The Rise of Urgent Care Centers: Implications for Competition and Access to Health Care

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Abstract

The rise of urgent care centers (UCCs) in the US has generated questions about how these establishments integrate into the health-care landscape. We study the implications of UCCs' location decisions for competition and access to health care. Using data on UCCs' locations, we estimate a model of endogenous market structure for UCCs and hospitals. We find that, while UCCs enjoy market power, hospital presence deters entry. However, UCCs are just as likely to enter traditionally underserved markets, suggesting that these establishments play a role in expanding access to health care.

JEL Codes: I11, I14, I18, L10

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1 Introduction

The last twenty years have seen dramatic changes in where Americans go to receive medical care. Before 2000, the vast majority of Americans had to visit the emergency room for after-hours or urgent medical needs. More recently, however, there has been a proliferation in the number and types of establishments offering medical services for non-life-threatening conditions. In particular, the United States health-care sector has seen an important expansion of independently owned urgent care centers (UCCs), and the number of these establishments has more than doubled from 2008 to 2018. UCCs are freestanding ambulatory care centers, typically open on nights and weekends, where patients can receive treatment for ailments such as minor injuries or illnesses.

This proliferation raises many questions about how UCCs interact with the rest of the health-care system. The existing literature predominantly takes as given UCC location decisions and focuses on both the impact of UCCs on health-care costs and the relationship between demand for care at UCCs versus hospital emergency rooms (see e.g., Currie, Karpova, and Zeltzer, 2021). In this paper, we focus on two complementary questions about market structure: (i) to what degree UCCs compete with each other as well as with hospitals and their affiliated UCCs, and (ii) whether UCCs' location decisions expand access in underserved markets.

Understanding the market structure of UCCs has important implications for the health-care landscape, particularly given the growing concerns about concentration and congestion in hospital markets as well as market power more generally in health-care markets in the US. For example, 90 percent of hospital markets were considered "highly concentrated" in 2016 (Fulton, 2017), and, despite a decline in the number of emergency departments over recent decades, emergency department visits have increased.[1] To the extent that UCCs are located near hospitals, they may face increased competition and alleviate congestion, which could generate downstream cost savings and health benefits. Moreover, understanding the extent to which UCCs choose to locate in areas that are traditionally well served by health-care establishments or instead broaden access to underserved markets has consequences for policies that aim to encourage or discourage entry of new health-care establishments (e.g., through Certificate-of-Need regulation).

To study UCC location decisions, we identify the geographic locations of UCC establishments from the Your Economy Time Series (YTS) database, which contains geo-coded locations of all business establishments in the United States from 1997 to 2019, including years of operation, establishment name, employment, NAICS codes, SIC codes, location, and parent organization. This data allows us to document several interesting patterns. First, we observe tremendous growth in UCCs since 2000, in line with that reported by the Urgent Care Association, a trade association for UCCs.[2] Second, we show that this expansion is not homogeneous across the country. While they tend to locate in higher-income, urban areas, UCC presence is also positively correlated with the percentage of residents who are Hispanic, and uncorrelated with the percentage of uninsured. An important difference does emerge, though, between independent urgent care centers (UCCs) and hospital-affiliated urgent care centers (AUCCs).[3] In particular, we see that AUCCs, whose objectives are likely tied to those of the hospital system that operates them, are located in markets with larger populations.

We use these descriptive facts to motivate a model of the equilibrium number

[1] See e.g., https://www.hcup-us.ahrq.gov/faststats/NationalTrendsEDServlet.

[2] See e.g., https://www.ucaoa.org/About-UCA/Industry-News/ArtMID/10309/ArticleID/877/Booming-Urgent-Care-Industry-Filling-the-Gaps-in-Patient-Care.

[3] In the rest of the paper, we refer to unaffiliated UCCs as UCCs and hospital-affiliated UCCs as AUCCs.

of UCCs in geographic markets, in the spirit of Bresnahan and Reiss (1991). Importantly, we jointly model the presence of hospitals alongside UCCs to account for competition between UCCs and hospitals. Thus, our model follows Mazzeo (2002) and Schaumans and Verboven (2008) in accommodating two types of firms (in an extension, we estimate a three-type model that includes AUCCs' entry decisions). In the model, UCCs and hospitals decide to enter markets, defined as Primary Care Service Areas (PCSAs). These decisions depend on both observable and unobservable determinants of profitability. We allow for the unobservable determinants of profitability to be correlated across UCCs and hospitals in a given market. We further assume that, while hospital entry decisions are not directly affected by UCC entry decisions, UCC market-level profits can depend on hospital entry. As hospital entry is endogenous, we identify the competitive effect of hospitals on UCCs by leveraging state-level variation in Certificate-of-Need (CON) laws. These laws affect the entry decisions of hospitals but are excluded from UCCs' payoffs. In a sample of markets that are plausibly isolated, we estimate the model as a bivariate probit.

When we account for the endogeneity of hospital entry, our estimates show that hospitals have a pronounced negative effect on the profitability of UCCs. Competition from multiple hospitals in the same market reduces the number of UCCs by 20.5 percent as compared with markets with at most one hospital. While this effect is significant, the presence of multiple hospitals does not foreclose UCC entry, possibly because of differentiation of UCCs through, e.g., superior convenience. In contrast with the descriptive evidence, our model estimates imply a negative relationship between UCC entry and market-level median income when controlling for several determinants of entry.

Following Bresnahan and Reiss (1991), we compute entry thresholds, which indicate the requisite population to sustain a given number of firms in a market. We find a minimum population threshold of around 31,000 people to sustain a monopolist UCC, while 39,000 people per-firm are needed to sustain three or more UCCs in a market. Bresnahan and Reiss (1991) show that the rate at which these thresholds increase in the number of firms is informative about the nature of competition. We find that, despite the highly nonstandard nature of competition in health-care markets, UCCs display a pattern that is familiar in oligopolistic retail markets. In particular, threshold ratios are above one, suggesting that UCCs maintain some market power even with three establishments in a market. This supports an interpretation that UCCs can exercise their market power via both bargaining with insurers and direct contracting with uninsured patients.

The fact that UCCs have an incentive to locate in markets with fewer hospitals suggests that UCCs expand the provision of medical services to new markets. To better understand who is impacted by this entry, we re-estimate our model on separate subsamples of the data. In doing so, we aim to capture heterogeneity in the determinants of entry across markets with different demographics. We focus on traditionally underserved markets, defined as those with higher rates of uninsured individuals, lower incomes, and higher social vulnerability. We find that entry thresholds are not higher (and typically lower) in these markets. Thus the concern that UCCs are avoiding these areas (e.g., Solomon, Popkin, Chen, Uttley, and Baruch, 2020),[4] thereby contributing to the lack of access to health care, is not consistent with our results.

A sizable fraction of urgent care centers are affiliated with a hospital system, and these establishments are likely to interact with hospitals differently than unaffiliated

[4]These concerns arise from the fact that UCCs are (descriptively) more likely to be located in higher income areas (Le and Hsia, 2016) and sometimes do not accept Medicaid patients. Insofar as these patterns conceal correlation with other observable and unobservable variables, drawing conclusions about determinants of UCC entry in the absence of a model may be misleading.

UCCs do. To investigate this, we modify the two-type model of hospitals and unaffiliated UCC competition to include the entry decisions of AUCCs. Our three-type entry model, in the spirit of Cohen and Mazzeo (2007), is more demanding of the data and relies on heftier assumptions. Nevertheless, the results about competition between UCCs and hospitals are robust to this extension. We also find that AUCCs and hospitals do not compete as fiercely as UCCs and hospitals: the model estimates support the intuition that hospital systems, when opening an AUCC, trade off self-cannibalization with market expansion. Moreover, AUCCs require three to five times the population that UCCs require to enter a market, suggesting that UCCs play a more dominant role in expanding access to small, underserved markets.

This paper is part of a recent literature that explores the expansion of urgent care centers in the US. Most of this literature studies demand-side questions related to the impact of urgent care centers on health-care use and costs (Weinick, Burns, and Mehrotra, 2010; Uscher-Pines, Pines, Kellermann, Gillen, and Mehrotra, 2013). Current evidence is mixed: some estimate a negative relationship between urgent care availability and emergency room use (Allen, Cummings, and Hockenberry, 2021) while others estimate null or positive effects (Currie et al., 2021).[5] Other papers document descriptive evidence of urgent care centers' locations (Le and Hsia, 2016; Corwin, Parker, and Brown, 2016). Complementary to these studies, which take market structure as given, we examine the determinants of market structure in the urgent care industry. In particular, we highlight the competition with hospitals and the demographic patterns of urgent care center entry.

More recently, Geddes and Schnell (2022) show that location choices of retail clinics and urgent care centers respond to changes in health insurance coverage: in

[5] A related literature studies similar questions for retail clinics (clinics typically located in grocery stores or "big box" stores like Target and Walmart); see, for example, Alexander, Currie, and Schnell (2019); Ashwood, Gaynor, Setodji, Reid, Weber, and Mehrotra (2016).

particular, such establishments expand in areas with higher rates of private insurance and avoid areas with higher rates of Medicaid coverage. While this evidence suggests that urgent care centers do not expand access along this dimension, our framework allows us to examine other definitions of underserved markets and quantify the relationship of UCCs vis-à-vis the presence of hospitals in providing access to care.

We also contribute to the broader literature on entry in US health-care markets. Work in this area investigates the determinants of entry of doctors' offices and dentists (Bresnahan and Reiss, 1991), hospitals (Abraham, Gaynor, and Vogt, 2007), outpatient substance abuse treatment facilities (Cohen, Freeborn, and McManus, 2013), retail clinics (Hollingsworth, 2014), and hospices (Chung and Sorensen, 2018). Using a static entry framework, papers in this area make inference on the nature of competition, and typically consider types of establishments in isolation. As UCC entry may be affected by hospital and AUCC entry in a market, we show the importance of accounting for the interdependence of entry decisions between different types of health-care establishments.

The paper proceeds as follows. Section 2 introduces our data and provides background and descriptives on the urgent care industry. Section 3 describes our model of endogenous UCC and hospital market structure and discusses identification and estimation of the model. Section 4 presents our results. Section 5 presents an extension to the model that incorporates AUCCs, and Section 6 concludes.

2 Industry Background and Data

In this section, we provide background on urgent care centers and their relation to other health-care establishments. We also document their expansion and provide descriptive evidence on their interaction with hospitals.

2.1 Urgent Care Centers

Urgent care centers are health-care establishments that specialize in the treatment of minor, non-life-threatening health conditions such as respiratory infections, digestive issues, fevers, sprains, lacerations, fractures, back pain, headaches, dermatological conditions, urinary infections, and allergies (Urgent Care Association, 2019). Urgent care centers provide walk-in, extended hour services like X-rays and laboratory testing, as well as diagnostic and screening services for more acute illnesses. Patients requiring more sophisticated services (e.g., surgery or CT scans) are sent to other medical establishments such as hospitals. They typically employ family practice physicians, emergency medicine physicians, nurse practitioners, and radiology technicians for imaging services (Urgent Care Association, 2019). The majority of urgent care centers are owned by physicians, but an increasing number are owned by (or affiliated with) hospital systems.[6]

Health-care establishments are often subject to a variety of state and federal regulations that oversee the conditions under which they are allowed to operate, including licensing requirements and Certificate-of-Need (CON) laws. For urgent care centers, however, this type of oversight is still relatively limited. For example, most states treat urgent care centers under the same rules as physician's offices. This implies that, beyond requiring physicians to be licensed in the state, the only form of state oversight typically concerns disciplining malpractice. This also implies that urgent care centers are often exempt from entry regulation like CON laws.

[6]Additionally, an increasing number are backed by private equity (mirroring a trend in other health-care establishments like nursing homes, hospitals, and some physician specialties, e.g., Gupta, Howell, Yannelis, and Gupta (2021) and Offodile, Cerullo, Bindal, Rauh-Hain, and Ho (2021)).

2.2 Relation between UCCs and Other Health-Care Establishments

Other types of health-care establishments provide services that overlap with urgent care centers, from routine vaccinations at retail clinics and physicians' offices to infections and fractures at hospitals (see Weinick et al. (2010) for a study on the overlap of care provided by retail clinics, urgent care centers, and hospital emergency departments).

