the landlord when the landlord could be stuck with you […] for two years.' (Agent 1)

While referencing reports reflect the diligence of agents and referencing firms, every physical meeting, phone call, or email exchange also contributes valuable data that informs landlords' decisions.

Landlords are often willing to accept lower rents to secure trustworthy tenants, with agents playing a crucial role in robust screening and referencing processes. Landlords rely on agents' judgement and may switch agents to find those capable of qualitatively assessing tenants alongside formal referencing. While qualitative assessment is important, formal referencing reassures many market players and is vital for convincing third parties of a professional risk management approach.

Table 1. Landlord attitudes to referencing and tenant selection ($n = 113$).

	Agree	Neither agree nor disagree	Disagree	Total
Best to talk to tenant rather than relying on referencing	57%	26%	17%	100%
Do not let to those with low credit scores	43%	25%	33%	100%
Tenant has 'sufficient income credit history' is not required	15%	36%	50%	100%
Services are accurate in predicting quality of tenant	53%	27%	20%	100%
Fully trust automated services	32%	25%	43%	100%
Current regulations limit gathering all information necessary	41%	27%	33%	100%
Lender and insurance company conditions influence tenant selection	41%	27%	33%	100%
All data collected by referencing companies is necessary and processed correctly	60%	27%	13%	100%

Source: Landlord survey (some totals may not sum due to rounding).

Table 1 provides an overview of the landlord survey that highlights both trust and reservations concerning tenant referencing services. Over half (53 per cent) view these services as accurate in predicting a tenant's quality. At the same time, only 32 per cent say they fully trust automated processing, showing a clear hesitancy to dispense with human input. Notably, 25 per cent are undecided, reflecting uncertainty about automated systems. By contrast, 43 per cent indicate some level of distrust toward these automated methods, favouring manual or in-person assessments – an inclination supported by qualitative findings. Indeed, 57 per cent of the surveyed landlords state they prefer directly speaking with potential tenants rather than relying solely on referencing data.

The automation of risk-profiling: segmenting the ordinal tenant

Digital tenant referencing tools automate and enhance the verification process using digital data sources, replacing or augmenting traditional manual methods, and in so doing create separations that act to segment ordinal tenants. These tools typically use CRA data to verify address histories and check for court judgments or bankruptcies. Analogue or hybrid systems manually collect additional information such as income, bank statements, employment status and landlord references. Fully automated systems may utilise open banking platforms to access applicants' transaction data, verifying rental payment history and income while assessing affordability based on detailed income and expenditure analysis (Ciocănel *et al.*, 2024). The degree of algorithmic processing in tenant risk profiling depends on the automation of administrative tasks, data availability and confidence in proxy measures and risk tolerance (Beer *et al.*, 2024a, 2024b).

End-to-end property management software, exemplified by firms like *OpenRent, GoodLord*, and *Reapit*, combine various aspects of tenant management, including

marketing, onboarding, referencing, rent recovery, repairs and tenant exits through integrated platforms. These systems manage workflows, provide contracts and letter templates, and ensure regulatory compliance, thus assisting with the policy ambition of a professionalised private rented sector. Tenant referencing services are commonly integrated *via* APIs into these platforms. Automation of letting agents' administrative processes, including tenant referencing, has reduced costs and affords the allocation of human resources to tasks requiring judgement and interaction, such as decision-making and landlord-tenant liaison.

In the USA, tenant risk profiling is predominantly automated, with manual verification reserved for disputed facts (CFPB, 2022). In contrast, in England, tenant referencing often utilises hybrid models combining automated administration and digital data collection with analogue or qualitative data in the segmentation of the properties or attributes of the tenant. Less automated systems, we found, may involve agents or landlords inputting data into platforms and uploading documents, while more advanced hybrids might use automatic email requests for references. Some systems are also beginning to incorporate AI to parse documents, though manual review remains common. As we have argued, the use of data and algorithms is extremely varied.

