Commentary on "Digitalization of the Housing Search" and "Algorithms for All"

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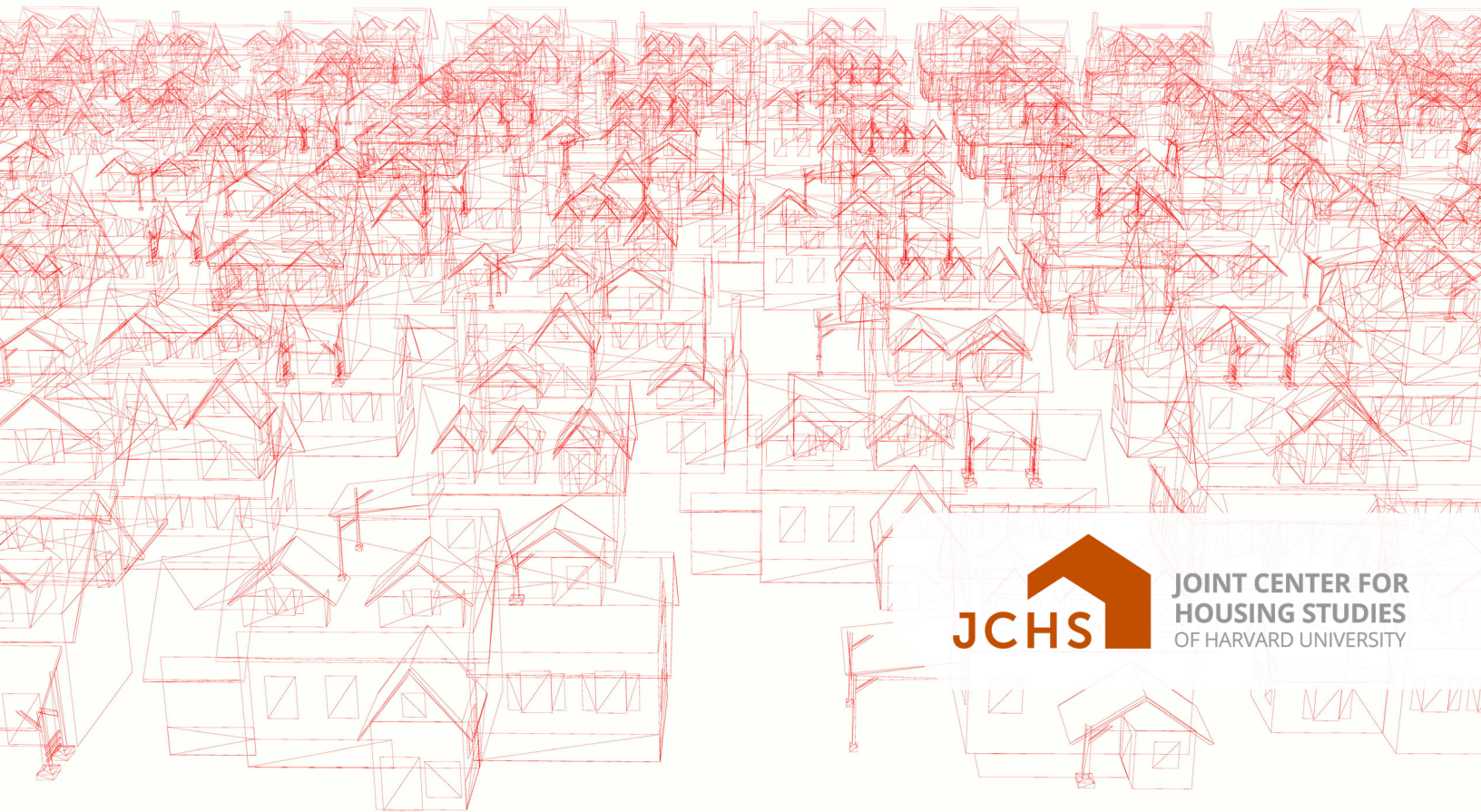
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Commentary on "Digitalization of the Housing Search: Homeseekers, Gatekeepers, and Market Legibility" and "Algorithms for All: Has Digitalization in the Mortgage Market Expanded Access to Homeownership?"

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Introduction

Digitalization is promising to expand opportunities for traditionally disadvantaged individuals and communities in the housing market. Digital platforms, such as Zillow and Redfin, are diminishing the role of traditional gatekeepers in the housing market, promising increased opportunities for marginalized groups to access information about the housing market.[1] Digital marketing uses algorithmically-based targeting techniques that can simultaneously broaden the reach of housing advertisements and narrow the characteristics of the advertisement recipients.[2] Algorithmic advances in the lending process are promising novel methods to assess credit-worthiness and evaluate home values for traditionally marginalized home purchasers.[3] Collectively, these digital transformations are optimistically touted as means to increase homeownership opportunities.