Hospitals serve a vast array of health conditions, ranging from planned and highly specialized surgeries to care for more minor (but not necessarily urgent) conditions in the emergency room. Within emergency departments, over a third of visits are for conditions not typically treated at urgent care centers, like chest pain, but emergency rooms still see a significant number of visits for conditions that overlap with urgent care centers, like strains, dermatological conditions, and upper respiratory infections (Weinick et al., 2010).

Retail clinics, which have also seen a proliferation in the past decade, treat a much more limited set of health conditions than urgent care centers, including upper respiratory infections, vaccinations, and allergies. Importantly, they are located within retail stores (such as CVS or Walmart) and thus have shorter hours than urgent care centers, and are typically staffed by nurse practitioners. Urgent care centers, on the other hand, often offer after-hours care, and employ physicians.

Because of these differences, we exclude retail clinics from our analysis, and instead focus on the competitive relationship between hospitals and urgent care centers. Similarly, we do not model competition between urgent care centers and physicians' offices, as urgent care centers cannot serve as a patient's primary care physician but instead provide walk-in and after-hours services not typically offered by physicians' offices. Thus our analysis focuses on the nature of competition among entities that provide unscheduled and after-hours care for urgent health needs: urgent care centers and emergency rooms. Moreover, we extend our main analysis to a model that includes hospital-affiliated urgent care centers (denoted as AUCCs) as distinct entities because they likely operate with different goals than UCCs (for example, unlike UCCs, hospital systems may be maximizing system-wide as opposed to AUCC-specific profits).

2.3 Data

Our main data source for geo-coded locations of UCCs is the Your Economy Time Series (YTS) database.[7] This database contains information on the universe of business establishments in the United States from 1997 to 2019, including years of operation, establishment name, employment, NAICS codes, SIC codes, location, and parent organization. We impose several sample restrictions from the full YTS data to obtain our final sample. We start by selecting all establishments that are classified under SIC code 80 (health-care services) at any point during their years of operation.

To isolate UCCs in our data, we obtain the name of all urgent care operators across the country from SolvHealth[8] – a comprehensive online platform to search for UCCs – and manually match the operator name in SolvHealth with the establishment name in YTS. We also keep health-care service establishments whose name includes the word "urgent", and then drop operators that correspond to retail clinics, including Walmart, Target, and CVS Minute Clinic, and – for our main analysis – operators

[7]This database is supported by the University of Wisconsin System Institute for Business and Entrepreneurship. It is based on InfoGroup's RefUSA database that has been used in several other studies (e.g., McDevitt, 2014; Suárez Serrato and Zidar, 2016).

[8]See https://www.solvhealth.com, accessed May 2022.

that are affiliated with hospitals (AUCCs).[9] Finally, we drop duplicate establishments in YTS, defined as those with the same identifier or those with the same operator that are within one block of the other. We show in Appendix Table 1 how these steps result in our sample of UCCs for the year 2015.

We aggregate this data to the market level, where a market is defined as a Primary Care Service Area (PCSA), defined by Goodman, Mick, Bott, Stukel, Chang, Marth, Poage, and Carretta (2003). This is one of two main market definitions that are based on how far patients actually travel to health establishments (the other one is Hospital Service Areas (HSAs)). PCSAs are defined to capture catchment areas for primary care services. Despite differences between primary care and urgent care services, the size of PCSAs more consistently aligns with the evidence of patients' travel distances for urgent care than do the larger HSAs.[10] Descriptive statistics on PCSAs in the continental US are presented in Table 1.

We supplement our YTS data with several other datasets to measure hospitals and demographic characteristics. We use the Hospital Compare database maintained by the Centers for Medicare and Medicaid Services (CMS) as our measure of the number of hospitals in each market. This dataset is a panel of all Medicare-certified hospitals from 2005 to 2019, containing information about hospital type, an indicator of whether the hospital has an emergency room, location, and years of operation. We also use demographic data from 5-year American Community Survey (ACS) estimates from 2013 to 2017 (hosted by IPUMS-NHGIS) at the Zip Code Tabulation Area (ZCTA) level, which we aggregate to the PCSA level. These characteristics in-

[9]To exclude AUCCs, we cross-check the names of our UCCs with hospital names in the Centers for Medicare and Medicaid Services' Hospital Compare. In a model extension in Section 5, we include AUCCs that are affiliated with hospitals in the same Health Service Area (HSA), but exclude AUCCs affiliated with hospitals located outside the HSA.

[10]Intuitively, hospitals offer many elective or specialized procedures, for which patients are willing to travel longer distances. We further discuss survey-based and model-based evidence that supports our market definition in Appendix B.

Table 1: Market Characteristics by Number of UCCs

	Full sample	Number of UCCs			
		0	1	2	>=3
Population (1,000s)	47.9 (73.9)	18.5 (21.5)	46.2 (38.7)	64.3 (51.2)	146.7 (124)
Rural	0.38 (0.42)	0.51 (0.44)	0.25 (0.34)	0.20 (0.31)	0.10 (0.19)
Per cap. Income ($10K)	3.04 (1.14)	2.91 (1.11)	3.09 (1.17)	3.23 (1.16)	3.36 (1.11)
Hispanic	0.11 (0.16)	0.09 (0.14)	0.11 (0.16)	0.13 (0.16)	0.16 (0.17)
Black	0.01 (0.07)	0.02 (0.09)	0.01 (0.04)	0.01 (0.03)	0.01 (0.02)
High school or more	0.46 (0.06)	0.45 (0.06)	0.46 (0.06)	0.47 (0.05)	0.47 (0.05)
Age 65 and over	0.18 (0.06)	0.19 (0.06)	0.17 (0.06)	0.17 (0.05)	0.16 (0.05)
Uninsured	0.09 (0.05)	0.09 (0.06)	0.09 (0.05)	0.09 (0.05)	0.09 (0.05)
CMS wage index	0.97 (0.17)	0.96 (0.16)	0.99 (0.18)	0.99 (0.19)	1.00 (0.18)
Any hospital	0.53 (0.50)	0.42 (0.49)	0.59 (0.49)	0.66 (0.47)	0.80 (0.40)
Any AUCC	0.16 (0.37)	0.07 (0.26)	0.16 (0.37)	0.24 (0.43)	0.46 (0.50)
T	6,696	4,010	994	581	1,111

Note: Table presents means and, in parentheses, standard deviations, of market characteristics in the full sample and in subsamples conditional on the number of UCCs, and total number of markets in the final row. Rural, Hispanic, Black, high school or more, age 65 and over, and uninsured are proportions of total population. Any hospital is the fraction of markets in the sample with at least one hospital. Any AUCC is the fraction of markets in the sample with at least one hospital-affiliated UCC.

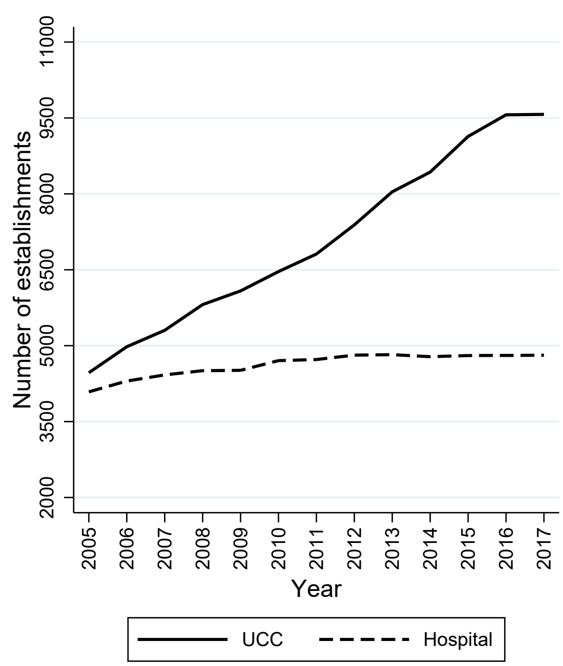
clude: total population; median per capita income; percentage of the population that identifies as Hispanic, non-Hispanic Black, and non-Hispanic white; percentage of the population that is uninsured; educational attainment; and percentage of population age 65 or older. We use an annual hospital wage index from CMS, defined as the ratio of the area's average hourly wage to the national average hourly wage, as a shifter of fixed costs. This index is measured at the level of Core-Based Statistical Areas (CBSAs), which we map to PCSAs. Finally, we obtain the Social Vulnerability Index (SVI) from the Agency of Toxic Substances and Disease Registry at the Center for Disease Control and Prevention and assign to a PCSA the population-averaged SVI across the ZCTAs within its boundaries.[11]

[11] The SVI of an area measures its vulnerability to public health emergencies, and captures factors including poverty, lack of access to transportation, and crowded housing. We use the 2014 county-level measure from http://svi.cdc.gov/.

2.4 The Expansion of UCCs

The urgent care sector experienced dramatic growth during the last decade, surging from around 4,500 establishments in 2005 to 9,500 in 2017 (see Figure 1).[12] In line with this growth in the number of UCC establishments, other work has shown that health-care utilization at UCCs also increased by 1,434 percent, thus representing 19 percent of claims lines in 2017 (FAIR Health, 2019). In contrast to the growth of urgent care centers, the number of hospitals has stagnated since 2012 at around 4,900 hospitals (see Figure 1). Overall, the data indicate a fast expansion of UCCs in both absolute terms and in relative terms with respect to hospitals.

Figure 1: Urgent Care and Hospital Sector Growth

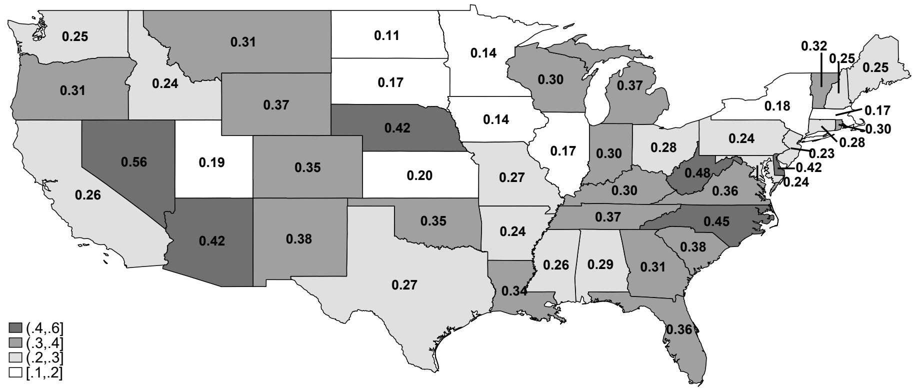


Note: Data for UCCs come from the Your Economy Time Series (YTS) database, which contains establishment-level information on all businesses in the United States, matched to Solv Health. Data for hospitals come from CMS' Hospital Compare, which contains all Medicare-certified hospitals.

[12] Our UCCs counts are broadly consistent with reports from the Urgent Care Association of America (UCAOA).

The expansion of UCCs is not homogeneous across the country. Figure 2 shows the number of UCCs per 10,000 residents in 2015 by state. There is wide variation in the number of UCCs per capita, with states in the Southwest having two to three times the number of UCCs per capita than states in the Northeast.

Figure 2: Number of UCCs per 10,000 State Residents in 2015



Note: Data come from the Your Economy Time Series (YTS) database, which contains establishment-level information on all businesses in the United States.

While suggesting geographic heterogeneity in entry patterns of UCCs, a more systematic analysis of the correlation between demographics and UCC entry requires looking at market-level patterns. Table 1 presents summary statistics of market characteristics in the full sample, consisting of 6,696 PCSAs, and separately by number of UCCs in a market. Unsurprisingly, more populous PCSAs support more UCCs. PCSAs with three or more UCCs have an average population of almost 147,000 residents, while PCSAs without UCCs have an average of around 18,500 residents. The average per capita income is increasing in the number of UCCs. While there is little variation in the average uninsured rate or percent Black in markets with and without UCCs, the percent Hispanic ranges from 9 percent in PCSAs without UCCs to 16 percent in markets with at least three UCCs. The table also shows a slight positive correlation between the number of UCCs and the percentage with at least a high school education, and a negative correlation with the percentage of individuals aged 65 or older. Finally, there is a strong positive correlation between the number of UCCs and the presence of hospitals or AUCCs in a market. Appendix Table 3 reports analogous summary statistics by number of AUCCs in a market, and shows similar demographic patterns.

