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Sorting into and out of Rural and Urban Retail Markets

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We compare the entry decisions and relative success of rural and urban retail start-ups in Iowa from 1992 through 2011. We use an expanded variant of the pull factor idea to predict the level of local retail sales. We then examine how the factors that increase sales affect the incentive to enter or exit an urban or rural market. We show that the same factors that affect retail sales also affect new retail firm entry and retail firm exit. Our findings are consistent with a model where the very best generally skilled entrepreneurs sort into thicker, urban locations where they are subjected to frequent arrival of other potential entrepreneurs who have some probability of having an even higher valued use for the site. Urban entrepreneurs may decide to sell their site to another entrepreneur, even if the first entrepreneur has a successful venture. On the other hand, the scarcity of potential successors in thinner rural markets means that a large share of the skill set for rural entrepreneurs is specific to the match between the entrepreneur and the location. Because the value of the rural firms are tied to the first entrepreneur, much of the venture's value cannot be priced were the venture to be sold, and so rural markets have little turnover in retail sites.

Keywords

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Disciplines

Industrial Organization | Regional Economics

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Abstract

We compare the entry decisions and relative success of rural and urban retail start-ups in Iowa from 1992 through 2011. We use an expanded variant of the pull factor idea to predict the level of local retail sales. We then examine how the factors that increase sales affect the incentive to enter or exit an urban or rural market. We show that the same factors that affect retail sales also affect new retail firm entry and retail firm exit. Our findings are consistent with a model where the very best generally skilled entrepreneurs sort into thicker, urban locations where they are subjected to frequent arrival of other potential entrepreneurs who have some probability of having an even higher valued use for the site. Urban entrepreneurs may decide to sell their site to another entrepreneur, even if the first entrepreneur has a successful venture. On the other hand, the scarcity of potential successors in thinner rural markets means that a large share of the skill set for rural entrepreneurs is specific to the match between the entrepreneur and the location. Because the value of the rural firms are tied to the first entrepreneur, much of the venture's value cannot be priced were the venture to be sold, and so rural markets have little turnover in retail sites.

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JEL codes: L26, P25, R10

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Retail Firm Sales and Sorting into and out of Rural and Urban Markets, 1991-2011

Business start-ups have been responsible for roughly one-fifth of job creation in the United States. Consequently, the slowdown in the rate of business entry over recent decades is a threat to future job growth and productivity growth in the United States. The share of U.S. employment accounted for by young firms has declined by almost 30 percent over the last 30 years and the share of firms aged five years or less has declined from 47 percent of all firms in the late 1980s to 39 percent of all firms before the start of the Great Recession. The young firm share declined even more after the recession (Decker *et al*, 2014).

It has been particularly challenging to attract new firm start-ups in rural markets. Agglomeration economies have greatly favored firm creation, expansion and productivity growth in urban markets compared to rural markets (Artz *et al*, 2016). Those advantages have been tied to the higher concentration of potential customers and suppliers, greater ability to access an educated labor market, and the presence of other firms in the same market cluster that helps speed the creation and diffusion of new technologies. To try to level the competitive environment, the U.S. Department of Agriculture has made incentivizing entrepreneurship and new firm expansion a key to revitalizing rural economies. Five different programs have funded 24,000 projects to support rural businesses and entrepreneurship since FY 2009 (USDA, 2016).[1]

This study compares the factors influencing urban and rural start-ups in the retail sector. The retail sector is particularly useful for this purpose because retail firms are universally present across urban and rural markets. In addition, relatively low start-up costs make the sector

[1] These programs include Rural Business Development Grants, Business and Industry Loan Guarantees, Intermediary Relending Program Loans, Rural Microentrepreneur Assistance Program, and Rural Economic Development Loans and Grants. Other programs encourage farmers to develop value added products or enhance infrastructure such as rural Broadband, community facilties and housing improvements.

particularly sensitive to variation in economic environment across areas.[2] However, technological changes in the industry have favored retail chains exploiting information technologies, modern logistics, and preferential treatment by suppliers so that the share of U.S. retail activity accounted for by single-establishment firms fell from 70 percent in 1948 to 39 percent in 1997 (Jarmin, Klimek, and Miranda, 2005). The increased emphasis on chain versus stand-alone retail stores would further disadvantage rural retail entrepreneurs. .

The context for our analysis is the location decisions and survival rates for Iowa rural and urban retail start-ups from 1992 through 2011. We first identify the local factors that increase rural and urban retail sales and then examine how those same factors influence the incentives to enter or exit an urban or rural location. In the process, we identify the relative importance of general and location-specific entrepreneurial skills in thick urban and thin rural markets.

We find that in both urban and rural markets, the same factors that increase local retail sales also increase incentives for firms to locate in that area. Firms enter markets that have greater than average retail sales rather than markets that appear to be under-retailed. Most of retail firm entry is driven by the observable factors that drive sales, but markets with sales above expected levels also attract more entrants, albeit by smaller percentages. The same factors that are tied to increased local retail sales are also tied to increased rate of firm exits which means that the most successful retail sites are characterized by churning.

