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Evaluating the Welfare Effects of a Location-Based Program in the Presence of Migration

A method and some examples

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[Extended Abstract]

Taryn Dinkelman and Sam Schulhofer-Wohl[1]

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Estimating the impacts of a place-based policy in a partial equilibrium setting often involves studying the effects on a few outcomes proximate to the policy in question. The development literature provides many recent examples: Devoto et al (2010) measure the demand for water connections, water usage and health, self-reported well-being and time use in response to subsidized private tap connections in Morocco; Dinkelman (2010) measures use of home production technologies, labor supply and earnings in response to household electrification in South Africa; Kremer et al (2010) measure disease incidence and willingness to pay for public spring protection in Kenya; Cattaneo et al (2009) measure child health, child cognition and adult happiness in response to newly cemented floors in Mexican households; Duflo and Pande (2007) measure agricultural productivity and various indicators of poverty (including wages) in response to dam building in India. In much of this work, little attention is focused on measuring welfare effects when adjustments to the policy occur along a different margin: the margin of migration.

In this paper, we make two points and a methodological contribution related to migration and the welfare impacts of location-specific investments. The first point is that when individuals migrate toward an area benefiting from location-specific policies, increases in local population may lead to crowding of access to other types of goods and services, especially when the supply of these other goods and services is inelastic.[2] To provide an example: if schools are being built in a

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[2] See Moretti 2010 for this general result in the context of a standard spatial equilibrium model.

certain district, then any family moving in to this district will have access to schools, will raise the student-teacher ratio for incumbent schoolchildren, and may lengthen the queue for getting health care at the local hospital. Depending on the elasticity of migration flows with respect to these policies, this reduced access to other goods and services (health care, in the example) may be important to measure in order to correctly quantify overall welfare impacts of the policy.[3]

The second point we emphasize is the complexity of measuring congestion effects when land markets (and/or labor markets) do not function. In theory (i.e. Roback 1982), looking at land prices or housing values and wages should be sufficient for signing and sizing the effects of such externalities on welfare. Indeed, some authors have done this type of work in the US, where such price and wage data are readily available: Black (1997) considers how improvements in school quality translate into higher housing prices; Davis (2010) examines how construction of a power plant in a county reduces land values and rents; and Greenstone et al (2010) look at how wages increase in counties who 'win' million-dollar plants. More importantly, land and labor markets exist and operate well, so that changes in welfare related to location-based investments are fully capitalized in housing prices or translate into wage effects (e.g. Busso, Gregory and Kline 2008; Gonzalez-Navarro and Quintana-Domeque 2010). In developing countries, where most of our examples come from, missing and dysfunctional land markets are more common. In these settings, when the population grows due to migration, the most usual allocation mechanism is the queue, rather than any increase in price. The combined effects of a location-specific policy and migration responses to location-based policies cannot be capitalized into housing or land values simply because these markets do not exist. This fact is difficult to handle in standard spatial equilibrium models.

The main contribution of the paper is to propose an alternative method for estimating welfare effects of a place-based policy, taking into account migration and missing land and housing markets. We develop a simple model to show how a new infrastructure investment affects labor market outcomes and migration directly, and indirectly changes the probability of accessing other locally-specific goods. We show that if one can plausibly estimate the migration elasticity in response to the initial infrastructure investment, as well as the change in probability of

[3] In fact, although RCTs seldom focus on spillovers related to migration responses to programs, they are perhaps ideally placed to identify these congestion externalities, if suitable data on other outcomes are available.

accessing these other locally-specific goods in response to the new policy (i.e. the increase in the length of the queue), under some assumptions on the utility function and using data on prices of these local goods taken from other markets, one can bound the total impact on welfare of the initial location-based investment.

We illustrate our method using the example of household electrification in rural South Africa. Dinkelman (forthcoming) studies the impact of new household connections to the electricity grid in rural KwaZulu-Natal using plausibly exogenous variation in one of the factors affecting the cost of grid expansion – community land gradient. In this example, the location-based policy is household electrification. We define goods that are subject to possible congestion externalities as high quality formal houses.

Building on the results of that paper, we show that migration into electrifying areas is substantially higher than migration into non-electrifying areas, across all age groups. We then use exogenous variation in electricity rollout identified by land gradient to estimate the change in the length of the queue for a good house, or, the change in the probability that an individual lives in a house of good or poor quality (where good quality/poor quality houses are defined below). And finally, armed with these estimates, the set of assumptions on preferences from our model, and taking data on housing prices for good and poor quality houses from markets in other parts of the country, we estimate the total welfare impact of rural household electrification.

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