These descriptive statistics raise important questions about UCC entry decisions. For one, the positive association at the market level between the presence of hospitals and UCCs suggests the possibility of strategic complementarities between these two types of establishments. Moreover, if UCCs tend to locate where hospitals are also present, underserved areas may be left without either type of establishment. Insofar as these correlations may be driven by unobservables, however, relying on the patterns in Table 1 alone to draw conclusions about determinants of UCC entry may be misleading.

3 An Empirical Model of UCC Entry

To study the determinants of the number of UCCs in a market, we develop a static entry model in the spirit of Bresnahan and Reiss (1991). In the model, market structure outcomes arise as an equilibrium, thus allowing us to understand the forces that determine the number of establishments in a market. Following Mazzeo (2002) and Schaumans and Verboven (2008) we explicitly model the simultaneous entry decisions of two types of firms: UCCs and hospitals. In this section, we first describe the model, then provide identification and estimation details, as the model can be estimated with our data on market-level entry outcomes and covariates.

3.1 Model

In each market t, UCCs and hospitals decide whether to operate in the market. For a set of independent markets $t = 1, \dots, T$, we observe the number of UCCs n_t and the number of hospitals n_t^h. All firms of a given type (UCCs or hospitals) are assumed to be identical. Thus, each of the n_t UCCs in market t earns total profits according to:

$$\pi_t(n_t, n_t^h) = V(n_t, n_t^h, x_t, S_t) - F(n_t, w_t),$$

where the variable profits earned by each entrant in market t, are a function V of the number of UCCs, the number of hospitals, market characteristics affecting demand and variable cost x_t, and the market size S_t. Furthermore, F represents the fixed cost of entry for a UCC in market t as a function of observable cost shifters w_t and of the number of UCCs.

Each of the n_t^h hospitals in market t earns profits according to:

$$\pi_t^h(n_t^h) = V^h(n_t^h, x_t, S_t) - F^h(n_t^h, w_t, z_t),$$

where the function defining variable hospital profits is denoted V^h and hospital fixed entry costs are denoted F^h. Fixed costs are a function of w_t, the number of hospitals, and additional shifters z_t that do not affect UCCs' fixed costs. Variable profits for hospitals are a function of the number of hospitals in a market and the same exogenous covariates affecting UCC profitability.

Thus we assume that, while hospitals can have a competitive effect on UCCs, UCCs' entry decisions do not affect hospitals' presence in a market.[13] Our assumption

[13] This is in line with the entry literature that considers industries with large and small players, where the competitive effect of the small player on the larger firms is assumed to be zero (see e.g., Ackerberg and Gowrisankaran, 2006; Grieco, 2014).

is supported by recent studies that find little evidence of a competitive effect of UCCs on the demand of certain hospital services (Currie et al., 2021). Moreover, the assumption is also consistent with Figure 1, which suggests that the number of hospitals is stable over time and not affected by the rise of UCCs.[14] We further assume that a firm's type (i.e., UCC or hospital) is set exogenously; that payoff functions, exogenous variables, and fixed costs are common knowledge; and that UCCs make entry decisions knowing the number of hospitals n_t^h.[15] Under these assumptions, the game has a unique equilibrium prediction for (n_t, n_t^h).

Following Bresnahan and Reiss (1991), we further parameterize payoffs to derive intuitive equilibrium conditions. We assume that UCCs' variable profit $V(\cdot)$ is separable in S_t:

$$V(n_t, n_t^h, x_t, S_t) = S_t v(n_t, n_t^h, x_t)$$

where, if market size is measured relative to population size, $v(n_t, n_t^h, x_t)$ are the average variable profits earned by a UCC for each person in market t. We assume that the data are generated by a Nash equilibrium of this entry game. Thus, the n_t UCCs present in market t must earn positive profits taking as given the n_t^h hospitals in the market, while profits with an additional entrant would be negative, or $\pi(n_t, n_t^h) \geq 0 \geq \pi(n_t + 1, n_t^h)$. Given our parameterization of profits, the equilibrium condition requiring entrants to make positive profits can be rewritten as

$$S_t \geq \frac{F(n_t, w_t)}{v(n_t, n_t^h, x_t)}.$$

[14]The time series also suggests that hospital entry largely occurred well before the advent of UCCs, implying that hospitals likely did not anticipate UCC entry when making their entry decisions.

[15]This can be seen as a timing assumption in a sequential game, or as the standard perfect foresight property of pure strategy Nash equilibrium in a complete information game.

Thus, for n_t UCCs to enter market t, the market size must exceed the ratio of fixed costs to the average variable profit per person.

To summarize how market size and entry patterns are linked, we consider the smallest market size accommodating $n_t = n$ UCCs. We define a per-firm threshold τ_n as the minimum level of per-firm market size for which n entrants can be sustained in a market with the average level of covariates conditional on n:

$$\tau_n = \frac{1}{n}\frac{F(n, \bar{w}_n)}{v(n, \bar{n}^h, \bar{x}_n)},$$

where a bar over a variable indicates the average across all markets conditional on having n UCCs. These thresholds are useful to study the extent of competition among UCCs in a market. In particular, Bresnahan and Reiss (1991) show that the change in threshold ratios of the form $\frac{\tau_{n+1}}{\tau_n}$ as n increases is informative on how firms compete. Imperfect competition is generally associated with declining ratios, as outcomes depend on the nature of local competition. For monopoly and perfect competition, threshold ratios are instead constant in n. While monopoly and perfect competition are not particularly compelling models of UCC behavior, the role of national insurers and the existence of national UCC chains could result in uniform pricing across markets and therefore constant thresholds. Thus, it is not obvious whether we should expect declining ratios for UCCs. We make the same assumptions on the function $V^h(\cdot)$, permitting us to derive separate population thresholds for hospital entry.

The model maintains a set of restrictive assumptions: (i) markets are independent, (ii) entry is a static decision, and (iii) payoffs are homogeneous within a market for each type of establishment. Market independence amounts to maintaining that chains of UCCs or hospitals do not take into account spillovers across markets in their decisions. While these have been found to be important in other industries, such as discount retail where the logistics of distribution naturally creates spillovers (e.g., Jia, 2008; Houde, Newberry, and Seim, 2023), we believe these factors to be less relevant for the industry we study. We also follow a large literature in modeling market structure outcomes, which unfold over time, as a static equilibrium (see, e.g., Berry and Reiss, 2007). Dynamic factors, which would require a more complex modeling approach, are not a primary object of interest in our study. Finally, we separately treat UCCs and hospitals as homogeneous within a market. While UCCs tend to be similar in the services they provide, geographic differentiation could be relevant. Ultimately, avoiding spillovers across markets (which could arise when markets are defined too narrowly) and geographic differentiation within a market (which could arise when markets are too large) requires an appropriate market definition.

3.2 Identification and Estimation

To bring this model to the data, we first impose sample restrictions to avoid the concerns about market spillovers discussed in the previous section. While we think PCSAs are a good market definition for this industry, it is hard to rule out spillovers in more densely populated areas. We follow the literature (see e.g., Bresnahan and Reiss, 1991) in estimating our model using only geographically isolated markets. To do so, we first compute the geographic distance between the markets' population-weighted centroids, and drop PCSAs within 35 miles of a more populated market.[16] We also drop a few PCSAs that cross state boundaries, as our CON laws instrument (discussed below) is defined at the state level. Although these are substantial restrictions, all the main descriptive facts in Table 1 are preserved in our sample of isolated markets

[16] Similarly, Abraham et al. (2007) focuses on isolated cities when studying hospital competition.

(see Appendix Table 2). Because market definition is a key component of our study, we explore an alternative market definition in Appendix B.

Next, we parameterize the profit functions of UCCs and hospitals as:

$$\pi_t(n_t, n_t^h) = S_t\left(x_t\theta_x + n_t^h\delta + \theta_1 - \sum_{i=2}^{n_t}\theta_i\right) - w_t\gamma_w - \gamma_1 - \sum_{i=2}^{n_t}\gamma_i + \varepsilon_t,$$
$$\pi_t^h(n_t^h) = S_t\left(x_t\theta_x^h + \theta_1^h\right) - w_t\gamma_w^h - z_t\gamma_z^h - \gamma_1^h + \varepsilon_t^h,$$

where x_t are market characteristics determining variable profit, and w_t is a measure of wages in the market. We also restrict n_t and n_t^h to address the few observations in the tails of the distribution (as in Bresnahan and Reiss, 1991; Abraham et al., 2007). Specifically, n_t takes on values reflecting zero, one, two, and three or more UCCs in a market. n_t^h is a dummy variable which indicates whether a market has two or more hospitals.[17] Following studies that use a similar model (e.g., Abraham et al., 2007), we use wages as a shifter of fixed production costs. The parameters θ_n, γ_n are respectively variable profit and cost fixed effects that depend on the number of UCCs in a market. Similarly, for hospitals, θ_n^h, γ_n^h are fixed effects that depend on n_t^h. We let market size S_t be proportional to market-level population. Variables in x_t are market demographics: per-capita income, percent of the population that is, respectively, Black, Hispanic, age 65 and over, uninsured, and rural.

The econometric unobservables ε_t and ε_t^h capture deviations from average profit for UCCs and hospitals, respectively. An important feature of our estimation approach is to carefully address the interrelated nature of hospital and UCC location choices. In particular, because the number of hospitals in a market affects UCC profit, unobservable characteristics ε_t and ε_t^h may be correlated. Ignoring this aspect could

[17]Given that over 90% of PCSAs in our sample of isolated markets have a hospital (see Appendix Table 2), we focus on the entry of an additional hospital. 35% of PCSAs in our sample of isolated markets have more than one hospital.

bias the estimate of δ. Thus, we assume that $(\varepsilon_t, \varepsilon_t^h)$ are jointly iid according to a bivariate standard Normal distribution with correlation ρ.

Allowing for correlation in unobservables, however, makes identification harder: positive correlation between n_t and n_t^h conditional on other observables could be due to a positive δ, or to a positive ρ. To identify the parameters of the model, we include a variable z_t which affects hospital profitability (and therefore the number of hospitals), but is excluded from the UCC profit function. In particular, we define $z_t = \text{CON}_t$, a measure of the intensity of state-level Certificate-of-Need laws (CON). Under these laws, state boards must approve the entry of new health-care establishments on the basis of whether there is a need for additional capacity in the relevant market, in an effort to reduce duplicative health care facilities and reduce costs. These laws have been shown to have an impact on both the entry of hospitals and the provision of new hospital services (e.g., Cutler, Huckman, and Kolstad, 2010). CON laws vary in scope across states in terms of what hospital services are subject to approval requirements, e.g., cardiac care, psychiatry, or equipment purchases such as MRIs. To capture this variation in regulatory environments across states, we adopt the measure of CON intensity in Bailey (2018), rescaled as the fraction of types of hospital expansions that are restricted by state laws in 2011.

To satisfy our exclusion restriction, CON laws must not directly impact the entry decision of UCCs (and hence should be independent of ε_t). We believe this is a reasonable assumption for several reasons. First, according to Bailey (2018), 35 states and the District of Columbia had CON laws in 2011, but for most of these states the CON laws do not apply to UCCs.[18] Second, most CON laws that apply today were

[18] The only possible exceptions are New York and North Carolina, which require a CON to operate some UCC establishments, such as those sufficiently large to qualify as diagnostic centers (Solomon et al., 2020). To address this concern, we run a robustness check in which we drop New York and North Carolina and show the results are quantitatively similar to our main estimates. See Appendix Tables 7 and 8.

set decades ago, while the ε_t shocks are contemporaneous. Finally, CON laws are set at the state level while the ε_t shocks are at the market (PCSA) level.