The model and empirical findings are consistent with the view that general entrepreneurial skills are complementary with agglomeration, and so the most generally skilled entrepreneurs have an incentive to locate in the most agglomerated locations. For an

[2] Retail firms represent 28% of all establishments but only 18% of total payrolls and sales in the 2012 Economic Census, implying that the average retail establishment is about two-thirds of the average size of establishments in the United States.

entrepreneur to enter a thin, rural market, he or she must have unique, location-specific skillsIn the thicker, urban locations, there is a frequent arrival of other potential entrepreneurs who have some probability of having an even higher valued use for the site, and so there is both more entry into and exit from thick markets. The scarcity of potential successors in thinner rural markets means that thin markets are characterized by low entry and low exit rates. The larger pool of potential successors in thick markets implies that a greater share of the entry costs can be recovered at the time of exit, while in thin markets, the importance of the unique match between entrepreneur and location means that less of the costs can be recovered at exit.

Literature Review

We build on an existing empirical and theoretical literature that characterizes the relative economic climate for retail markets. This literature draws on central place theory, which proposes a hierarchical ordering of places based on the number, type and variety of retail and service businesses located in the place (Christaller 1933, Losch 1954). There are two key concepts: the range, or maximum distance consumers would be willing to travel in order to purchase the commodity, and the threshold level, or the minimum demand for the good or service that makes it economically viable for a firm to supply it (Yanagida, et al, 1991). Goods with larger ranges and larger threshold levels will be located in fewer, more populated places, while retail stores for goods with smaller ranges and smaller threshold levels will be found in a greater number of lower order, less populous places. Reilly's (1931) gravity model provides an analytical method to estimate the size of a retail trade area based on the maximum distance customers travel to shop in a certain community. A somewhat simpler measure of trade area size is the retail sales pull factor, computed as the ratio of local sales relative to the level expected on the basis of local population and income.[3] Ratios above 1 imply more sales than expected while those less than 1 suggest that local sales are leaking over to other jurisdictions.

Pull factors have been used to measure retail trade capture in applied studies (Chase and Pulver 1983; Hustedde et al. 1984; Shaffer 1989; Yanagida, et al, 1991; Gruidl and Andrianacos, 1994; Darling and Tubene, 1996) as well as by community development practitioners and University Extension professionals to document the relative performance of and trends in county and town retail. While pull factors provide an easy-to-measure indication of the size of a local retail sector, they do not provide information about the determinants of local retail trade (Harris and Shonkwiler, 1997). A handful of studies have examined demand and supply factors that affect retail pull factors (or retail sales), typically within a particular state or region (Yanagida, et al 1991; Gruidl and Andrianacos, 1994; Darling and Tubene, 1996; Harris and Shonkwiler, 1997). Beyond population and per capita income, factors that are positively related to the size of the retail pull factor are increasing distance from a metropolitan area or regional trade center, the proportion of the population over age 65, and the number of stores in the area. Lower pull factors are associated with declining population, higher unemployment rates and a greater dependence on the agricultural sector.

Steadily declining pull factors along with declining population are evidence of the erosion of retail sales away from rural markets (Gale, 1996). Population growth greatly favors urban retail firms because urban populations have grown by 234% since 1940 compared to 3.5% for rural areas. Increased out- commuting and declining transportation costs have also contributed to the decline of rural retail markets (Shields and Deller, 1998; Hammond and

[3] Shaffer (1989) provides an early summary of methods to analyze local markets. While Reilly (1931) and Converse (1949) related relative retail sales to relative population, the first expression of pull factor appears to have been by Huff (1963, 1964) although he does not use the term.

Thompson, 2001). Vias (2004) documents changes in retail employment and number of stores by county from 1988-1999, finding that the most distressed counties are concentrated in the Great Plains region. While a large number of counties lost both stores and employment, others experienced growth in retail employment despite a decline in the number of stores. There is evidence, however, that some rural retail markets have expanded. Non-metropolitan counties with increasing populations and high levels of amenities have seen rising retail employment and an increasing number of stores. Even some less densely populated, agriculturally dependent counties experienced growth in retail employment (Vias, 2004).

We lack evidence on the factors that affect the pace of new retail firm entry in rural markets. Much of the research on start-ups focuses on urban or metropolitan areas[4]. These studies show that new firm entry is attracted by agglomeration economies—the concentration of potential customers, employees, innovators, venture capitalists, and information flows that make firms more productive in cities than in less densely populated markets (Jofre-Monseny et al., 2011; Ellison et al., 2010; Shapiro, 2006; Moretti, 2004; Porter, 2003; Feldman and Audretch, 1999; Glaeser et al., 1992; Glaser and Gottlieb, 2009). However, if agglomeration economies are necessary for firms to enter and thrive, what still induces firms to enter thinner markets and are these rural firms doomed?

Some initial investigation into these questions suggests that there may be a different paradigm needed to characterize an entrepreneur's incentives to enter a rural market. First, it seems that rural firm start-ups are entering the relatively few rural markets that offer at least limited benefits of agglomeration and not the most remote markets (Artz et al., 2016). However, rural entrepreneurship does differ from urban entrepreneurship in important ways. First, rural

[4] An exception is Blair, Traynor and Duan (2004) who find that manufacturing activity spurs retail development in more isolated rural counties, particularly in counties with greater entrepreneurial resources.

start-up locations are more tied to the match between the location and the entrepreneur while urban start-up locations are more tied to the productivity of the location itself (Artz et al., 2016). Second, rural start-ups face more constraints in succession of the business, a constraint that affects the decision to enter. Yu et al. (2011) showed that the difficulty of selling the assets of a rural firm means that entrepreneurs must have a higher probability that the venture will succeed in order to enter[5]. As a result, rural start-ups are more likely to succeed than observationally equivalent urban start-ups. Artz and Yu (2011) found differences in succession planning across the rural and urban markets: rural entrepreneurs are more likely to anticipate passing the business on to relatives while urban entrepreneurs are more likely to anticipate selling the operation. The implication is that the same factors that encourage entry in more densely populated markets may also encourage exit, since they affect the salvage value, and hence the opportunity cost, of the firm.