Both of the papers to which I am responding evaluate whether digitalization is realizing its promise. Boeing, Harten, and Sanchez-Moyano focus on the digitalization specifically in the homeseeking process, both for purchases and for rentals, whereas Perry and Martin examine digitalization across the homebuying process. Taken in concert, their analyses highlight the potential—and pitfalls—for digitalization to help expand homeownership opportunities.

Algorithmic Steering for Homeseeking Process

An unequivocal pitfall is the emergence of algorithmically-based digital marketing for housing units. This practice, labelled as algorithmic steering, describes how predictive models can be used to target housing ads to particular recipients, thereby employing algorithms to steer homebuyers towards different homes.[4] Both papers express wariness towards this practice and view algorithmic steering as unquestionably detrimental to expanding access to housing for several reasons. First, algorithmic steering may permit racial targeting that is unlawful according to the fair housing statutes. Both papers observe that Facebook allowed housing advertisers to exclude advertising recipients based on Facebook's ethnicity models, effecting racial discrimination and allegedly violating the Fair Housing Act. Second, even apart from the targeting capabilities they afford to advertisers, algorithmic steering can perpetuate or even exacerbate segregation. Algorithms inherently perpetuate the status quo because

[1] G. Boeing, J. Harten, and R. Sanchez-Moyano, "Digitalization of the Housing Search: Homeseekers, Gatekeepers, and Market Legibility."

[2] Ibid.

[3] V. Perry and K. Martin, "Algorithms for All: Has Digitalization in the Mortgage Market Expanded Access to Homeownership?"

[4] Ibid.

they are trained based on prior data.[5] Thus, algorithms target housing advertisements to people who are similar to current residents. Third, algorithmic steering can lead to unexpected, and not immediately obvious, disparities due to unanticipated inferences. For instance, women receive fewer STEM job advertisements than men receive because women are a more desirable demographic for advertisers and command a higher cost-per-advertisement.[6] Thus, even without discriminatory preferences from the advertiser, digital marketing can produce discriminatory outcomes and disparate impacts.

Digital Platforms for Homeseeking Process

The emergence of digital platforms is optimistically expected to "democratize" the homeseeking experience by removing traditional gatekeepers such as real estate professionals and by providing freely available housing information, thereby reducing information asymmetry.[7]

This optimism for transparency, or marketing legibility as it is called by Boeing, Harten, and Sanchez-Moyano, should be approached cautiously. More equitable internet access is a prerequisite for market legibility to expand housing opportunities. In order for digital information to increase housing opportunities, people must have broadband internet access and the resources required to move. The digital divide and the wealth gap create disparities in the ability to access and implement decisions based on widely available digital information.[8]

Boeing, Harten, and Sanchez-Moyano do note that digitalization may alter the setting for discrimination, suggesting that discrimination may occur on the platform or shift to the offline world. On digital platforms, indications of racial or religious identity are associated with lower success, including the likelihood of finding shared housing.[9] Even seemingly innocuous neighborhood information, such as school test scores or school racial composition, can be used by parents to self-segregate.[10] Lower information asymmetry, about individuals or neighborhoods, can paradoxically reduce equity and yield negative externalities for other residents in those neighborhoods.[11]

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[5] S. Barocas and A. D. Selbst, "Big Data's Disparate Impact."
[6] A. Lambrecht and C. Tucker, "Algorithmic Bias? An Empirical Study of Apparent Gender-Based Discrimination in the Display of STEM Career Ads."
[7] Boeing, Harten, and Sanchez-Moyano, "Digitalization of the Housing Search."
[8] S. Hasan and A. Kumar, "Digitization and Divergence: Online School Ratings and Segregation in America."
[9] S. M. Gaddis and R. Ghoshal, "Searching for a Roommate: A Correspondence Audit Examining Racial/Ethnic and Immigrant Discrimination among Millennials"; L. Rhue and J. Clark, "Who Are You and What Are You Selling? Creator-Based and Product-Based Racial Cues in Crowdfunding."
[10] Hasan and Kumar, "Digitization and Divergence"; V. Strauss, "What to Know Before Using School Ratings Tools from Real Estate Companies."
[11] Hasan and Kumar, "Digitization and Divergence"; Strauss, "What to Know."