In addition to the excludability assumption of CON laws, we also follow the literature on hospital entry (Abraham et al., 2007) and impose that CON laws affect hospital profits through fixed costs.[19] For this to be realistic, we must assume that, while CON laws impose significant entry costs, they do not completely foreclose entry of additional hospitals. That is, additional hospitals that want to be present in a market and are willing to pay higher costs are eventually able to do so. Indeed application costs alone can be as high as several tens of thousands of dollars, not including potential attorney and consultant fees (Mitchell, Amez Droz, and Parsons, 2020). We also must assume that these costs are constant in the number of other hospitals in the market.[20]

Under our parametric assumptions, the model becomes a bivariate ordered probit which we estimate via maximum likelihood using the cross-section of UCCs and hospitals in 2015.[21] Our choice of 2015 is a compromise between using a recent year of data so as to capture the rapid expansion of UCCs while maximizing the relevance of our measure of CON intensity for 2011. Given the time it takes for hospitals to be approved and built, we maintain that CON laws from 2011 are relevant for entry outcomes in 2015.

[19] By including CON laws as a variable CON_t in hospitals' profit functions, we assume that CON laws affect the cost of entry, as opposed to specifying a maximum number of hospitals that can enter a market. See Schaumans and Verboven (2008) for a modeling approach that allows for restricted entry.

[20] This would be the case, e.g., if fixed costs were mainly the posted application fee. The assumption also allows us to avoid the econometric difficulty that arises if hospitals' entry decisions depend on the number of incumbents. If the true model has a cost of CON laws that is increasing in the number of hospitals, our estimates would likely reflect a weighted average of the increasing thresholds.

[21] An alternative way to deal with endogeneity in probit models is the control function approach (Rivers and Vuong, 1988). However, this approach is problematic in our context, as the endogenous variable is discrete (see Wooldridge, 2015).

4 Results

Table 2 reports parameter estimates from two versions of our model: Column 1 reports estimates from a univariate ordered probit model of UCC entry that takes hospital locations as predetermined (thereby ignoring the joint entry decisions of hospitals), while columns 3 and 5 report estimates for the bivariate ordered probit model in which entry of UCCs and hospitals are modeled jointly (hospital estimates in column 3 and UCC estimates in column 5).

Comparing columns 1 and 5 of Table 2 reveals the consequences of ignoring the endogeneity of hospital entry. We estimate a negative coefficient on the presence of hospitals in column 5, in line with hospitals having a competitive effect on UCCs by decreasing their expected profits from entry. The competitive effect is substantially attenuated in column 1, where we do not account for endogenous hospital entry. Furthermore, we estimate that the correlation between unobservables is 0.4, pointing to a strong positive association between ε_t and ε_t^h.

Column 3 of Table 2 provides estimates of the hospitals' profit function for entry. As our model is non-linear, a diagnostic for instrument strength is not available. However, we find a strong and statistically significant positive effect of CON laws on hospital fixed costs, so that CON law intensity reduces hospital entry. Although not a formal measure of instrument strength, this estimate suggests that CON intensity has a meaningful effect. In fact, a ceteris-paribus increase of one standard deviation in CON intensity would reduce presence of an additional hospital by 4 percent.

Because the magnitudes of ordered probit coefficients are not easily interpretable, we perform simulations to understand the economic significance of the bivariate ordered probit model's estimates. To interpret the effect of a single covariate on UCC entry, we compare simulated outcomes for the number of UCCs using the covariates

Table 2: Entry Model Estimates

		Univariate		Bivariate				
				Hospitals		UCCs		
		coef	se	coef	se	coef	se	sim
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Variable Profit Parameters:</u>								
δ	Additional hospital presence	-23.6	(14.4)	—		-67.0	(19.2)	-20.5
θ_x, θ_x^h	Rural	52.2	(43.5)	117.5	(45.4)	59.5	(42.8)	4.0
	Income per capita	-39.9	(11.3)	0.6	(8.9)	-33.2	(11.1)	-9.8
	Hispanic	-69.3	(51.0)	-102.9	(32.6)	-77.7	(48.6)	-5.9
	Black	-300.9	(242.3)	422.1	(242.0)	-239.0	(240.7)	-13.5
	High school or more	382.8	(232.6)	-206.2	(156.4)	315.5	(225.8)	3.7
	Age 65 or more	308.0	(189.5)	356.2	(154.0)	294.3	(184.3)	3.7
	Uninsured	93.7	(192.6)	101.4	(151.6)	111.0	(185.5)	1.5
θ_n, θ_n^h	θ_1	373.4	(104.6)	143.4	(66.5)	390.0	(102.0)	—
	θ_2	279.5	(37.5)	—		254.8	(39.1)	—
	θ_3	5.4	(10.8)	—		3.4	(10.0)	—
<u>Fixed Cost Parameters:</u>								
γ_w, γ_w^h	CMS wage index	0.2	(0.5)	0.9	(0.5)	0.3	(0.5)	-0.3
γ_z	CON Laws	—		0.7	(0.2)	—		—
γ_n, γ_n^h	γ_1	1.3	(0.5)	0.4	(0.5)	1.3	(0.5)	—
	γ_2	0.0	(0.1)	—		0.1	(0.1)	—
	γ_3	0.5	(0.1)	—		0.5	(0.1)	—
ρ		—		—		0.4	(0.1)	—
T		673		673		673		

Note: Coefficients and standard errors of the univariate ordered probit of UCC entry are reported in columns 1 and 2, respectively. Coefficients and standard errors for the bivariate ordered probit are reported in columns 3 and 4 for hospitals, and in columns 5 and 6 for UCCs. Column 7 reports the simulated percent change in the mean number of UCCs across markets in the bivariate model due to a standard deviation increase in that covariate (or due to setting all hospital or rural indicators to 1).

in the data with simulated outcomes obtained from modifying that covariate. In particular, to gauge the competitive effect of hospitals on UCCs, we compare UCC entry when we impose that multiple hospitals are present in all markets to UCC entry imposing at most one hospital in all markets. For the other variables, we simulate the effect on UCC entry when we increase the covariate of interest by one standard deviation. Column 7 reports the percent change in the mean number of UCCs across markets from these simulations.

Our estimates imply that having multiple hospitals in all markets would lower the average number of UCCs by 20.5 percent according to the bivariate model, suggesting an economically significant competitive effect of hospitals on UCCs. Other demographic variables also have a sizeable economic effect on UCC entry. For instance, raising income per capita by one standard deviation decreases the average number of UCCs by 9.8 percent. However, since several of these market-level variables are strongly correlated, the ceteris-paribus effects do not speak to the important question of whether UCCs expand access to health care into traditionally underserved markets. We return to these patterns below.

4.1 How Competitive are UCC Markets?

To study the nature of competition among UCCs, we compute from model estimates the entry thresholds for UCCs and hospitals. These correspond respectively to τ_n, the minimal market size needed for n UCCs to enter an average market, and an analogous τ_1^h, the minimal market size needed for more than one hospital to enter an average market (recall that n_t^h is an indicator variable for more than one hospital). These thresholds (measured in 1,000s of people per-firm) are reported in Table 3. Focusing on the bivariate model (columns 3 and 5), the monopoly entry threshold for UCCs is around 31,000 people, while 55,000 people is the threshold for having two or more hospitals. The number of individuals per-firm needed to sustain a given number of firms is increasing, but at a decreasing rate: to support two UCCs, 36,000 individuals per-firm are needed, while 39,000 individuals per-firm are needed to support three or more UCCs.

Table 3: Per-Firm Entry Thresholds and Ratios

	Univariate		Bivariate			
			Hospitals		UCCs	
	coef (1)	se (2)	coef (3)	se (4)	coef (5)	se (6)
Thresholds:						
τ_1	30.83	(1.51)	55.47	(2.90)	31.16	(1.51)
τ_2	37.04	(1.84)	—		36.24	(1.69)
τ_3	37.99	(1.49)	—		38.77	(1.46)
Ratios:						
τ_2/τ_1	1.20	(0.08)	—		1.16	(0.08)
τ_3/τ_2	1.03	(0.03)	—		1.07	(0.03)
T	673		673		673	

Note: Table reports entry thresholds and entry ratios for UCCs from the univariate ordered probit in columns (1) and (2) and the bivariate ordered probit in columns (5)-(6). Columns (3) and (4) present the entry threshold for a monopoly hospital from the bivariate ordered probit. Entry thresholds are measured in 1,000s of people per-firm. Standard errors based on the delta method are reported in parenthesis.

The fact that entry thresholds are increasing at a decreasing rate with the number of firms suggests that additional entry makes the urgent care sector more competitive. This can be seen directly from the entry ratios in the lower panel of the table. In column 5 we find that entry ratios are greater than one even for the third entrant, suggestive of imperfect competition and market power. Furthermore, these ratios are monotonically decreasing with the number of firms, indicating that competition intensifies and market power declines in markets with more entrants.

In Table 4 we examine per-firm entry thresholds and ratios separately for markets with and without multiple hospitals. We observe that the UCC entry thresholds display different patterns in these two types of markets. A larger population is needed to sustain UCC entry in markets with multiple hospitals because the presence of multiple hospitals has a negative effect on UCCs' profits. The effect is not very large when looking at the thresholds for UCC monopoly. This may speak to a relatively limited degree of competition between UCCs and hospitals, possibly due to the differentiation of UCCs through, e.g., lower wait times when compared to emergency rooms. However, the increase in the per-firm entry threshold is more pronounced when looking at the population needed to sustain a second or third UCC. While in markets with at most one hospital around 64,000 people in total are sufficient to sustain a UCC duopoly, 88,000 people in total are needed if the market also contains multiple hospitals. As in the overall sample, threshold ratios are declining in the number of UCCs, although more rapidly in markets with multiple hospitals.

Table 4: Per-Firm Entry Thresholds and Ratios, Conditional on Number of Hospitals

	Number of hospitals			
	<=1		>1	
Thresholds:				
τ_1	30.31	(1.44)	34.91	(2.28)
τ_2	32.18	(1.87)	44.09	(3.12)
τ_3	30.97	(1.93)	44.01	(2.55)
Ratios:				
τ_2/τ_1	1.06	(0.07)	1.26	(0.10)
τ_3/τ_2	0.96	(0.03)	1.00	(0.04)
T	438		235	

Note: Table reports entry thresholds and entry ratios for UCCs from the bivariate ordered probit conditional on the number of hospitals and evaluated at the full sample means of demographics and CMS wage index. Entry thresholds are measured in 1,000s of people per-firm. Standard errors based on the delta method are reported in parenthesis.

Our results are robust to other data and modeling choices. As UCCs offer services that primarily overlap with those offered by emergency rooms and not with other units in hospitals, in Appendix Tables 5 and 6 we show robustness to only including hospitals that have an emergency room (which account for 92.4 percent of hospitals in our sample). Appendix Tables 7 and 8 show robustness to alternative definitions of UCC state regulation. Appendix Tables 9 and 10 show results using different years in our sample. Appendix Tables 11 and 12 present similar results when we exclude Texas, to test the sensitivity to the presence of freestanding emergency departments.[22]

In Appendix B, we explore whether our market definition for UCCs is too narrow. Specifically, we consider the possibility that UCCs and hospitals compete at the broader Hospital Service Area (HSA) level. We first discuss survey evidence that highlights the similarity of consumers' average travel distances when seeking urgent care and routine care services, which suggests that PCSAs capture well competition in the UCC market. We then estimate a model in which both hospitals and UCCs compete in HSA markets. The parameter estimates in Appendix Table 18 imply that, all else equal, the profit per establishment increases in the number of UCCs, which is inconsistent with standard models of competition.

Overall, the results in this section show that competition for UCCs follows a familiar pattern in oligopolistic retail markets where pricing is local. This is remarkable in light of the many factors that make competition in most healthcare markets highly nonstandard. For instance, the presence of national UCC chains that bargain with national insurers could facilitate uniform pricing. Moreover, UCCs have a patient mix that is split between privately insured (67% according to Allen et al. (2021)), Medicare and Medicaid patients (almost all UCCs accept Medicare, while fewer than two-thirds of UCCs accept Medicaid – likely because of Medicaid's low reimbursement rates – see Urgent Care Association (2019)), and the uninsured.