Theory

At the margin, every venture must meet or exceed the opportunity cost of capital investment, *r* which we assume is constant across time and space. In every market *j*, we would expect that a viable venture by entrepreneur *i* would satisfy

(1) $r \leq \frac{\pi_{ijt}}{P_{jt}}$

where π_{ijt} is the expected present value of the stream of net earnings from the i^{th} venture in the j^{th} location and P_{jt} is the cost of opening the venture in location *j*.

[5] An implication is that rural firms face an asset fixity (Johnson, 1956; Edwards, 1959) or spatial fixity problem (Ward and Hite, 1999; Hite, 1997). The asset fixity trap arises when the salvage value of the farm deviates significantly from its use value under the current owner and the asset becomes “trapped” in its current usage. This has implications for entry. Since the salvage value will be lower in less densely populated markets, asset fixity will be more severe in rural than urban areas. This is consistent with the empirical evidence that rural firms live as long, or longer, than urban firms (Buss and Lin, 1990; Huiban, 2011; Yu, Orazem, and Jolly, 2011).

We assume that the stream of net earnings from the venture will depend on the productive attributes of its location and the skills of the entrepreneur according to[6]

(2) $\pi_{ijt} = Z_{jt}^{\alpha_Z}(1 + \varepsilon_i + \varepsilon_j + \varepsilon_{ij} + \eta_{ijt})$

Net returns from locating the venture in *j* depend on the productive amenities at that location, Z_{jt}, which would include measures of agglomeration economies and other locational advantages. If these amenities are indeed productive, then $\alpha_Z > 0$. The other factors affecting the value of the venture at location *j* include the talents of the entrepreneur that are transferable to any location, ε_i; the complementarities between the entrepreneur's skills and location *j*, ε_{ij}; the location-specific fixed effect, ε_j; and an *i.i.d.* zero mean shock to profitability, η_{ijt}. The specification presumes that there are some entrepreneurial skills that are location-specific such as knowledge of the customer base, relationships with suppliers or potential financiers, or knowledge of the natural or human resources that would enhance the business. We assume that ε_{ij}, ε_i, and ε_j are identically and independently distributed with zero mean.

The cost of entry, P_{jt}, will reflect the cost of the land and construction. The land price will reflect the location-specific attributes, Z_{jt}. The construction and other entry costs, C_t, are assumed to be the same across locations.

(3) $P_{jt} = (Z_{jt}^{\beta_Z} C_t)^{1-\gamma_j}$

where $0 < \gamma_j < 1$ is the location-specific share of the entry costs that can be recaptured were the operation to be sold.

[6] Multiplying by $(1 + \varepsilon_i + \varepsilon_j + \varepsilon_{ij} + \eta_{ijt})$ allows individual and locational unobservable attributes to have a zero mean effect across all potential entrepreneurs on present value in the location, but still allow some entrepreneurs to have above average expected revenue due to their skills and their locational match.

Combining (1-3)[7] and taking logs, we have that the log of the present value of entrepreneur *i* entering market *j* in year *t* is

(4) $V_{ijt} = \left(\alpha_Z - \beta_Z(1-\gamma_j)\right)\ln(Z_{jt}) + \varepsilon_{ij} + \varepsilon_i + \varepsilon_j + \eta_{ijt} - (1-\gamma_j)\ln(C_t)$

The entrepreneur will select market *j* if

(5) $V_{ijt} > V_{ij't}\ \forall j' \neq j$

The model generates several useful insights about new retail entrants.

1) Local attributes will not affect entry if $\alpha_Z = \beta_Z(1-\gamma_j)$, meaning that the local attributes have the same effect on the stream of returns from the venture as they have on the purchase price of the land net of expected lost value from resale. If ventures are risky, we would expect that $\alpha_Z > \beta_Z(1-\gamma_j)$ so that entrepreneurs are rewarded for taking on risk beyond the net purchase price of the land.

2) The talents of the entrepreneur are not incorporated in the purchase price of the land or the salvage value of the firm because the entrepreneur would not stay with the firm were it to be sold.

3) Areas with high local productive amenities make entrepreneurs more productive, and so there is an incentive for the most talented entrepreneurs to enter the most productive markets. To see why, note that the reward from individual entrepreneurial skills reflects the level of local productive attributes,

(6A) $\frac{\partial \pi_{ijt}}{\partial \varepsilon_i} = Z_{jt}^{\alpha_Z}$;

[7] We use the approximation that $\ln(1+x) \approx x$ when *x* is small.

and so the reward from entrepreneurial ability is greatest in the most attribute rich locales:

(6B) $\frac{\partial^2 \pi_{ijt}}{\partial \varepsilon_i \partial Z_{jt}} = \alpha_Z Z_{jt}^{\alpha_Z - 1} > 0$

4) There is an incentive for entrepreneurs with location-specific skills to enter those locations, consistent with data that suggests the existence of a local-bias in entrepreneurial entry (Michelacci and Silva, 2007; Dahl and Sorenson, 2012).