In other instances, fully automated systems generate algorithmically profiled outputs based on open banking data (Ciocănel *et al*., 2024), including detailed income and expenditure for affordability assessments. Decision-making in these systems follows categorical rules, segmenting the features of the individual tenant. However, slow innovation in the industry leads many to cautiously explore automation, balancing analogue and automated features in hybrid products. Referencing firms acknowledge a cautious market where stakeholders are hesitant to change traditional methods unless new systems fully meet their needs. With one landlord explaining that 'as the largest asset class in the world, property is probably the last to lean on technology and to embrace technology…the level of data literacy is very low' (PRS landlord 6). Another participant, this time working in tenant referencing, says that when it comes to products 'where the computer would do it all, people don't typically buy that'. Instead of the fully automated process, they further explained that they 'have the next level where […] technology does 75% and a human does a little bit. Then you obviously have the one where it's more […] 50:50, and that is still our big product about 80% of the time.' (Tenant referencing firm 4). The caution around removing the human is one aspect, but the hybridisation despite this caution is another.

Despite these advancements, and the broader imperative to collect and apply more data (Fourcade & Healy, 2024), human oversight remains crucial for accommodating complex circumstances within standardised frameworks (Beer *et al*., 2024a, 2024b). Human referencers check applications for errors that machines might reject and gather supporting information to help applicants pass or override recommendations. Referencing tools in the UK are increasingly digital and automated but still rely on human oversight for complex cases. As one participant in the insurance put it, 'We could go to a fully tech solution, but actually, what we'll do is just switch off a load of business and therefore, we'll switch off some

partners… So, we wouldn't ever want to switch off that manual, human intervention because you'll just lose a load of business. It might become efficient, but it's not what we're about' (Insurer 1). Human invention in the segmentation of the ordinal tenant remains an expectation even where algorithmic processes are integrated.

The data infrastructures of automated risk profiling: informing the ordinal tenant

The extent of automation in tenant referencing, and the degree to which tenants are rendered ordinal, depends on the level of 'datafication' – the process of turning various aspects of tenant information into data. In the UK, there are significant gaps in this, particularly regarding the quality of employment contracts and landlord references, which affects how comprehensively tenants can be profiled and ranked. Perspectives differ on whether proxies like open banking suffice. CRA data, from agencies like *Experian, Transunion* and *Equifax*, forms the basis of tenant referencing, verifying identities, addresses and credit histories. These agencies also provide insights into fraud risks and open banking transaction data, continuously expanding their datasets, forming what Fourcade and Healy (2017) earlier termed 'information dragnets'.

Credit checks, once confined to financial sectors, now play a key role in digital referencing, and accessing records from CRAs or brokers. County Court Judgments (CCJs), critical for assessing adverse credit, stay on file for six years. Referencing firms use this data to verify creditworthiness and rental history, often including anti-money laundering checks. Although, this doesn't mean the end of an application, but that the application might still be considered but with disclosure being the focus. One letting agent told us, for example, that:

> 'Historical issues like CCJs […] it's not an automatic ban. Instead, we take the view […] we […] need to be told in advance. If a tenant doesn't disclose it and it comes up in a check, that is […] a red flag. If a tenant is forthcoming […] more times than not it's not an issue. We might require a guarantor or something.' (Agent 5)

Still, applicants with undisclosed CCJs are often viewed unfavourably, which can be coded into algorithmic systems, while some landlords seek nuanced insights into debt circumstances and repayment status. As this suggests, the emphasis of such checks is upon rapid turnaround with key information, as was explained by one participant operating in tenant referencing who described how:

> 'All we're really looking for is if they've got any adverse credit history, any CCJs, or bankruptcies, IVAs [Individual Voluntary Arrangements are agreements with creditors to pay all or part of your debts] […] Essentially, that's our express check, and they're […] quicker to turnaround, because they're mostly automated […]. We have an API with [removed company name] which pulls back the information within a couple of minutes.' (Tenant referencing firm 9)

There are geographic variations concerning how referencing utilises existing databases to assess previous tenancies. For instance, in the USA, housing court data can negatively impact tenants, irrespective of case outcomes and in Australia, referencing involves checking tenant blacklists. However, the UK lacks databases for non-payment of rent or property damage, and landlords seldom register CCJs against tenants due to the costs. Some landlords negotiate with tenants to vacate rather than pursue eviction due to expense and time constraints (Rugg & Wallace, 2021). Insurance companies' landlord rent guarantee claims records are emerging as a data resource to identify risk in this area but are not universally accessible to all referencing platforms.