The pattern of entry thresholds represents only indirect evidence of competition

[22] Although there is overlap in services between freestanding emergency departments, hospital EDs, and UCCs, we chose not to include them in our analysis. This is mainly because they are concentrated in a few states where they are subject to different regulations than UCCs. For example, in 2015 Schuur, Baker, Freshman, Wilson, and Cutler (2017) identified only 360 freestanding EDs nationwide, and over half of them were in Texas alone.

and markups. However, our findings support an interpretation that UCCs can exercise their market power via both bargaining with insurers and direct contracting with uninsured patients. While we do not have data on the prices UCCs charge to insured patients, the literature on hospital price setting suggests that increased market power of hospitals within a market (due to, for example, mergers), can raise prices substantially (see, for example, Town and Vistnes (2001), Gowrisankaran, Nevo, and Town (2015), and Cooper, Craig, Gaynor, and Van Reenen (2019), or Handel and Ho (2021) for a review). We conjecture that similar mechanisms may be at play with respect to UCCs and their relationships with insurers. Moreover, as health care prices are notoriously opaque, this limits the ability of demand-side forces to exert downward pressure on prices (see, e.g., Brown, 2019).

4.2 UCCs and Access to Care

Our results from the previous subsection suggest that UCCs have some degree of market power in markets where they locate. However, the degree of competition in markets with UCCs is not the only concern to policymakers. Much of the recent policy debate has focused on whether UCCs choose to locate in areas that are traditionally well served by health-care establishments or instead broaden access by locating in markets that are underserved.

The estimates in Table 2 provide some evidence on the ceteris paribus effects of hospital presence and market demographics on profitability. For instance, the negative competitive effect of hospitals suggests that UCCs enter markets that are less served by these larger establishments. If UCCs avoid markets with more hospitals, what types of markets are they serving? In this subsection, we investigate the role of UCCs in access to health care by taking into account the correlation between market demographics and hospital competition.

To do this, we estimate our bivariate ordered probit on different subsamples, considering splits along dimensions of demographics that may correlate with lack of access. We define underserved markets in our sample as those with below-median incomes, above-median rates of uninsured individuals, and above-median values of the Social Vulnerability Index (SVI). Across types of markets, we compute per-firm entry thresholds. If these thresholds are not consistently higher in underserved markets, UCCs do not require additional people in order to be profitable in underserved areas. We interpret this finding as evidence that UCCs expand access to underserved markets.

TABLE 5: Per-Firm Entry Thresholds and Ratios in Demographic Subsamples

	Percent uninsured		Per capita income		SVI	
	High	Low	Low	High	High	Low
Thresholds:						
τ_1	29.74	33.09	30.56	32.06	31.44	31.51
	(1.95)	(2.34)	(1.69)	(2.73)	(2.04)	(2.32)
τ_2	35.08	35.58	31.37	36.96	31.24	39.01
	(2.60)	(2.25)	(1.98)	(2.67)	(1.96)	(2.82)
τ_3	29.88	39.71	32.93	38.35	31.95	40.81
	(2.19)	(1.96)	(1.67)	(2.41)	(1.93)	(2.50)
Ratios:						
τ_2/τ_1	1.18	1.08	1.03	1.15	0.99	1.24
	(0.13)	(0.09)	(0.09)	(0.11)	(0.09)	(0.13)
τ_3/τ_2	0.85	1.12	1.05	1.04	1.02	1.05
	(0.04)	(0.05)	(0.03)	(0.07)	(0.04)	(0.08)
T	336	337	337	336	336	337

Note: Table reports entry thresholds and ratios for UCCs from bivariate ordered probits estimated from subsamples of PCSAs: below median income, above median income, above median percent uninsured, below median percent uninsured, above median Social Vulnerability Index (SVI), and below median SVI. Entry thresholds are measured in 1,000s of people per-firm. Standard errors in parentheses.

Table 5 presents UCC entry thresholds and ratios in these subsamples.[23] Our

[23] The bivariate ordered probit estimates associated with these entry thresholds and ratios are presented in Appendix Table 13.

results are in general consistent with UCCs expanding access to care. We find that an urgent care monopoly in a market with below median per capita income requires 1,500 fewer people (or 4.6%) than in a market with above median per capita income. Moreover, entry thresholds for the second and third firms are both smaller in lower income PCSAs. We obtain similar patterns from the decomposition of the sample based on SVI and the uninsured rate. Thus, when defining underserved markets along these dimensions, we find that UCCs need a lower threshold of population to enter these markets and expand access to care.

These results are largely driven by higher variable profits. While beyond the scope of our model, the source of these differences could be that UCCs in markets with higher rates of uninsurance are better able to charge patients sticker prices rather than go through insurance.

5 Extension: Three-Type Model with Hospital-Affiliated UCCs

Our analysis thus far excludes AUCCs. These are urgent care centers that are owned by a hospital system, and thus may take into consideration not only establishment-level profits, but also the impact of their presence on the broader hospital system. For instance, hospitals may divert low-acuity patients from possibly strained emergency departments.

In this section, we augment the model to incorporate the entry decisions of AUCCs, resulting in a three-type model as in Cohen and Mazzeo (2007). In each market t, we additionally observe the number of AUCCs n_t^a,[24] which we model as the outcome

[24] We exclude AUCCs located in different HSAs than their affiliated hospitals. There are only 300 of these (out of 8,446 urgent care centers).

of equilibrium entry decisions by symmetric AUCC potential entrants. Specifically, n_t^a takes on values reflecting zero, one, and two or more AUCCs in a market. In this model, hospitals, UCCs, and AUCCs make simultaneous entry decisions in each market. AUCCs' profits, conditional on the number of hospitals and UCCs in market t are:

$$\pi_t^a(n_t, n_t^h, n_t^a) = S_t(x_t\theta_x^a + n_t^h\delta^{a,h} + n_t\delta^a + \theta_1^a - \mathbf{1}[n_t^a \geq 2]\theta_2^a) - w_t\gamma_w^a - \gamma_1^a - \mathbf{1}[n_t^a \geq 2]\gamma_2^a + \varepsilon_t^a.$$

where $\mathbf{1}[\cdot]$ is the indicator function. Hospital profits are unchanged from the specification in Section 3; UCC profits, instead, are modified to include the effect of the presence of n_t^a AUCCs in market t. Importantly, this specification features type-specific parameters, as to capture the differences in business model between UCCs and AUCCs. For instance, we allow the competitive effect of hospitals to differ across the two types.

The three-type model is more flexible, and thus more demanding of our data. While identification of the two-type model relied on using exogenous variation in CON laws to shift hospitals' entry decisions, we are not aware of a corresponding instrument that affects entry decisions of AUCCs but is excluded from the profit functions of both hospitals and UCCs. Instead, we rely on the assumption that in each market $\varepsilon_t^a = \varepsilon_t$, meaning that unobserved shocks to profits of UCCs and AUCCs are the same.[25] Although these establishments differ in ownership and in some important aspects of their profit function (e.g., the interaction with hospitals), unobserved determinants of profits such as attractiveness of location must affect them

[25] While restrictive, our assumptions on the structure of the unobservables relax strong assumptions imposed in existing literature.

in the same way. As in the two-type model, we leave correlation between $\varepsilon_t^a = \varepsilon_t$ and ε_t^h as a free parameter.

5.1 Results

We estimate the three-type specification with MLE, and report parameter estimates in Table 6 below. Our findings on the patterns of competition between UCCs and hospitals remain virtually unchanged when compared to the two-type model. The presence of additional hospitals has practically the same competitive effect on UCC profitability in the two-type and three-type model.

Moreover, the three-type specification also sheds light on how AUCCs compete with other establishments. We find that the competitive effect of an additional hospital on AUCCs, while negative, is much lower in magnitude than the effect of a hospital on UCCs. This is consistent with our conjecture that, due to the common owner, AUCCs and hospitals do not compete as fiercely as UCCs and hospitals. However, the monopoly fixed effect in variable profits is lower for AUCCs, presumably because hospital systems internalize the fact that some AUCC patients could have been treated in their own hospitals. We also find that AUCCs and UCCs have similar competitive effects on each other. Furthermore, market-level covariates similarly affect AUCC and UCC profits. For instance, coefficients for rural and uninsured are similar across these two types of establishments. While UCCs and AUCCs face different incentives to enter a market, these differences come from the relationship between AUCCs and hospitals. Once we control for hospital presence, it is unsurprising that market covariates have similar effects on their profitability.

To gain more insight into the nature of competition in these markets, we now report the entry thresholds for the three-type model. As shown in Table 7, entry

TABLE 6: Three-Type Entry Model Estimates

		Hospitals		AUCCs		UCCs	
		coef (1)	se (2)	coef (3)	se (4)	coef (5)	se (6)
Variable Profit Parameters:							
δ	Additional hospital presence	—		-29.6	(10.0)	-62.8	(15.5)
	Presence of AUCC	—		—		-48.8	(7.6)
	Presence of UCC	—		-53.3	(8.5)	—	
	Rural	119.1	(43.8)	110.6	(35.9)	70.2	(41.5)
	Income per capita	-1.4	(9.5)	-11.4	(6.5)	-24.9	(11.6)
	Hispanic	-84.6	(37.9)	-73.7	(21.7)	-89.2	(50.8)
	Black	443.0	(236.8)	-471.1	(245.6)	-250.2	(238.6)
	High school or more	-139.2	(173.5)	150.4	(111.5)	304.1	(234.1)
	Age 65 or more	311.9	(158.0)	-16.3	(103.1)	181.7	(182.5)
	Uninsured	56.9	(151.0)	218.5	(104.5)	188.9	(187.4)
θ_n	θ_1	123.6	(74.6)	207.4	(56.2)	399.4	(103.5)
	θ_2	—		-0.6	(4.0)	211.7	(39.1)
	θ_3	—		—		5.3	(10.3)
Fixed Cost Parameters:							
γ_w	CMS wage index	0.9	(0.5)	-0.2	(0.4)	0.3	(0.4)
γ_z	CON Laws	0.7	(0.2)	—		—	
γ_n	γ_1	0.5	(0.5)	1.6	(0.4)	1.3	(0.4)
	γ_2	—		0.5	(0.1)	0.2	(0.1)
	γ_3	—		—		0.5	(0.1)
ρ						0.5	(0.1)
T		673		673		673	

Note: Coefficients and standard errors for the multivariate ordered probit are reported in columns 1 and 2 for hospitals, in columns 3 and 4 for AUCCs, and in columns 5 and 6 for UCCs.

thresholds for hospitals and UCCs, and ratios for UCCs, are similar to those reported for the two-type model. We find differences in entry thresholds between UCCs and AUCCs, which point to important differences in incentives to enter different markets. In particular, AUCCs have much higher entry thresholds than UCCs. Economically, this can be rationalized by the idea that hospital systems prefer to open AUCCs in larger markets, where hospital congestion is more severe and self-cannibalization less of an issue. This is consistent with the lower monopoly fixed effect in variable profits for AUCCs, discussed above.

Table 7: Three-Type Model Entry Thresholds and Ratios

	Hospitals	AUCCs	UCCs
Thresholds:			
τ_1	55.52	84.92	31.99
	(2.91)	(4.75)	(1.50)
τ_2	—	150.72	35.75
		(7.85)	(1.52)
τ_3	—	—	38.33
			(1.37)
Ratios:			
τ_2/τ_1	—	1.77	1.12
		(0.04)	(0.06)
τ_3/τ_2	—	—	1.07
			(0.03)
T	673	673	673

Note: Table reports entry thresholds and entry ratios for UCCs, AUCCs, and hospitals. Entry thresholds are measured in 1,000s of people per-firm. Standard errors based on the delta method are reported in parentheses.

In Appendix Table 14, we also explore how entry thresholds for UCCs vary conditionnal on the number of AUCCs and hospitals in a market. We find that, in markets with multiple hospitals (columns 2 through 4), the entry thresholds for two UCCs with a given number of AUCC competitors, is similar to the entry thresholds for one UCC with an additional AUCC competitor (τ_2 in column 2 vs τ_1 in column 3; τ_2 in column 3 vs τ_1 in column 4). This means that AUCCs have a competitive effect on UCCs roughly equivalent to one additional UCC in the market, in line with the competitive effects found in Table 6.