These predictions imply that the very best retailers will locate in the densest markets. The value of the operation will depend on the talents of the entrepreneur. However, the owner's skills do not continue with the firm or location when it passes on to a successor. Consequently, the resale value of the venture will not depend on the attributes of the current owner but on the skills of the successor. If the purchase price of the location can be fully recouped on resale, the attributes do not affect the entry decision. However, if the resale price is less than the purchase price, both the locational attributes and the share of the cost that can be recouped will affect the decision to enter a given location.

Empirical Strategy

The previous discussion suggests that profitable locational attributes Z_{jt} will attract retail entry if the value of Z_{jt} are not fully captured upon resale of the property. That suggests two empirical tests, the first being to identify the elements of Z_{jt} and the second being to assess if the elements of Z_{jt} matter for entry consistent with their effects on profit.

Our first task is accomplished by evaluating equation (2) at the market *j* level to get

(7) $\ln(\pi_{jt}) = \alpha_Z \ln(Z_{jt}) + \eta_{jt}$

where π_{jt} is a measure of aggregate value across firms in area *j* at time *t*, and η_{jt} is the aggregate error term across individuals. We assume that $\eta_{jt} = \eta_j + \xi_{jt}$, a location-specific fixed effect plus a random term. Because of the *i.i.d.* assumption, the expected value of the individual specific effects would be zero in the population, but the nonrandom sorting across markets due to the possible complementarity between locational attributes and individuals' skills may lead to greater productivity in denser markets. Our measure of π_{jt} is based on aggregate revenue from retail sales in the area at time *t*, R_{jt}. If the current revenue stream is a reasonable predictor of the expected future stream of revenues, then $\pi_{jt} \approx \frac{R_{jt} m_j}{i_t - g_j}$ where m_j is the location-specific price cost margin,[8] i is the interest rate and g_{jt} is the location specific growth rate in retail sales. In logs, $\ln(\pi_{jt}) = \ln(R_{jt}) + \ln(\frac{m_j}{i - g_{jt}}))$. The second term becomes another source of a location-specific fixed effect. As a result, the estimable form of (7) becomes

(8) $\ln(R_{jt}) = \alpha_Z \ln(Z_{jt}) + \eta_j + \ln(\frac{m_j}{i - g_{jt}}) + \xi_{jt}$

Elements of Z_{jt} with positive attached coefficients α_Z will be systematically correlated with better expected revenue streams. The error term, ξ_{jt}, provides a measure of whether the market has atypically strong retail sales, or is underserved relative to sales that would be expected based on productive amenities. The error term will vary about 0, and so the measure that corresponds to the traditional pull factor will be $PF_{jt} = \exp(\xi_{jt})$ which will be greater than 1 if sales are unexpectedly large and less than 1 otherwise.

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[8] The price cost margin for area *j* in any period *t* is defined as $m_j = \frac{P_j - C_j}{P_j}$ so that $R_j \cdot (m_j) = P_j Q_j \cdot (\frac{(P_j - C_j)}{P_j}) = Q_j(P_j - C_j)$ which is net revenue.

Our second task is to assess whether the factors that positively affect the retail revenue stream also affect the incentives for new entrepreneurs to enter the market. To test that, we apply equations 4) and 5) to assess the probability that equation 5) holds, *i.e.*

(9) $Pr(V_{ijt} > V_{ij't}) =$

$$Pr\left[\left(\alpha_Z - \beta_Z(1-\gamma_j)\right)\ln(Z_{jt}) - \left(\alpha_Z - \beta_Z(1-\gamma_{j'})\right)\ln(Z_{j't}) + (\gamma_{j'} - \gamma_j)\ln(C_t)\right]$$

$$< \varepsilon_{ij} - \varepsilon_{ij'} + \eta_{ijt} - \eta_{ij't}$$

which can be estimated using conditional logit methods. The theory predicts that if not all of the location-specific productive attributes are factored into the resale value of the venture at exit, the same factors that raise the retail revenue stream should increase the pace of new retail firm entry.

We can characterize that decision using a dichotomous variable $E_{ijt} = 1$ if a retail firm opts to enter area *j* in year *t* and $E_{ijt} = 0$ otherwise. That implies that $E_{ijt} = 1$ if $(V_{ijt} > V_{ij't})$. If we assume that the composite error term $\varepsilon_{ij} - \varepsilon_{ij'} + \eta_{ijt} - \eta_{ij't}$ follows the type-1 extreme distribution, we can estimate (9) using the conditional logit estimator.

Data

The dependent variables for this stage of the analysis include aggregate retail sales by county and new retail start-ups in the county in each year. Our measure of retail sales is the taxable retail sales in each county in each year. The Iowa Department of Revenue and Finance has compiled sales tax data for every county and year since 1976. Because sales tax rates are known for every jurisdiction, we can derive the aggregate taxable retail sales for each county. To match our data on new firm entry, we restrict our analysis to the period from 1992 on.

Data on new retail firm start-ups were compiled from the Iowa edition of the National Establishment Time Series (NETS) data set that includes the universe of all firm start-ups in the state. Data were available on start-ups from 1992 through 2011.

