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ing Program.” Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory Working Paper no. 56380.

## **Comment**      Olivier Deschênes

Most proposed climate legislations are centered on the establishment of a market-based mechanism to price the externality caused by carbon emissions. In many cases, these proposals also include other provisions such as industry-specific subsidies, standards, and other forms of regulations or incentives. The chapter by Lucas Davis begins by making the key observation that in settings where asymmetric information or principal-agent problems arise, carbon pricing alone may not be sufficient to solve the environmental externality problem. Such settings would justify combining standards and market-based approaches to address the externality, as is the case for example in H.R. 2454.

One example where a market failure still arises in the presence of a market price on carbon emissions is the “landlord-tenant” problem. Because information about the energy efficiency of certain appliances might be difficult to credibly convey to tenants, landlords will tend to furnish their rental units with cheaper, energy inefficient appliances. In that case, and to the extent that tenants cannot change their appliances in response to the higher energy costs, carbon pricing will lead to inefficient energy consumption amongst tenants. Lucas Davis’s chapter fills an important gap in the literature by presenting the first comprehensive empirical analysis of the landlord-tenant problem using data from the 2005 Residential Energy Consumption Survey (RECS).

The evidence in this chapter clearly supports the notion of a landlord-tenant problem. First and foremost, Davis’s analysis convincingly shows that renters are significantly less likely to have energy efficient appliances (defined as appliances with the “Energy Star” certification) than homeowners. This is especially notable for refrigerators and dishwashers, where the homeowner-renter energy efficiency gaps are 7 and 10 percentage points, respectively. The baseline coverage rate of these energy efficient appliances is roughly 25 percent so the estimated gaps are large. Importantly, most of the regression estimates reported are insensitive to the inclusion or exclusion of a rich set of control variables such as household income, demographic variables, energy prices, and weather variables. As such, concerns about omitted variables bias plaguing the estimates are unlikely to be important. Davis also

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considers a series of alternative explanations for the main findings and presents a thorough specification analysis aimed at evaluating them. By and large, the main results are robust to the alternative specifications considered, lending further support to the landlord-tenant hypothesis.

I have a few suggestions for the author and others doing research in this area. One interesting finding that needs further attention is the fact the homeowner-renter energy efficiency gap does not appear to interact with household income, as shown in rows (G) and (H) of table 19.3. Davis interprets this as suggestive evidence against the notion that the documented homeowner-renter gap reflects a difference in unobserved preferences for “green” products. Whether this is the case should be more carefully analyzed in future research. Also, while I share Davis’s view that taken as a whole the empirical evidence supports the notion of a landlord-tenant problem, there are a few empirical irregularities in table 19.3 that might require further attention. One such issue is sign reversals and sizable changes in point estimates across some of the specifications. While some of these fluctuations may reflect nothing more than sampling variation, it will be important to continue probing these estimates as more data become available.

More generally, I think future work in this area should focus on the important appliances such as central heating and cooling units that are not analyzed in this chapter because of data limitations. As Davis notes, central heating and cooling demand accounts for roughly 75 percent of renters’ energy consumption, and these types of appliances are possibly even more subject to creating perverse agency issues. Future installments of the RECS should consider expanding their questionnaires to include these appliances. Finally, another possible area for future research is to analyze differences in actual energy consumption between homeowners and renters conditional on income, household size, and house/unit square footage rather than simply analyzing the “coverage” of energy efficiency unit. The landlord-tenant problem is not as much of an issue if renters use their variable-usage appliances such as dishwasher and air conditioners less intensively than homeowners.