Our findings on expanding access are also preserved and reinforced in the three-type specification. Parameter estimates for the three-type model in demographic subsamples are reported in Appendix Table 15 and associated entry thresholds and ratios are reported in Appendix Table 16. In sum, the results of the three-type model, which incorporates hospital-affiliated UCCs, confirm our conclusions about competition and access among UCCs and hospitals.

6 Conclusion

UCCs are an important sector of the US health-care system, and have experienced fast growth over the last few decades. In this paper we use data on UCC locations to estimate an equilibrium model of market structure in this industry. The model captures the interdependent entry decisions of UCCs and hospitals across geographic markets, and uses market-level demographics to uncover the determinants of UCC profitability. Estimation of the model delivers two main results. With respect to competition, estimates suggest that hospitals negatively impact profitability of UCCs, and that UCCs enjoy market power. We also show that these establishments are at least as likely to enter in areas with a high proportion of traditionally underserved populations. Thus, UCCs have a role in expanding access to the underserved. Extending the model to include AUCC entry preserves these conclusions.

Our results raise open questions for further research. We find evidence both that UCCs have a role in expanding access but also exercise market power. Our data do not permit us to quantify the welfare effects of these competing forces. A full accounting of the welfare effects of UCC entry would integrate these concerns with the work being done on UCC quality provision and cost savings (e.g., Currie et al., 2021). We leave such an exercise to future work.

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Appendix A Additional Tables

This appendix reports supplementary tables, including more details about our sample construction and restrictions, summary statistics by number of hospital-affiliated UCCs, parameter estimates and entry thresholds for alternative samples as robustness checks, parameter estimates for our subsample analysis, and parameter estimates for the three-type model.

A.1 Details of sample construction

Appendix Table 1 provides a step-by-step accounting of the number of establishments that remain in the sample after each sample restriction. In Appendix Table 2, we create a version of Table 1 from our final sample of geographically isolated PCSAs (see Section 3.2 for more details). We use this restricted sample to estimate our two- and three-type model.

Appendix Table 1: Sample Restrictions and Sample Size

Sample Restriction	Resulting number of establishments
1. Keep SIC 80	38,455,053
2. Drop missing establishment name	30,854,081
3. Keep years 2005-2017	19,615,445
4.1 Keep establishments with “Urgent” in name	54,920
4.2 Keep establishments that match with Solv Health	47,239
5. Append 4.1 and 4.2	102,159
6. Drop duplicates in establishment identifier	98,690
7. Drop duplicates in establishment longitude and latitude	97,038
8. Drop AUCCs within a hospital’s HSA	91,883
9. Keep year 2015	8,510
10. Keep geographically isolated markets	1,935

Note: Table reports the number of establishments remaining in our main sample after applying each sample restriction, starting from the raw 1997-2019 YTS data. Step 4.1 filters all establishments in YTS with the regular expression “Urgent” in the establishment name. Step 4.2 matches establishment names in YTS to operator names in Solv Health, excluding operators that correspond to retail clinics and hospital-affiliated operators (using CMS’s Hospital Compare to cross-check hospital names), and excluding those with “Urgent” in the establishment name. Geographically isolated markets are defined as markets whose population-weighted centroids are at least 35 miles from a more populated market and markets that do not cross state boundaries.

Appendix Table 2: Market Characteristics by Number of UCCs

	Main sample	Number of UCCs			
		0	1	2	>=3
Population (1,000s)	96.0 (139)	15.2 (13.1)	55.6 (48.5)	81.7 (73.8)	219 (177)
Rural	0.34 (0.35)	0.52 (0.38)	0.34 (0.29)	0.29 (0.28)	0.13 (0.18)
Per cap. Income ($10K)	2.74 (0.63)	2.61 (0.60)	2.59 (0.50)	2.78 (0.52)	2.98 (0.69)
Hispanic	0.15 (0.18)	0.14 (0.18)	0.15 (0.21)	0.12 (0.15)	0.15 (0.18)
Black	0.04 (0.13)	0.08 (0.19)	0.02 (0.06)	0.02 (0.04)	0.01 (0.01)
High school or more	0.44 (0.05)	0.43 (0.06)	0.43 (0.05)	0.45 (0.04)	0.46 (0.04)
Age 65 and over	0.18 (0.06)	0.19 (0.06)	0.18 (0.05)	0.17 (0.04)	0.15 (0.04)
Uninsured	0.10 (0.05)	0.11 (0.06)	0.11 (0.05)	0.09 (0.04)	0.10 (0.04)
CMS wage index	0.95 (0.14)	0.96 (0.11)	0.94 (0.15)	0.94 (0.13)	0.95 (0.16)
Any hospital	0.90 (0.30)	0.81 (0.39)	0.96 (0.19)	0.97 (0.17)	0.96 (0.19)
Any AUCC	0.35 (0.48)	0.13 (0.33)	0.30 (0.46)	0.51 (0.50)	0.59 (0.49)
T	673	273	111	65	224

Note: Table presents means and, in parentheses, standard deviations, of market characteristics in the main estimation sample and in subsamples conditional on the number of UCCs, and total number of markets in the final row. Rural, Hispanic, Black, high school or more, age 65 and over, and uninsured are proportions of total population. Any hospital is the fraction of markets in the sample with at least one hospital. Any AUCC is the fraction of markets in the sample with at least one hospital-affiliated UCC.

A.2 Descriptives of AUCCs

Appendix Table 3 reports summary statistics by number of AUCCs in a market in the full sample and Appendix Table 4 reports analogous summary statistics for the estimation sample in the three-type model extension presented in Section 5.

APPENDIX TABLE 3: Market Characteristics by Number of AUCCs

	Full sample	Number of AUCCs		
		0	1	>=2
Population (1,000s)	47.9 (73.9)	34.7 (50.4)	90.9 (89.8)	136.8 (142)
Rural	0.38 (0.42)	0.42 (0.43)	0.21 (0.29)	0.17 (0.27)
Per cap. Income ($10K)	3.04 (1.14)	3.02 (1.15)	3.05 (1.04)	3.17 (1.08)
Hispanic	0.11 (0.16)	0.10 (0.15)	0.13 (0.17)	0.15 (0.17)
Black	0.01 (0.07)	0.02 (0.08)	0.01 (0.02)	0.01 (0.01)
High school or more	0.46 (0.06)	0.46 (0.06)	0.46 (0.05)	0.46 (0.05)
Age 65 and over	0.18 (0.06)	0.18 (0.06)	0.17 (0.05)	0.16 (0.04)
Uninsured	0.09 (0.05)	0.09 (0.05)	0.09 (0.05)	0.09 (0.04)
CMS wage index	0.97 (0.17)	0.97 (0.17)	0.98 (0.16)	0.98 (0.17)
Any hospital	0.53 (0.50)	0.44 (0.50)	1.00 (0.00)	1.00 (0.00)
Any UCC	0.16 (0.37)	0.34 (0.47)	0.68 (0.47)	0.78 (0.41)
T	6,696	5,601	514	581

Note: Table presents means and, in parentheses, standard deviations, of market characteristics in the full sample and in subsamples conditional on the number of AUCCs, and total number of markets in the final row. Rural, Hispanic, Black, high school or more, age 65 and over, and uninsured are proportions of total population. Any hospital is the fraction of markets in the sample with at least one hospital. Any UCC is the fraction of markets in the sample with at least one UCC.

Appendix Table 4: Market Characteristics by Number of AUCCs

	Main sample	Number of AUCCs		
		0	1	>=2
Population (1,000s)	96.0 (139)	54.3 (83.3)	111 (111.3)	210 (204.5)
Rural	0.34 (0.35)	0.41 (0.37)	0.23 (0.22)	0.18 (0.24)
Per cap. Income ($10K)	2.74 (0.63)	2.67 (0.62)	2.66 (0.47)	3.01 (0.67)
Hispanic	0.15 (0.18)	0.14 (0.18)	0.15 (0.22)	0.15 (0.17)
Black	0.04 (0.13)	0.06 (0.16)	0.01 (0.02)	0.01 (0.01)
High school or more	0.44 (0.05)	0.44 (0.05)	0.44 (0.05)	0.46 (0.04)
Age 65 and over	0.18 (0.06)	0.18 (0.06)	0.17 (0.04)	0.15 (0.04)
Uninsured	0.10 (0.05)	0.11 (0.06)	0.10 (0.06)	0.10 (0.04)
CMS wage index	0.95 (0.14)	0.95 (0.13)	0.92 (0.12)	0.96 (0.15)
Any hospital	0.90 (0.30)	0.85 (0.36)	1.00 (0.00)	1.00 (0.00)
Any UCC	0.35 (0.48)	0.46 (0.50)	0.75 (0.43)	0.91 (0.29)
T	673	439	85	149

Note: Table presents means and, in parentheses, standard deviations, of market characteristics in the main estimation sample and in subsamples conditional on the number of AUCCs, and total number of markets in the final row. Rural, Hispanic, Black, high school or more, age 65 and over, and uninsured are proportions of total population. Any hospital is the fraction of markets in the sample with at least one hospital. Any UCC is the fraction of markets in the sample with at least one UCC.

A.3 Robustness to alternative sample constructions

This appendix reports parameter estimates and entry thresholds and ratios for a host of alternative samples as robustness checks. Appendix Tables 5 and 6 present similar results when we exclude hospitals without emergency departments, and Appendix Tables 7 and 8 show robustness to alternative definitions of UCC state regulation, including (a) excluding states that require any type of UCC licensing and (b) excluding New York and North Carolina, where CON laws apply to some UCCs. Appendix Tables 9 and 10 show similar results when estimating the model based on years 2014 or 2016. Appendix Tables 11 and 12 present similar results when we exclude Texas, to test the sensitivity to the presence of freestanding emergency departments.

Appendix Table 5: Robustness of Parameter Estimates to Excluding Hospitals without Emergency Departments

		Hospitals		UCCs	
		coef	se	coef	se
		(1)	(2)	(3)	(4)
Variable Profit Parameters:					
δ	Additional hospital presence	—		-76.5	(19.4)
θ_x, θ_x^h	Rural	141.7	(44.8)	60.0	(42.8)
	Income per capita	3.0	(8.0)	-32.6	(11.1)
	Hispanic	-96.1	(27.4)	-78.8	(48.2)
	Black	521.6	(240.1)	-226.1	(241.0)
	High school or more	-260.1	(140.6)	308.5	(224.6)
	Age 65 or more	199.5	(142.0)	254.9	(183.9)
	Uninsured	191.2	(145.3)	128.0	(184.4)
θ_n, θ_n^h	θ_1	163.0	(58.8)	402.6	(102.3)
	θ_2	—		255.6	(39.3)
	θ_3	—		2.9	(9.9)
Fixed Cost Parameters:					
γ_w, γ_w^h	CMS wage index	0.7	(0.5)	0.2	(0.5)
γ_z	CON Laws	0.7	(0.3)	—	
γ_n, γ_n^h	γ_1	0.8	(0.5)	1.3	(0.5)
	γ_2	—		0.1	(0.1)
	γ_3	—		0.5	(0.1)
ρ		—		0.3	(0.1)
T		673		673	

Note: Table reports coefficients and standard errors of the the bivariate ordered probit excluding hospitals that do not have emergency departments. We report results for hospitals in columns 1 and 2, and for UCCs in columns 3 and 4.

Appendix Table 6: Robustness of Entry Thresholds and Ratios to Excluding Hospitals without Emergency Departments

	Hospitals		UCCs	
Thresholds:				
τ_1	61.31	(3.36)	31.31	(1.51)
τ_2	—	—	35.64	(1.65)
τ_3	—	—	38.28	(1.41)
Ratios:				
τ_2/τ_1	—	—	1.14	(0.07)
τ_3/τ_2	—	—	1.07	(0.03)
T	673		673	

Note: Table reports entry thresholds and entry ratios for UCCs and hospitals excluding hospitals that do not have emergency departments. Entry thresholds are measured in 1,000s of people per-firm. Standard errors based on the delta method are reported in parentheses.

