Title: One-to-Many Matching with Complementary Preferences: An Empirical Study of Natural Gas Lease Quality and Market Power

Abstract: As a consequence of technological innovation in the oil and natural gas industry over the last 20 years, firms have increased access to reserves trapped in tight-shale formations, and new wells are now being drilled in more densely populated regions. The leases landowners sign, relinquishing the rights to their mineral estates, are critical in protecting them against exposure to health risks and the other negative features of drilling activity (noise, disruption, etc.). This paper studies the observable determinants of more protective leases for landowners, and builds a structural model of negotiation capturing relevant features of the leasing market. Using unique data on the contents of privately negotiated natural gas leases, I study the direct and indirect effects of firms’ “economies of leasing,” or firms’ geographic market concentrations. Firms value concentration directly because it quickens the time between leasing mineral rights and profiting from natural gas sales. Indirectly, firms with large lease concentrations sign less costly leases, suggesting that they are able to exercise market power. Using theoretical results describing large markets with complementary preferences, the negotiations between firms and landowners are modeled as a two-sided, one-to-many matching model where firms have complementary preferences for sets of parcels, valuing parcels more in areas where they sign a greater concentration of leases. The estimated model is then used to analyze the effects of policies that change the market structure and restrict the lease quality signed in the industry. I am able to predict the effects of these policies on firms’ and landowners’ values of negotiating, the negotiated lease quality, and the changes in the spatial distributions of leasing behavior.