Open banking technology is increasingly used to verify income and rent payment histories, check regularity over past months (Ciocănel *et al*., 2024) and increasingly used to produce detailed affordability assessments. Yet, of course, open banking cannot determine nuisance behaviour or property damage. Manually collected employment data remains critical. Employment stability influences creditworthiness, and agents focus on assessing employment terms over the period of the tenancy, especially for precarious contracts. While open banking and APIs provide electronic wage slip data, they cannot predict future employment status. Accurate employment references remain challenging, often limited in detail, though some agents supplement with follow-up calls (Beer *et al*., 2024b).

Tenants must consent to data sharing with third-party open banking providers, and firms note significant dropout rates at consent stages. Tenants often feel pressured to grant consent quickly, impacting their freedom to choose. Firms strive to design interfaces that instil tenant confidence while offering alternative verification options. Open banking represents a significant change in tenant scoring, producing winners and losers. In some instances, detailed financial behaviour analysis through machine learning provides a nuanced understanding of applicants' affordability. Yet, despite rapid expansion, open banking faces challenges in verifying employment stability and predicting income fluctuations (Ciocănel *et al*., 2024). The difference in attitude concerning the use of banking transactions data can depend on trust and also on a sense of necessity. In this regard, a research participant from a tenant referencing firm suggested that:

> 'When you ask someone objectively, "Would you give personal information to a tech company?" They're like, "No, never." Then, when your landlord who you want to rent from says, "You have to give your personal information to this tech company," then it just shows the power of the need for housing.' (Tenant referencing firm 10)

Alongside open banking, tenant passporting is gaining traction. Azevedo *et al*. (2024) highlight its use in the Viennese rental market, where tenants leverage the *KSV InfoPass* system to showcase their profiles and gain a competitive edge. Similarly, our interviews suggests this trend is emerging in the English PRS, with tenants compiling digital data to demonstrate credibility to landlords and agents, shifting risk-profiling responsibilities to tenants. In competitive markets, tenant passports can streamline applications and improve tenants' chances of securing housing. While several companies are developing these tools, their success hinges on tenant participation, landlord trust in the data and demonstrable time and cost savings.

The development of a rental score as part of tenant passports would aggregate multiple attributes, like credit scores, and be used to screen tenants before viewings. This system is already in use in Australia, where the *Snug*[5] product increases scores based on provided data. However, tenants often struggle with understanding data requirements, and factors like pet ownership or receipt of benefits can be challenging (Przhedetsky, 2024). Digitally excluded tenants and those with minor past offences or thin credit files obviously face difficulties. The Snug system previously allowed higher rental scores for tenants willing to bid over the asking price, but this practice was curtailed after a regulatory backlash.[6]

In the UK, tenant passports could influence how tenants manage their finances, rather like the impact of credit scores. These passports increase transparency by allowing tenants to see the data shared with agents and landlords, addressing privacy and security concerns. Passports display affordability, rent payment history, and identity information through platforms like *Credit Ladder*. However, not all necessary information is digitally available, such as employment and former landlord data. Opinions differ on the extent of data included in tenant passports, their ability to reflect different agents' and landlords' affordability requirements and some firms argue that passports do not replace full tenant referencing but could accelerate pre-screening. The cost of tenant passports is also debated, with some suggesting basic screening should be free while full referencing remains landlord-funded. Linking tenant passports to open banking products could improve tenants' affordability assessments and promote inclusion. Standardising the information to meet a range of agents' and landlords' needs is an obstacle though, and some suggest tenants might need indemnity insurance to cover risks to landlords. In terms of the experience, in relation to one product, it was explained to us that:

> 'Traditionally, tenants have been a little bit wary of referencing companies; it feels a little bit smoke and mirrors: you don't really know what's happening to your information, or what you're being assessed on. Whereas *Property Passport* is much more transparent, in that way; the product lasts for the lifetime of the tenant – so they can keep updating it, keep coming back to it.' (Tenant referencing firm 8)

The emphasis here is upon the uncertainty of how the ordinal tenant is being formed through information. And so, while some tenants welcome the transparency of tenant passports, others see limited benefits, as pre-qualification does not address the inherent power imbalance in the rental market.