Appendix Table 7: Robustness of Parameter Estimates to UCC State Regulation

		(1) w/o UCC licensing		(2) w/o NY and NC	
		Hospitals	UCCs	Hospitals	UCCs
Variable Profit Parameters:					
δ	Additional hospital presence	—	-75.1	—	-59.4
			(21.7)		(21.3)
θ_x, θ_x^h	Rural	87.6	69.0	102.9	64.9
		(49.6)	(47.8)	(49.0)	(45.1)
	Income per capita	-1.3	0.8	-3.7	-3.4
		(12.2)	(21.9)	(10.0)	(17.7)
	Hispanic	-101.9	-78.3	-129.3	-31.9
		(46.6)	(61.3)	(35.2)	(54.7)
	Black	1069.3	-640.1	452.0	-236.3
		(448.0)	(441.1)	(244.0)	(244.9)
	High school or more	-161.4	262.1	-163.9	228.0
		(233.6)	(287.1)	(165.8)	(256.0)
	Age 65 or more	723.7	286.2	363.4	366.8
		(238.1)	(259.1)	(165.9)	(200.2)
	Uninsured	169.9	263.2	144.9	64.4
		(176.3)	(214.8)	(163.0)	(205.2)
θ_n, θ_n^h	θ_1	77.3	318.8	148.8	336.5
		(94.6)	(120.6)	(69.3)	(112.2)
	θ_2	—	266.9	—	263.2
			(43.4)		(39.6)
	θ_3	—	-6.8	—	-3.1
			(11.6)		(11.8)
Fixed Cost Parameters:					
γ_w, γ_w^h	CMS wage index	1.0	0.3	0.9	0.5
		(0.6)	(0.5)	(0.6)	(0.5)
γ_z	CON Laws	0.8	—	0.6	—
		(0.3)		(0.3)	
γ_n, γ_n^h	γ_1	0.4	1.3	0.5	1.1
		(0.6)	(0.5)	(0.5)	(0.5)
	γ_2	—	0.0	—	0.0
			(0.1)		(0.1)
	γ_3	—	0.6	—	0.5
			(0.1)		(0.1)
ρ			0.4		0.3
			(0.1)		(0.1)
T		540	540	647	647

Note: Table reports coefficients and standard errors of the bivariate ordered probit model for hospitals and UCCs for alternative samples which exclude states that regulate UCCs. Column 1 excludes states that require any type of UCC licensing. Column 2 excludes New York and North Carolina where CON laws apply to some UCCs.

Appendix Table 8: Robustness of Per-Firm Entry Thresholds to UCC State Regulation

	(1) w/o UCC licensing		(2) w/o NY and NC	
	Hospitals	UCCs	Hospitals	UCCs
Thresholds:				
τ_1	50.80	31.37	52.10	31.41
	(2.98)	(1.65)	(2.70)	(1.53)
τ_2	—	34.69	—	36.28
		(1.89)		(1.82)
τ_3	—	36.94	—	37.30
		(1.64)		(1.50)
Ratios:				
τ_2/τ_1	—	1.11	—	1.15
		(0.09)		(0.08)
τ_3/τ_2	—	1.06	—	1.03
		(0.04)		(0.03)
T	540	540	647	647

Note: Table reports entry thresholds and entry ratios for UCCs and hospitals for alternative samples which exclude states that regulate UCCs. Column 1 excludes states that require any type of UCC licensing. Column 2 excludes New York and North Carolina where CON laws apply to some UCCs. Entry thresholds are measured in 1,000s of people per firm. Standard errors based on the delta method are reported in parentheses.

Appendix Table 9: Robustness of Parameter Estimates to Alternative Years of Data

		2014		2016	
		Hospitals	UCCs	Hospitals	UCCs
<u>Variable Profit Parameters:</u>					
δ	Additional hospital presence	—	-111.3	—	-35.4
			(20.2)		(21.1)
θ_x, θ_x^h	Rural	127.1	75.0	123.0	21.2
		(45.8)	(43.5)	(45.1)	(43.9)
	Income per capita	0.1	-46.6	1.2	9.9
		(8.8)	(12.4)	(8.2)	(20.5)
	Hispanic	-102.7	-65.5	-104.8	5.6
		(33.3)	(55.0)	(27.4)	(57.3)
	Black	354.2	-149.1	485.0	-220.9
		(246.3)	(236.5)	(240.5)	(247.1)
	High school or more	-210.4	483.4	-237.6	321.6
		(158.1)	(245.8)	(141.9)	(277.9)
	Age 65 or more	348.4	548.6	175.0	187.5
		(154.4)	(194.0)	(144.2)	(196.2)
	Uninsured	106.9	341.1	184.2	60.6
		(150.0)	(212.4)	(146.4)	(205.1)
θ_n, θ_n^h	θ_1	149.4	100.2	166.8	314.5
		(67.9)	(101.6)	(59.1)	(118.6)
	θ_2	—	30.1	—	284.0
			(17.2)		(43.7)
	θ_3	—	-40.1	—	34.5
			(12.2)		(16.4)
<u>Fixed Cost Parameters:</u>					
γ_w, γ_w^h	CMS wage index	0.8	-0.1	0.9	1.1
		(0.5)	(0.4)	(0.5)	(0.5)
γ_z	CON Laws	0.8	—	0.8	—
		(0.2)		(0.3)	
γ_n, γ_n^h	γ_1	0.6	1.3	0.5	0.5
		(0.5)	(0.4)	(0.5)	(0.5)
	γ_2	—	0.5	—	0.1
			(0.1)		(0.1)
	γ_3	—	0.9	—	0.3
			(0.1)		(0.1)
ρ		—	0.5	—	0.2
			(0.1)		(0.1)
T		673	673	673	673

Note: Table reports coefficients and standard errors of the bivariate ordered probit model for hospitals and UCCs for alternative sample years 2014 and 2016. These samples are constructed by replacing step 7 in Appendix Table 1 with the appropriate year.

Appendix Table 10: Robustness of Per-Firm Entry Thresholds to Alternative Years of Data

	2014		2016	
	Hospitals	UCCs	Hospitals	UCCs
Thresholds:				
τ_1	58.18	39.19	58.29	30.08
	(2.89)	(2.12)	(3.23)	(1.47)
τ_2	—	32.46	—	36.56
		(1.40)		(1.74)
τ_3	—	37.34	—	36.17
		(1.24)		(1.68)
Ratios:				
τ_2/τ_1	—	0.83	—	1.22
		(0.04)		(0.09)
τ_3/τ_2	—	1.15	—	0.99
		(0.03)		(0.05)
T	673	673	673	673

Note: Table reports entry thresholds and entry ratios for UCCs and hospitals for alternative sample years 2014 and 2016. These samples are constructed by replacing step 9 in Appendix Table 1 with the appropriate year. Entry thresholds are measured in 1,000s of people per-firm. Standard errors based on the delta method are reported in parentheses.

Appendix Table 11: Robustness of Parameter Estimates to Excluding Texas

		Hospitals		UCCs	
		coef	se	coef	se
		(1)	(2)	(3)	(4)
Variable Profit Parameters:					
δ	Additional hospital presence	—		-73.4	(21.3)
θ_x, θ_x^h	Rural	124.1	(48.7)	74.9	(45.9)
	Income per capita	4.4	(9.7)	-23.7	(11.6)
	Hispanic	-107.8	(30.3)	-81.1	(56.1)
	Black	384.3	(247.2)	-357.7	(251.3)
	High school or more	-283.6	(161.5)	69.8	(240.4)
	Age 65 or more	414.8	(157.0)	235.1	(199.9)
	Uninsured	95.5	(193.3)	325.3	(253.0)
θ_n, θ_n^h	θ_1	158.7	(62.1)	449.2	(109.6)
	θ_2	—		227.6	(41.3)
	θ_3	—		10.4	(12.4)
Fixed Cost Parameters:					
γ_w, γ_w^h	CMS wage index	1.1	(0.6)	0.4	(0.5)
γ_z	CON Laws	0.8	(0.3)	—	
γ_n, γ_n^h	γ_1	0.3	(0.5)	1.1	(0.5)
	γ_2	—		0.1	(0.1)
	γ_3	—		0.4	(0.1)
ρ				0.4	(0.1)
T		607		607	

Note: Table reports coefficients and standard errors of the bivariate ordered probit excluding the state of Texas, which has the majority of freestanding Emergency Departments. We report results for hospitals in columns 1 and 2, and for UCCs in columns 3 and 4.

Appendix Table 12: Robustness of Entry Thresholds and Ratios to Excluding Texas

	Hospitals		UCCs	
Thresholds:				
τ_1	53.95	(2.96)	30.91	(1.60)
τ_2	—	—	35.50	(1.69)
τ_3	—	—	37.30	(1.50)
Ratios:				
τ_2/τ_1	—	—	1.15	(0.08)
τ_3/τ_2	—	—	1.05	(0.03)
T	607		607	

Note: Table reports entry thresholds and entry ratios for UCCs and hospitals excluding the state of Texas, which has the majority of freestanding Emergency Departments. Entry thresholds are measured in 1,000s of people per-firm. Standard errors based on the delta method are reported in parentheses.

A.4 Parameter estimates and thresholds for subsample analyses

Appendix Table 13 reports parameter estimates that accompany the entry threshold and ratio estimates for the demographic subsample analyses in Table 5, which include PCSA-level above- and below-median per-capita income, above- and below-median percent uninsured, and above- and below-median Social Vulnerability Index.

Appendix Table 13: UCC Parameter Estimates in Demographic Subsamples

		Percent uninsured		Per capita income		SVI	
		High	Low	Low	High	High	Low
Variable Profit Parameters:							
δ	Additional hospital presence	-49.2	-77.9	-71.9	-57.4	-93.8	-36.3
		(37.0)	(24.4)	(34.6)	(25.8)	(31.3)	(28.8)
θ_x	Rural	15.4	118.1	175.9	-4.3	128.4	4.0
		(75.2)	(57.2)	(65.0)	(61.8)	(61.0)	(69.5)
	Income per capita	-53.6	-4.3	—	—	34.1	-11.2
		(32.9)	(14.4)			(37.0)	(16.8)
	Hispanic	120.9	-210.5	110.3	-212.6	84.4	-273.6
		(82.6)	(81.3)	(86.1)	(53.2)	(83.3)	(121.6)
	Black	-251.6	-1192.5	-147.2	-606.5	-160.2	-601.1
		(273.0)	(785.3)	(265.7)	(707.1)	(269.2)	(657.5)
	High school or more	1941.8	-372.7	1377.1	-596.5	1222.6	-321.8
		(469.7)	(308.0)	(492.6)	(182.0)	(478.9)	(344.6)
	Age 65 or more	489.6	17.3	670.5	-110.1	635.8	-184.3
		(269.8)	(303.3)	(312.6)	(257.7)	(281.7)	(324.0)
	Uninsured	—	—	164.1	609.3	255.8	267.2
				(271.2)	(307.1)	(263.3)	(379.5)
θ_n	θ_1	-158.0	633.1	-168.8	703.1	-224.1	693.8
		(205.4)	(136.5)	(232.5)	(127.0)	(225.4)	(161.8)
	θ_2	361.6	200.0	315.6	194.9	275.1	243.6
		(64.7)	(48.7)	(58.7)	(52.8)	(56.4)	(58.6)
	θ_3	-10.4	9.2	-24.2	23.5	-54.3	74.4
		(21.8)	(14.4)	(19.9)	(19.7)	(22.5)	(18.6)
Fixed Cost Parameters:							
γ_x	CMS wage index	-0.3	0.1	0.1	0.5	-0.1	0.7
		(0.7)	(0.6)	(0.1)	(0.6)	(0.6)	(0.8)
γ_n	γ_1	2.0	1.4	1.8	0.9	1.8	0.8
		(0.7)	(0.6)	(0.7)	(0.6)	(0.6)	(0.8)
	γ_2	0.0	0.1	0.0	0.1	0.0	0.1
		(0.2)	(0.1)	(0.2)	(0.1)	(0.2)	(0.2)
	γ_3	0.6	0.5	0.7	0.5	1.0	0.3
		(0.2)	(0.1)	(0.2)	(0.2)	(0.2)	(0.1)
ρ		0.1	0.4	0.2	0.4	0.4	0.3
		(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
T		336	337	337	336	336	337

Note: Table reports coefficients and standard errors of the bivariate ordered probit model for UCCs only in different subsamples of the main dataset. The subsamples High and Low correspond to markets that are above and below median for the given demographic variable. The estimates are used to compute the population thresholds in Table 5.