Traditional pull factor analysis support including local population and income per capita in our vector of locational attributes, Z_{jt}. However, the relevant local population of shoppers would also include in-commuters. Out-commuting increased fastest in the towns under 2,500 population, reaching 73% by 2009. We measure the net rate of in-commuters (in-commuters minus out-commuters as a fraction of the local population) by the ratio of local employees by place of work divided by the local population. We culled all information on population, per capita income, and local employment from the Bureau of Economic Analysis CA1 county dataset.

Availability of high-speed internet may also affect local retail sales. Internet access is commonly believed to reduce local retail sales because of the easy substitutability of alternative suppliers, but it can also make remote customers accessible to local retailers. The National Telecommunications and Information Administration Survey of High Speed Internet Providers has reported *HSIProviders*: the number of High Speed Internet providers by Zip Code since December 1999. This information was aggregated to the county level using population weights by Zip Code. The measure will show if there is any Broadband provision and, if present, the level of competition among providers that should be inversely related to the cost of service. Before 1999, Broadband service was not widely available in any county in Iowa.

The third set of measures that could affect the local market for retail includes measures of agglomeration economies. We make use of measures explored by Artz, Kim, and Orazem (2016) for their ability to explain relative firm incentives to enter rural and urban markets.

Cluster represents the number of firms in a county in the same industry. Having multiple firms in an industry in one place is believed to help in accessing commonly trained workers or common innovations. In retail, it is likely most important for lowering the cost of search by customers seeking alternative products in diversified retail markets. Our cluster measure at the county level represents the average value of the measure across all 4 digit retail sectors. For individual firm entry, it is the 4-digit cluster measure for firm's retail sector.

The next measure is *Herfindahl*, a measure of the economic diversity of commodity offerings in a county. Counties with highly concentrated economies are more vulnerable to booms and busts because large amounts of people in the area are employed in very few industries. This vulnerability can lead to more cyclically fluctuating demand for retail sales within the county. Moreover, a more diversified industrial base means that customers do not have to travel long distances to find the range of consumer products they seek. For both reasons, we would expect that a highly diverse economy will have more stable retail sales relative to a concentrated economy. We measure our Herfindahl index by the summed square of the employment shares across all sectors in the economy, using the data from the Bureau of Economic Analysis.

Upstream is an indicator of how close a firm is to their upstream providers. Being proximate to suppliers decreases transportation costs and inventory maintenance costs, leading to more competitive pricing by the firm. Downstream firm customers are not germane to this study because we are primarily looking at retail firms who sell to end customers and not to other firms. Our measure of upstream providers follows that of Ellison, Glaeser and Kerr (2010). We use an input-output model to measure the share of suppliers to the local retail sector that are present in the same county. For our more detailed firm entry analysis, we can disaggregate this measure to the 4-digit retail level.[9]

We also control for remaining variation in the climate for local retail with a series of dummy variables designating each county to 1 of 9 possible Rural-Urban continuum codes (Beale codes) that define each county by population size and proximity to a metro area. Details on the definitions along with sample statistics are presented in Table 1.

The error term, ξ_{jt}, from the retail sales equation will be the unexpected sales that are orthogonal to the vector of observable market factors, Z_{jt}. We use this as a measure of the natural log of the Pull Factor.

Results

We establish the factors that affect the natural log of county taxable retail sales using equation (8). We use the elements of the vector $\ln(Z_{jt})$ as defined in the previous section. Our control for the area-specific factors $\ln(\frac{m_j}{i-g_{jt}})$ is defined by the vector of 9 possible Beale code dummy variables plus a time trend. Our estimation controls for clustering at the county level.[10] The results are presented in the first column of Table 2.

The two factors commonly used to model the local retail "pull" are population and per capita income. Both have positive effects on retail sales, but population is the more important of the two. A 1% increase in population raises taxable retail sales by 1.2%. In contrast, a 1% increase in per capita income only increases taxable sales by 0.1% and the effect is not

[9] At the national level, the most important sectors providing intermediate inputs into the retail trade sector are construction, manufacturing, real estate, arts and entertainment, transportation, and nongovernmental services. Inputs from manufacturing are unlikely to be provided within the same county, but the other inputs are plausibly available locally. We thank Younjun Kim for supplying this matrix.

[10] We also estimated equation (8) with county-specific fixed effects. Results were similar to those reported in Table 2 except that the cluster effect became virtually zero and statistically insignificant.

significantly different from zero. Much more important is the employment rate by place of work. A 1% increase in the ratio of workers in the county relative to the county population raises taxable sales by 1.2%, presumably because the population stays in the county to work rather than working in a neighboring market.

Local availability of high speed Internet does not affect local retail sales positively or negatively. Local access to suppliers is also unrelated to the level of retail sales. However, having larger concentrations of retailers in the same 4-digit retail sector does increase overall sales, as does having a more diverse local economy. In all counties, taxable retail sales face a steady headwind. Retail sales are declining at a rate of 1.5% per year, other factors constant.

We can illustrate the roles of local population and the local employment rate on retail sales by fixing each at their start of period values and simulating what retail sales would have been had population or employment rates not changed. We are particularly interested in examining how these factors affect relative sales growth in thick (urban) or thin (rural) markets. Figures 1 and 2 illustrate the time path of population growth and employment rate growth in three Beale code groups, 2: metro with over 250 thousand to 1 million population; 5: urban with over 20,000 in population but not adjacent to a metro area; and 9: completely rural with less than 2,500 population and not adjacent to a metro.