Classification in tenant selection: applying the ordinal tenant

Tools like those mentioned above can exacerbate exclusion, particularly without human oversight (So, 2023). Landlords often override recommendations, influenced by local market conditions or personal preferences, such as accepting tenant explanations for adverse credit or offering conditional lets requiring guarantors or advance rent – terms many tenants cannot meet. Few stakeholders address overall tenant selection outcomes, focusing on direct discrimination while

neglecting indirect impacts on other groups. While technological solutions like platform adjustments or open banking may improve some tenants' profiles, they fail to address broader exclusion issues or the power imbalances in the rental market.

Tenant referencing reports typically categorise assessments as pass/fail, suitable/unsuitable, or as high/medium/low risk. They might use a traffic light system (green for accept, red for refuse, orange for further review). Reports often provide aggregate risk ratings or reflect credit scores, with final assessments typically categorical, indicating a confident or borderline pass or fail. Some reports include a narrative summary to aid landlords and agents in understanding the assessments. Landlords often struggle to interpret these reports and grasp how data informs recommendations. Companies debate whether to display all data insights or only key points such as adverse credit or affordability, believing landlords prefer straightforward guidance on tenant suitability, despite some desiring detailed reports.

Landlords varied in their engagement and understanding of the reports, often relying on agents' interpretations. They sought concise explanations yet also desired more narrative to clarify ambiguous or conditional findings. Concerns about data privacy prompted firms to restrict data sharing with landlords. Some firms limited reports to confirming affordability, fearing revealing maximum affordable rents might lead to rent hikes. Providing minimal pass/fail data balanced landlords' and tenants' needs. However, disclosing indicative household incomes during pre-screening somewhat nullifies this tenant protection point.

Many tenants are rejected due to referencing. Estimates suggest between 4 and 10 per cent fail assessments and another 15 per cent face conditional lets. Half of the surveyed landlords had rejected tenants based on references. While these proportions seem low, nearly one million private lets were made in 2021/22 (DLUHC, 2024), impacting up to 10,000 people yearly. At-risk groups include those with poor affordability, non-standard employment, adverse credit, older people relying on savings and benefit recipients.

Failed references often result in tenants accessing lower-quality properties or facing homelessness in high-pressure areas. Affordability issues were the primary reason for failure. Employment income stability, not just the amount, is also critical, with non-standard employment forms often leading to failure. Some firms check HMRC or Companies House data for self-employed accounts, but irregular earnings undermine confidence. Fixed-term contracts ending before the tenancy period also pose challenges. The proposed *Renters' Rights Bill* may limit evictions without reason, potentially prompting landlords to exclude more tenants to secure long-term sustainability.

Credit files were used to verify debt, identity and address histories. Some landlords instantly rejected applicants with adverse credit, while others accepted old or small debts with explanations, especially if disclosed during pre-screening. Credit data ensured consistency between applicants' claims and third-party records, boosting confidence in integrity. Young people or migrants with thin credit files often struggled to verify their history, lacking a substantial digital

financial footprint (a crucial aspect of overall *eigencapital*), making them less visible to credit agencies. This external validation absence often led referencing firms, landlords and agents to doubt their credibility. Applicants without credit history but confirming other attributes were sometimes considered for conditional lets.

Older individuals with low incomes but higher savings often do not fit regular employment income models, as tenant wealth or assets are typically not considered. This leaves them unable to secure a tenancy without a guarantor or paying advance rent, accruing interest to the landlord. In response to such requests, as one tenant put it to us, being asked for a guarantor 'that's really insulting actually…if you can pay your rent and you can prove that you paid your last six months of rent with receipts or whatever, then it really shouldn't be an issue' (Tenant 15). As well as having an agitating effect, obtaining a family guarantor is challenging due to role reversals where adult children support parents. An insurer noted previous product rules excluded even millionaires without employment income, requiring a guarantor or advance rent.