A.5 Parameter estimates and thresholds for three-type model

This appendix reports additional results for the three-type model of Section 5, which extends the model presented in Section 3 by incorporating AUCCs as an additional type of health-care provider. Appendix Table 14 decomposes the thresholds and ratios for the three-type model (parameter estimates reported in Table 7) by the number of hospitals and AUCCs in a market. Appendix Table 15 reports the parameter estimates for the subsample analyses of the three-type model, which include PCSA-level above- and below-median per-capita income, above- and below-median percent uninsured, and above- and below-median Social Vulnerability Index. Appendix Tables 16 and 17 report thresholds for UCCs and AUCCs, respectively, in each of these subsamples.

Appendix Table 14: Per-Firm UCC Entry Thresholds and Ratios, Conditional on Number of Hospitals and AUCCs

	Hospitals, AUCCs			
	≤1, 0	≥1, 0	≥1, 1	≥1, 2
Thresholds:				
τ_1	30.98	35.97	38.69	46.62
	(1.70)	(2.82)	(2.92)	(4.35)
τ_2	30.75	37.48	46.40	69.47
	(1.97)	(2.71)	(3.60)	(6.84)
τ_3	26.49	35.26	43.28	65.35
	(1.54)	(2.35)	(2.70)	(5.87)
Ratios:				
τ_2/τ_1	0.99	1.04	1.20	1.49
	(0.06)	(0.07)	(0.08)	(0.14)
τ_3/τ_2	0.86	0.94	0.93	0.94
	(0.03)	(0.03)	(0.03)	(0.05)
T	65	374	85	149

Note: Table reports entry thresholds and entry ratios for UCCs from the multivariate ordered probit conditional on the number of hospitals and on the number of AUCCs, evaluated at the full sample means of demographics and CMS wage index. Entry thresholds are measured in 1,000s of people per-firm. Standard errors based on the delta method are reported in parenthesis.

Appendix Table 15: UCC Parameter Estimates in Demographic Subsamples for Three-Type Model

		Percent uninsured		Per capita income		SVI	
		High	Low	Low	High	High	Low
Variable Profit Parameters:							
δ	Additional hospital presence	-66.3	-57.5	-95.9	-43.4	-91.5	-40.4
		(26.4)	(20.5)	(27.8)	(20.5)	(23.6)	(22.9)
	Presence of AUCCs	-45.9	-49.3	-82.9	-35.1	-58.7	-42.2
		(15.1)	(9.8)	(14.5)	(9.3)	(13.3)	(10.6)
θ_x	Rural	38.6	116.9	146.4	3.8	128.7	28.9
		(69.7)	(57.2)	(63.2)	(59.9)	(57.4)	(69.1)
	Income per capita	-14.3	-4.2	—	—	31.3	-12.0
		(37.6)	(14.8)			(34.5)	(17.1)
	Hispanic	-43.0	-158.6	43.0	-170.8	14.6	-171.7
		(72.0)	(84.1)	(80.4)	(54.4)	(76.0)	(126.6)
	White	-266.4	-1020.2	-238.0	-396.8	-196.0	-474.0
		(269.9)	(780.1)	(266.1)	(695.0)	(263.9)	(649.8)
	High school or less	659.6	-210.1	1374.3	-475.0	920.3	-114.1
		(464.2)	(312.0)	(490.9)	(180.3)	(457.2)	(348.3)
	Age 65 or more	260.2	19.1	544.5	-200.7	363.1	-180.7
		(269.0)	(314.7)	(304.9)	(256.7)	(272.3)	(330.4)
	Uninsured	—	—	335.5	549.8	255.9	262.9
				(286.0)	(305.4)	(270.5)	(370.1)
θ_n	θ_1	302.3	590.5	-91.4	664.1	-12.0	599.2
		(181.5)	(137.6)	(232.6)	(123.6)	(218.0)	(159.1)
	θ_2	271.4	185.0	234.6	171.6	226.7	203.6
		(63.1)	(50.3)	(63.0)	(50.6)	(57.6)	(57.3)
	θ_3	-13.7	11.0	-4.4	20.5	-40.9	34.6
		(20.9)	(14.8)	(23.1)	(18.8)	(23.3)	(19.3)
Fixed Cost Parameters:							
γ_w	CMS wage index	0.0	0.3	-0.4	0.7	-0.3	1.1
		(0.7)	(0.6)	(0.7)	(0.6)	(0.6)	(0.8)
γ_n	γ_1	1.7	1.3	2.3	0.6	2.0	0.4
		(0.7)	(0.6)	(0.7)	(0.6)	(0.6)	(0.8)
	γ_2	0.1	0.1	0.2	0.2	0.1	0.2
		(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
	γ_3	0.6	0.6	0.5	0.5	0.9	0.4
		(0.2)	(0.1)	(0.2)	(0.2)	(0.2)	(0.1)
ρ		0.5	0.5	0.6	0.5	0.6	0.4
		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
T		336	337	337	336	336	337

Note: Table reports coefficients and standard errors of the multivariate ordered probit model for UCCs only in different subsamples of the main dataset. The subsamples High and Low correspond to markets that are above and below median for the given demographic variable. The estimates are used to compute the population thresholds in Appendix Table 16.

Appendix Table 16: Per-Firm Entry Thresholds and Ratios in Demographic Subsamples for UCCs in Three-Type Model

	Percent uninsured		Per capita income		SVI	
	High	Low	Low	High	High	Low
Thresholds:						
τ_1	30.15	33.99	31.91	33.05	35.53	32.47
	(1.98)	(2.28)	(1.66)	(2.78)	(2.72)	(2.85)
τ_2	34.82	36.03	30.71	37.12	36.60	40.34
	(2.43)	(2.09)	(1.58)	(2.57)	(2.79)	(3.61)
τ_3	34.14	38.33	30.61	39.20	35.36	40.75
	(2.30)	(1.82)	(1.43)	(2.30)	(2.40)	(3.02)
Ratios:						
τ_2/τ_1	1.15	1.06	0.96	1.12	1.03	1.24
	(0.11)	(0.07)	(0.06)	(0.10)	(0.09)	(0.10)
τ_3/τ_2	0.98	1.06	1.00	1.06	0.97	1.01
	(0.04)	(0.05)	(0.03)	(0.06)	(0.04)	(0.06)
T	336	337	337	336	336	337

Note: Table reports entry thresholds and ratios for UCCs from multivariate ordered probits estimated from subsamples of PCSAs: below median income, above median income, above median percent uninsured, below median percent uninsured, above median Social Vulnerability Index (SVI), and below median SVI. Entry thresholds are measured in 1,000s of people per-firm. Standard errors in parentheses.

Appendix Table 17: Per-Firm Entry Thresholds and Ratios in Demographic Subsamples for AUCCs in Three-Type Model

	Percent uninsured		Per capita income		SVI	
	High	Low	Low	High	High	Low
Thresholds:						
τ_1	85.74	87.77	73.55	89.64	30.62	127.82
	(7.61)	(6.99)	(5.07)	(8.13)	(13.42)	(221.61)
τ_2	159.65	142.31	127.23	154.19	162.11	138.02
	(11.48)	(11.22)	(10.02)	(11.61)	(11.44)	(10.82)
Ratios:						
τ_2/τ_1	1.86	1.62	1.73	1.72	5.29	1.08
	(0.06)	(0.07)	(0.07)	(0.07)	(0.07)	(0.06)
T	336	337	337	336	336	337

Note: Table reports entry thresholds and ratios for AUCCs from multivariate ordered probits estimated from subsamples of PCSAs: below median income, above median income, above median percent uninsured, below median percent uninsured, above median Social Vulnerability Index (SVI), and below median SVI. Entry thresholds are measured in 1,000s of people per-firm. Standard errors in parentheses.

Appendix B HSA as Market Definition

We explore in this appendix an alternative market definition and provide further support for our choice. We considered two plausible choices in our setting according to definitions tailored to other healthcare markets: HSAs and PCSAs. There are 3,436 HSAs and 6,696 PCSAs in the continental US, and HSAs are systematically larger than PCSAs.

On a conceptual level, HSAs, designed to capture catchment areas for hospitals, are likely to be too large to capture competition among UCCs, as many patients undergo specialized procedures in hospitals. PCSAs are instead designed to capture markets for primary care, and while there are differences between primary care and urgent care services, patients' willingness to travel for these services seems more aligned. Survey evidence supports this reasoning. A 2012 survey by the Washington State Office of Financial Management finds that respondents travel 8.6 miles for urgent care services on average; this translates into a current average travel time of 17.9 minutes.[26] For "routine care", respondents also travel 8.6 miles on average. Given the similarity between willingness to travel for urgent and routine care, PCSAs represent a more realistic definition for urgent care markets.

To further investigate HSAs as a market definition, we estimate the two-type model using HSAs as a market definition for both hospitals and UCCs. Results are in Appendix Table 18. We find evidence that the HSA market definition is inappropriate for UCCs. Specifically, our estimates suggest there is a positive competitive effect between UCCs (which can be seen in column 3 of the table from the fact that the duopoly variable profit fixed effect exceeds the monopoly fixed effect or, $\theta_2 < 0$). This

[26]The paper is available at https://ofm.wa.gov/sites/default/files/public/legacy/researchbriefs/2013/brief070.pdf.

Appendix Table 18: Robustness of Parameter Estimates to HSA Market Definition

		Hospitals		UCCs	
		coef	se	coef	se
		(1)	(2)	(3)	(4)
Variable Profit Parameters:					
δ	Additional hospital presence	—		-76.7	(6.9)
θ_x, θ_x^h	Rural	110.0	(16.2)	42.1	(12.8)
	Income per capita	-5.6	(2.4)	-3.7	(2.8)
	Hispanic	-54.6	(20.1)	-52.2	(20.3)
	Black	326.2	(126.3)	36.1	(100.9)
	High school or more	-330.8	(67.3)	-70.4	(70.9)
	Age 65 or more	196.8	(58.7)	349.6	(63.1)
	Uninsured	71.1	(70.9)	381.3	(76.8)
θ_n, θ_n^h	θ_1	229.4	(35.1)	147.4	(37.8)
	θ_2	—		-8.4	(3.0)
	θ_3	—		-0.2	(3.4)
Fixed Cost Parameters:					
γ_w, γ_w^h	CMS wage index	0.5	(0.2)	0.4	(0.2)
γ_z	CON Laws	0.4	(0.1)	—	
γ_n, γ_n^h	γ_1	0.7	(0.2)	0.7	(0.2)
	γ_2	—		0.5	(0.0)
	γ_3	—		0.5	(0.0)
ρ				0.5	(0.1)
T		3,408		3,408	

Note: Table reports coefficients and standard errors of the bivariate ordered probit using Hospital Service Areas as market definition. We report results for hospitals in columns 1 and 2, and for UCCs in columns 3 and 4.

pattern is inconsistent with standard models of oligopolistic competition and violates the restriction imposed in Bresnahan and Reiss (1991).

To understand why this violation suggests that HSAs are in fact too big as a market definition, consider the following example. Suppose that there are four (true) geographic markets for UCCs, labeled A, B, C, D, and that markets A and B fall in HSA 1, while markets C and D fall in HSA 2. The demographics (except for population) and firms' fixed costs in different geographic markets are identical; the population of market A is 4,000, while B, C, and D have a population of 5,000. Further suppose that market A has no UCCs while markets B, C, and D each have one UCC earning the same per-capita variable profit. If we impose HSA as a market definition, we observe a monopoly market with 9,000 people in HSA 1, and a duopoly market with 10,000 people in HSA 2. This could imply that each of the duopolists needs 5,000 people to cover their entry cost, while the monopolist may need up to 9,000. Therefore, variable per-capita profits may increase when going from a monopoly to a duopoly. While this example is heuristic and the model could not be estimated out of these two observations alone, this pattern would be captured by a negative θ_2 parameter, and would be inconsistent with oligopoly models: we expect prices to be higher in a monopoly than in a duopoly under any standard notion of competition.