Name: Stefan MacAskill

Topic: Enhancing affordable housing policy and delivery through green building principles: An integrated participatory system modelling approach.

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Publication & Symposiums:

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Submitted or presented conference/symposium documentation


PhD Thesis Abstract

In Australia, rising energy, water, and gas costs exert increasing financial pressure on low- and middle-income rental households, which are often subject to issues of split-incentives. The split-incentive problem concerns the lack of appropriate incentives for landlords to implement green building principles and associated utility efficiency measures. This thesis explores policy options for mandating green building principles into future Australian affordable rental housing. A revision to the Australian ‘Affordable Housing Bond Aggregator’ (AHBA) model is proposed, which incentivises operational utility efficiency measures in exchange for low-cost development loans derived from green bond issuances. The thesis is comprised of three studies. First, a case study is undertaken which investigates the financial value of green building principles within the South East Queensland region. Operational utility efficiencies, achieved through green building principles, are modelled to reduce total housing costs by 1.7–3.8% (an average approximate saving of AUD $5–18 per week) for one- and four-person low-income households, respectively. The implications of the study relate to innovative perceptions of affordable rental housing subsidies through green building practices. Second, a systematic literature is undertaken to establish a consensus on the existence— or nonexistence— of a green premium in the green bond market. A consensus is confirmed within 56% of primary and 70% of secondary market studies, particularly for green bonds that are government-issued, investment grade, and that follow defined green bond governance and reporting procedures. The green premium varies for the primary market; however, an average green premium of −1 to −9 basis points on the secondary market is observed. Aside from its implications for affordable housing policy, the study has broader implications for bond pricing theory by suggesting that future bond pricing should consider noneconomic motives of investors, such as environmental preferences. Lastly, an operational system dynamics model is developed to determine regional outcomes of changes to the AHBA, over a 20 year-horizon. Overall, it is found that the green building framework will deliver 2.37% less housing due to higher initial capital costs. However, green affordable housing delivers substantial long-term energy and water efficiency benefits, improved affordability for tenants due to reduced utility costs, deferred water and energy infrastructure benefits, and considerable contributions towards Australia’s carbon emission reduction targets. Tenants are expected to benefit from a 45–59% reduction in energy and a 27% decrease in water bills. Moreover, a shift to affordable green building policy could contribute to 2.9% of Australia’s Conference of Parties 2030 carbon emissions reduction target if applied nationally. Policy recommendations are modelled that would yield the benefits of green affordable housing without sacrificing the small reduction in housing stock delivered by the proposed program. It is determined that a green building grant provided to developers would mitigate the reduction in affordable housing supply, and at a net financial cost that is lower than the aggregated benefit. Overall, this research has implications for the future of Australian affordable housing policy through providing evidence to suggest that a focus on green building principles at a policy level may offer a broad base of economic, environmental, and social benefits. Key themes: Affordable housing policy, Green building, Sustainable finance, Green bonds, System dynamics modelling.
Key thesis achievements

Practical:
The study explored what impact a green building mandate within government supported affordable housing would have on the South East Queensland Region. Economic, environmental and social impacts were quantified.

Contributes to NHFIC research objectives into broader housing affordability and innovative methods for analysis. (Dr. MacAskill spoken with Hugh Hartigan at NHFIC whom is aware of my research and applications to their work.)

Academic:

First use of system dynamics modelling to forecast affordable housing supply and demand in South East Queensland (model is adaptable for other regions)

First systematic literature review into the ‘green premium’ in green bond prices globally.

Contribution to the literature surrounding green building performance attributes as a function of operational cost for tenants.