Since 1976, population rose 21% in metro areas, fell 17% in urban, nonadjacent areas, and fell 26% in the most rural areas. With an elasticity of 1.2, population loss alone would explain a 55% gap in retail sales growth between metro and remote rural markets. However, employment rates were rising about 20% over time in all markets because of rising female labor force participation rates and the changing age distribution in the population due to the baby boom. Rising employment rates would have increased retail sales by 24% in the remote rural markets, not quite counteracting the negative effect of the population decline. In Figure 3 we show the net result. Had population in rural markets (Beale codes 6-9) remained constant at the level in 1991, rural retail sales would have declined only 3% between 1991 and 2013 instead of the 11% decline actually experienced. Had the rural employment rate stayed constant at the 1991 level, rural retail sales would have decreased 29%, a much larger decline than actually experienced. Rural retailers were greatly helped by rising local employment rates, although the employment rates rose even faster in the urban and metro markets.

The second column of Table 2 estimates equation (9) using a conditional logit specification. Each firm chooses a county to enter from the 99 options available, conditional on having decided to enter a county in Iowa in the given year. The estimation holds all firm-specific and entrepreneur-specific attributes ε_i constant as well as fixed effects for the county Beale codes.

Our primary interest is in the extent to which firm entry follows the factors that also increase county retail sales. While the data sets, dependent variables, and econometric specification are all different across columns 1 and 2, the null hypothesis that the coefficients for the same factor have the same sign holds in 7 of 8 possible coefficient pairs. The only exception is for local upstream supply which has a significant positive effect on firm entry but an insignificant effect on retail sales. The probability that we would randomly match 7 of 8 possible pairs is only 3.1%.[11]

The coefficient magnitudes in the two columns are not comparable, and so we present the elasticities in Table 3. Firm entry is more sensitive to variation in factors that affect retail sales

[11] Using the binomial distribution, the probability of k outcomes of n possible trials in a trial with two equally probable outcomes is defined by $\mathcal{P}(n,k) = \binom{n}{k} p^k (1-p)^{n-k} = \frac{n!}{k!(n-k)!}$. In our case, p = 0.5, n is 8 and k is 7, so $\mathcal{P}(8,7) = 0.03125$.

than are retail sales themselves. This is not surprising as these firms have the option of comparing relative economic environments across 99 possible locations at the time of initial investment. However, incumbent firms are already committed to the current location and cannot move in response to changing market conditions. Consequently, retail sales that are derived mainly from incumbent firms are less sensitive to the latest market factors than are current investment decisions by the next cohort of retail firms.

If expected retail sales encourage entry, do unexplained retail sales also encourage entry? Or do markets that generate more retail sales than expected based on the factors included in Table 2 discourage entry? To test this, we re-estimated equation (9) including our measure of the natural log of the Pull Factor, the error term from equation (8), ξ_{jt}, as an added regressor. The coefficient on ξ_{jt} is 0.39 with a z-statistic of 12.3, and so there is clear evidence that retail firms enter markets with unexpectedly large retail sales. The implied effect is modest, however. A shock to retail sales equal to one standard deviation in ξ_{jt} increases the probability of firm entry in that market by only 6%. Consequently, local firm entry is driven by the observable factors that encourage retail sales and not unexpectedly large sales.

Location-specific human capital will be more important in thin than in thick markets

Suppose that market $\mathcal{R}$ is a thin, rural market with low values of $Z_{\mathcal{R}t}$ compared to a thick, urban market $\mathcal{U}$ with $Z_{\mathcal{U}t}$. On the margin, ventures in $\mathcal{U}$ and $\mathcal{R}$ have to return r, and so

$$\left(\alpha_Z - \beta_Z(1-\gamma_{\mathcal{U}})\right)\ln(Z_{\mathcal{U}t}) + \varepsilon_{i\mathcal{U}} + \varepsilon_i|(j=\mathcal{U}) - (1-\gamma_{\mathcal{U}})\ln(C_t) + \eta_{i\mathcal{U}t}$$

$$= \left(\alpha_Z - \beta_Z(1-\gamma_{\mathcal{R}})\right)\ln(Z_{\mathcal{R}t}) + \varepsilon_{i\mathcal{R}} + \varepsilon_i|(j=\mathcal{R}) - (1-\gamma_k)\ln(C_t) + \eta_{i\mathcal{R}t}$$

where the notation $|(j = \mathcal{U})$ reflects the application of the individual entrepreneurial skill to market $\mathcal{U}$. The thin market will have less agglomeration and other productive amenities, and so $\ln(Z_{\mathcal{U}t})$ > $\ln(Z_{\mathcal{R}t})$ and $\varepsilon_{\mathcal{U}} > \varepsilon_{\mathcal{R}}$. The thin market will also have a disadvantage in the resale market if the assets of the firm are to be sold, and so $\gamma_{\mathcal{U}} > \gamma_{\mathcal{R}}$. As a result, we would expect that

$\left(\alpha_Z - \beta_Z(1-\gamma_{\mathcal{U}})\right)\ln(Z_{\mathcal{U}t}) + \varepsilon_{\mathcal{U}} > \left(\alpha_Z - \beta_Z(1-\gamma_{\mathcal{R}})\right)\ln(Z_{\mathcal{R}t}) + \varepsilon_{\mathcal{R}}$ and $(1-\gamma_{\mathcal{U}})\ln(C_t) < (1-\gamma_{\mathcal{R}})\ln(C_t)$. Both of these favor entry into the thick market because the resale value of the land and the building will be a greater share of the original value in the thick market. As a consequence, the individual entrepreneur's skill must be sufficiently large in the thin market to make up for the locational disadvantage, and so