Pre-screening excludes prospective tenants reliant on benefits from property selection. Some tenants could not input benefit income into platforms, hindering affordability demonstration. Some referencing agencies specifically included benefit income in assessments but acknowledge informal filtering by landlords or agents in adverts or screenings. Exclusions based on insecure employment or benefit receipt highlight risk perceived from deviations from ideal tenant profiles. While justified in some cases, exclusion patterns suggest indirect discrimination, especially affecting certain groups. This creates categories for the ordinal tenants that are considered misrepresentative, as one tenant explained:

> 'there is no proper section for people who are claiming benefits. You can only click an option called unemployed. That's it. So, the other thing is, if you select employed you can put your employment details and your income and all these things, but if you select unemployed you can't even put your income details. Nothing from your benefits […] You can't even prove there on that website you have an income from the government.' (Tenant 17)

The evolving labour market affects housing access, with landlords viewing insecure employment as a risk, leading to exclusion or conditional tenancies. About 21 per cent of workers are in severely insecure work, disproportionately affecting young people and minority ethnic groups. These workers earn less, rely more on benefits, and may have insecure contracts. ONS (2023) data shows self-employment, zero-hour contracts, and temporary work is more likely among Asian, Black, and female workers, suggesting indirect exclusion by referencing tools impacting protected groups' mainstream rental access. Only one firm had any analysis of letting recommendation outcomes on their radar, however. Evidence of direct exclusion based on protected characteristics is limited, but some firms hint at occasional landlord discrimination. Direct exclusion *via* pre-screening and discretionary decisions like conditional lets affect certain groups, while others benefit from homeowner guarantors or savings for advance rent.

Tenant experiences: being an ordinal tenant

Platforms often posed challenges for tenants on benefits or with savings, failing to accurately represent their circumstances. Established brands helped ease data-sharing concerns, though not everyone understood why certain information was required or how it would be processed. Privacy statements were received but often not thoroughly read. Tenants generally viewed digital referencing positively, especially those with seamless experiences. However, some felt coerced into participating due to urgent housing needs, despite concerns over privacy or data security. While platforms were often described as user-friendly, individuals with complex circumstances found them challenging. Tenants appreciated mobile applications that allowed them to track progress and receive clear assessment results. Platforms designed solely for agents and landlords were criticised for inadequate transparency.

Although digitisation permits faster referencing processes, delays occurred when the agent or landlord staff did not promptly review completed references. Digital referencing also improved transparency by offering tenant portals to track information. Companies increasingly adopted this approach to enhance the customer journey, responding actively to feedback with frequent adjustments. Tenants and landlords noted the substantial increase in data requests compared to past rental experiences, often finding them excessive. While some verifications were necessary, the overall process was seen as intrusive. Concerns were raised about queries regarding relationships with other tenants rather than financial matters. The intensified data requirements due to digitisation and automation were frustrating for many renters. With regard to digital and automated referencing, one tenant concluded that 'I feel like it's really intrusive now' (Tenant 12).

Complaints about data requests were infrequent, implying some tenant satisfaction with the process. However, this might reflect the urgency for housing overriding dissatisfaction with the process. Questions arose over the necessity of certain data requests, such as address histories, which tenants felt inferred instability or could be used for criminal history checks. Data protection regulations require data collection to be sufficient and proportionate. Yet, tenants often perceived some data requests as overly extensive. One firm increased data requests for at-risk tenants, akin to an interviewer probing further to give candidates a chance to respond effectively. They also reduced requests overall for data not significantly influencing recommendations.

More established forms of digital exclusion were minimal, as most individuals possessed email addresses and device access. However, older tenants faced challenges with platform use and digital evidence submission, often relying on family assistance or physical document submission. Whether these challenges stemmed from platform issues or user errors remained unclear. Trust in data-gathering systems was crucial for tenants. The customer interface needed to inspire confidence in handling personal information, particularly with open banking and third-party consent for banking data (Ciocănel *et al.*, 2024).