Although the tension between transparency and equity is common in digital platforms, the solution is not as simple as lowering transparency. If transparency is eventually necessary, then lower initial transparency may lead to discrimination on digital platforms later in the process.[12] In the housing market, moderate transparency about the neighborhood and home condition is necessary; transparency about the current homeowner's identity is not necessary. There must be a balance between transparency about necessary unit characteristics and reticence about unnecessary identifiers. Digital platforms bear the burden in designing platforms to achieve that balance.

Predictive Models for Evaluation (Credit and Appraisals)

Perry and Martin note that predictive models for evaluation, such as credit scoring or home appraisals, are potentially positive consequences of digitalization. Current credit scoring practices are known to embed structural disparities.[13] The increased availability of financially relevant, non-traditional data and technological advances may increase the opportunities for minority and low-income borrowers.[14] Prior research has shown that digital and algorithmic lenders reduce disparities in interest rates as compared to traditional lenders,[15] supporting the conclusion in Perry and Martin. Perry and Martin identify the reticence of traditional marginalized populations to adopt these technology-based lenders as a major obstacle. A natural implication is the need to engage with community members and encourage the adoption of these innovative platforms.

Predictive models can also transform the appraisal process through automated valuation models (AVM) for houses. Current practices incorporate human appraisers who calculate the appraisal value based on their perceptions, and those subjective appraisals have been shown to exhibit bias.[16] AVMs incorporate more complex information about the housing market and may be trained to disregard information about the homeowner's identity, thereby generating more equitable appraisals for minority homeowners.[17] Again, the critical next step is the development and adoption of AVMs to offset the subjectivity of current appraisal practices.

Perry and Martin also view the potential for these predictive models to yield algorithmic reparations, or restorative justice for prior discrimination in the housing market.[18] This application of

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[12] J. Mejia and C. Parker, "When Transparency Fails: Bias and Financial Incentives in Ridesharing Platforms."
[13] Perry and Martin, "Algorithms for All."
[14] Ibid.
[15] R. Bartlett, A. Morse, R. Stanton, and N. Wallace, "Consumer-Lending Discrimination in the FinTech Era."
[16] Perry and Martin, "Algorithms for All."
[17] Ibid.
[18] J. Davis, A. Williams, and M. W. Yang, "Algorithmic Reparation."

AVMs and other predictive models feels premature. Predictive models typically identify and replicate prior patterns,[19] so their adoption in markets with historical inequities will only perpetuate those patterns, such as lower valuations for homes in formerly redlined neighborhoods. To use AVMs and other models as tools towards justice, we must explicitly define fairness and the legal framework for fairness in housing-related algorithms. Fairness affects every aspect of model building—collecting data, training classifiers, post-processing, and decision-marking—and each choice to increase fairness may also have legal and societal implications. For instance, a model that artificially lowers home values in majority neighborhoods to produce parity with minority neighborhoods would likely receive swift condemnation despite lowering racial disparities. Collectively, society must define justice in the housing market before AVMs, or other models, can be implemented to correct for historic injustices.

Discussion/Summary

Digitalization in the housing market can support the dual goals of expanding homeownership opportunities: helping individual homeowners from traditionally disadvantaged populations and helping traditionally marginalized neighborhoods. The first goal could be more easily achieved through digitalization. Digitalization in credit and appraisals, particularly predictive models, could reduce disparities by gathering non-traditional data, identifying novel patterns, and ignoring identity-related attributes. In this context, fairness is easy to understand; for instance, all borrowers with the same profile should receive the same amount of credit. The second goal is harder to achieve through digitalization. The transparency of digital platforms may harm traditionally marginalized communities through the mechanisms discussed above, continuing devaluation and discrimination. Any proposed use of digitalization to address historical discrimination, such as redlining, is hampered by the societal disagreement about what fairness means for previously redlined neighborhoods and their residents.

Boeing, Harten, and Sanchez-Moyano ask how we can "ensure these platforms' societal benefits outweigh their societal harms—for the community at large and for its most vulnerable members." This question summarizes the heart of the promise and perils of digitalization in the housing market. Although algorithmic steering is unquestionably perilous, other digital transformations, such as digital platforms and predictive models, hold the potential to expand opportunities for traditionally marginalized individuals and their neighborhoods as long as their harms can be minimized. The key to realizing that potential is to establish the definition of fairness in the context of the housing market.

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[19] Barocas and Selbst, "Big Data's Disparate Impact."

Digitalization in the housing market can potentially expand opportunities for traditionally disadvantaged populations—but only if implemented fairly.

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