(10) $\varepsilon_{i\mathcal{U}} + \varepsilon_i|(j = \mathcal{U}) < \varepsilon_{i\mathcal{R}} + \varepsilon_i|(j = \mathcal{R})$

As noted, equation (6B) suggests that high ε_i individuals will have an added incentive to locate in the thick market, and so $\varepsilon_i|(j = \mathcal{U}) \geq \varepsilon_i|(j = \mathcal{R})$. As a result, location-specific skills must be most important for firm entry in thin markets, and so $\varepsilon_{i\mathcal{U}} < \varepsilon_{i\mathcal{R}}$.

Exit

Exit will occur when the opportunity cost of the site exceeds the returns.[12] Let $\mu_{ij} = \varepsilon_{ij} + \varepsilon_j + \varepsilon_i$ be the combined unobserved location-specific and idiosyncratic skills of the i^{th} entrepreneur. The cumulative distribution function of μ_{ij} is $F(\mu_{ij})$. It would be efficient to transfer the location to another enterprise if the productivity of the location could be increased. Using (5), it is efficient to transfer the location from entrepreneur *i* to entrepreneur ℓ when $V_{ijt} < V_{\ell jt} - c_t$, where c_t is the cost of altering the property for the new venture. We assume

[12] We could make firm turnover also a function of evolving information on the entrepreneur's skills rather than making these skills known at the time of entry, but the more interesting source of turnover is the changing opportunity cost of the location due to the arrival of more able entrepreneurs.

those costs are common across areas. Applying (4), the efficient exit condition implies that $\mu_{\ell j} > \mu_{ij} + c_t$ so that the superior skills of the new entrepreneur ℓ compared to entrepreneur *i* raises the revenue stream sufficiently to pay for entrepreneur i's value added to the venture plus the transition cost to the new venture. The probability that a given entrepreneur ℓ will take over from entrepreneur *i* is $F(\mu_{ij} + c_t)$ which decreases in the skills of the current entrepreneur.

As shown in equation (10), the marginal entrepreneurs in thin, rural markets will have low values of Z_{jt} and high values of μ_{ij} while the marginal entrepreneurs in thick, urban markets will have high values of Z_{jt} and low values of μ_{ij}. That means that there will be a higher probability that a firm exits business in thick compared to thin markets, a result consistent with the finding of Yu *et al* (2011) that rural firms live longer than observationally equivalent urban firms.

This observation translates to a market-level prediction that the conditions that lead to more firm entry in thick markets will also lead to more firm exits in thick markets. Let N_j be the number of potential entrepreneurs in market *j*. Thick markets ($\mathcal{U}$) have large numbers of potential entrepreneurs and thin markets ($\mathcal{R}$) have small numbers, and so $N_{\mathcal{U}} > N_{\mathcal{R}}$. The probability $G(\mu_{ij} + c_t, N_j)$ that one of these potential entrepreneurs will enter the market in place of the i^{th} entrepreneur is

(11) $G(\mu_{ij} + c_t, N_j) = 1 - [1 - F(\mu_{ij} + c_t)]^{N_j}$.

The associated density function is $g(\mu_{ij} + c_t, N_j)$.

Suppose the k^{th} entrepreneur in each market is the weakest venture. Because $\mu_{k\mathcal{U}} < \mu_{k\mathcal{R}}$, meaning that the k^{th} entrepreneur in the thick market will have a poorer draw on the idiosyncratic productivity component than the k^{th} entrepreneur in the thin market, and because $N_{\mathcal{U}} > N_{\mathcal{R}}$, it must be true that $G(\mu_{k\mathcal{U}} + c_t, N_{\mathcal{U}}) > G(\mu_{k\mathcal{R}} + c_t, N_{\mathcal{R}})$ as illustrated in Figure 4. Consequently, there will be more new entrepreneurs taking over from old entrepreneurs in the thick markets than the thin markets. That means that the same factors that lead to better conditions for firm entry in thick markets (high $Z_{\mathcal{U}t}$) at time *t* will be correlated with a higher probability that the firm will subsequently exit due to the higher probability that a more skilled entrepreneur will take over.

To test this proposition, we examine the role of Z_{jt} on firm exits. We embed our measure of these unobserved factors in the firm's survival function. Let the realized return from the entrepreneurial venture be defined as:

$$\pi^R_{ij,t+\tau} = Z_{j0}^{\alpha_Z}\left(1 + \varepsilon_i + \varepsilon_j + \varepsilon_{ij} + \eta_{ij0}\right)\theta_{ij,t+\tau}$$

where the first term on the right-hand-side represents the profit expected at the time of start-up; $\theta_{ij,t+\tau}$ denotes a random negative or positive shock to the expected stream of returns to the i^{th} venture that is realized as of time $t + \tau$. The i^{th} entrepreneur will exit if $Z_{j0}^{\alpha_Z}\left(1 + \varepsilon_i + \varepsilon_j + \varepsilon_{ij} + \eta_{ij0}\right)\theta_{ij,t+\tau} < \mu_{\ell j} - c_{t+\tau}$ so that venture *i*'s realized value is exceeded by another potential venture ℓ in the same location.