Tenants prioritising GDPR compliance and cybersecurity sought platforms with secure indicators, like padlock symbols in the browser URL. They emphasised

proportionate data collection and transparent data retention policies. Concerns arose when landlords requested sensitive information *via* insecure email, prompting cautious data release in segmented portions to mitigate risks. Being an ordinal tenant can include being concerned about the data being gathered. As one tenant put it:

> 'They give you a lot of information about […] where the money goes […] and all of that but they don't give you much about the documents you've supplied. Perhaps they should say this is kept in a safe place or registered somewhere so that, for the term of the let, this is protected. […] So that's why I was worried about them holding this material.' (Tenant 4)

Despite privacy concerns, tenants often trusted referencing firms, landlords and agents due to urgent housing needs. For instance, one tenant, who was a web developer, overlooked platform security issues, relying on reputation and widespread use, though some worried about data use and credit score impacts. Security was important, but many skipped privacy notices, prioritising housing over transparency. Data retention practices by self-managing landlords and agents were less clear than those of larger firms. In high-end rentals, tenants were sometimes reluctant to disclose income and net worth, prompting agents to use data transfer contracts to specify terms for sharing and approval.

Conclusion

This article has examined the emergence of the 'ordinal tenant' as a phenomenon shaped by data-driven, algorithmically implicated risk profiling within what Fourcade and Healy (2024) term an 'ordinal society.' The concept reflects tenants' categorisation through data attributes and algorithmic processes. Despite the hybrid nature of these systems, where human judgement and subjectivity persist, ordinal tenants are predominantly assessed *via* data-driven scales. We explore how such tenants are created, segmented and evaluated, alongside their lived experiences of being subjected to these systems.

Koopman (2019) highlights the role of data in shaping individuals through 'fastening,' describing how information systems both constrain and accelerate their subjects: 'Formats both tie us down and speed us up. The fastening enacted in formats is an operation of power that canalizes and accelerates the persons it helps to produce' (Koopman, 2019, p. 12). Ordinal tenants are thus fastened into data structures that inform algorithmic processes, influencing their treatment in the PRS.

The development of England's PRS has been driven by digital tenant referencing tools, which have transformed landlord practices by integrating comprehensive datasets. These tools enable landlords to access financial and administrative data, enhancing tenant selection decisions while streamlining processes. However, digitalisation also exacerbates accessibility barriers, particularly for tenants in non-standard employment, reliant on benefits or with limited digital proficiency.

While digital tools automate risk assessment, landlords' judgement remains crucial for navigating contextual complexities, such as varying risk thresholds shaped by market pressures and geography. Credit checks continue to dominate assessments despite attempts to contextualise credit histories. Initiatives like open

banking and tenant passports, intended to enhance inclusivity, may inadvertently deepen inequalities, benefiting affluent tenants while marginalising others and reinforcing spatial sorting.

These socio-technical systems not only entrench existing disparities but also raise critical ethical issues regarding privacy, fairness and bias in housing access. The digitalisation of landlord-tenant relationships reflects broader societal shifts explored by Fourcade and Healy (2024), where digital categorisation reshapes cultural, economic and social dynamics. The study highlights the need for balanced scrutiny to address the equity challenges posed by these technologies.

Notes

1. Open banking allows third-party financial service providers to access consumer banking, transactions, and other financial data using Application Programming Interfaces (APIs).
2. Those three letters stand for the Department of Social Security, a government department that has not existed since 2001 (becoming the Department for Work and Pensions (DWP)). However, in popular discourse the 'DSS' trope has stuck.
3. The study, *Code Encounters: Algorithmic Risk-Profiling in Housing* (https://www.york.ac.uk/chp/housing-markets/code-encounters/), was funded by the Nuffield Foundation. The views expressed are those of the authors and not necessarily the Foundation.
4. As part of internal border apparatus, the UK Government legally requires landlords and agents to check a person's immigration status to ensure their Right to Rent. Landlords can face penalties for non-compliance.
5. See: https://snug.com/.
6. See: https://www.theguardian.com/australia-news/2022/nov/17/imperfect-match-australian-renters-in-the-dark-over-use-of-data-by-tech-company-snug.

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