Let $T_i > 0$ denote the duration of firm *i*'s existence. If entrepreneur *i* exits business τ_i years after start-up, then $T_i = \tau_i$. T_i has a cumulative distribution, $H(\tau_i)$ which is the probability of firm exit due to poor economic performance or the appearance of a dominant local rival venture. The associated probability density function is $h(\tau_i)$.

The probability of failure at time $t + \tau$ is:

$$(12)\quad H(\tau_i) = \Pr(T_i \leq \tau_i)$$

$$= \Pr(\ln(Z'_{jt})\omega_Z + \varepsilon_i + \varepsilon_j + \varepsilon_{ij} + \eta_{ij0} + \ln\theta_{ijk,t+\tau} - \mu_{\ell j} + c_{t+\tau} \leq 0)$$

$$= \Pr(\varepsilon_i + \varepsilon_j + \varepsilon_{ij} + \eta_{ij0} + \ln\theta_{ijk,t+\tau} - \mu_{\ell j} \leq -\left(\ln(Z'_{jt})\omega_Z\right) - c_{t+\tau})$$

$$= H[-\left(\ln(Z'_{jt})\omega_Z\right) - c_{t+\tau})]$$

We can control for the cost of entry $c_{t+\tau}$ with year-specific dummy variables. Our theory suggests that the same factors that lead to added local entry will lead to more local exits, and so we expect that $sgn(\omega_Z) = sgn\left(\alpha_Z - \beta_Z\left(1 - \gamma_j\right)\right)$.

Equation (12) defines a survival function analysis. We assume the composite error term in (12) has a log-logistic distribution which implies that we can use log logistic survival analysis to estimate the vector of parameters, ω_Z.

Results of the survival analysis

The results of the estimation of equation (12) are presented in the third column of Table 2. We expected that the factors encouraging firm entry would also increase the likelihood that the firm would exit because of the higher density of potential dominating ventures in thick markets. The prediction holds up reasonably well, with sign reversals between columns 2 and 3 occurring in 6 of 8 possible cases. One contrary result is that the employment rate has a large positive and significant effect on firm entry but has a small, insignificant but still positive effect on firm survival. The other is that more industry concentration, indicated by higher values of the Herfindahl index, suggest a small and insignificant negative effect on both firm entry and firm survival. The random probability that the 8 comparisons would result in 6 sign reversals is 10.9%. If we focus only on coefficients that are statistically significant in both the entry and survival equations, the hypothesis holds up in all 4 cases, a result that would occur at random 6.3% of the time. When the unexpected retail sales measure, ξ_{jt}, is added as an additional factor, its coefficient is 0.05 with a z statistic of 1.78. In general, we find that either we get the expected sign reversal or the effects become very small in the survival equation compared to the entry equation. We view this as at least modest support for the presumption that there is both more firm entry and more firm exit in thicker markets.

Conclusions

This study identifies distinctions in entrepreneurial decision-making between thin rural markets and thick urban markets. The study focuses on retail sales because of the sector's low cost of entry and exit. Among the findings:

1) The most able entrepreneurs will enter urban markets because of agglomeration factors that complement their skills. However, the entrepreneurs that enter rural markets will have atypically large location-specific skills.

2) The same factors that affect retail sales also affect new retail firm entry. In addition, areas that have strong pull factors so that $\xi_{jt} > 0$ also attract new retail entrants. These findings suggest that firms enter markets that have better than expected retail sales rather than markets that appear to be under-retailed. One reason is that entry into the most successful markets promise a higher salvage value of the initial cost of entry if the venture fails.

3) If firms do not enter underserved markets because the expected profitability is greater in markets already enjoying atypically large sales, then efforts to incentivize entry into the underserved markets are likely to be unsuccessful. The entrepreneurs who enter a thin market solely because of the subsidy will lack the location-specific match capital necessary to sustain the venture, and so they will exit if the subsidy expires.

4) The same factors that are tied to increased local retail sales are tied to increased rate of firm exits. That suggests that the most successful retail sites are subject to churning. Areas with more rapid arrival rates of potential entrepreneurs (the thick urban markets) are able to pass sites from one entrepreneur to another, even if the first entrepreneur has a successful venture. The higher exit rate is driven by higher opportunity costs of the site – the successor anticipates an even more successful venture and is willing to pay beyond the value of the venture to the first entrepreneur. Thin markets will have lower exit rates because they lack the pool of potential successors.

5) Rural retailers faced declining demand as a result of population loss. Offsetting this partially was the rising employment rate of rural residents reflecting the movement of the baby-boom into prime earning years and the rising female labor force participation rates in the 1990s. Had that not happened, the decline in rural retail would have been much more severe. As the baby boom retires and as commuting to urban markets becomes increasingly common, rural employment rates may fall, compounding the effect of declining population on rural retail sales. In contrast to the ease of transition from one urban venture to another, the low exit rate from rural markets is related to the high location-specific skills of rural entrepreneurs. These location-specific skills are lost when the location passes on to a successor, and so there is a greater loss of value when rural properties change hands.

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Table 1: Summary of Variables

Variables and definitions	Mean	Std. Dev.
ln(pop): *log of county population*	9.851	0.788
ln(pc_inc): *log of county per capita income*	4.924	0.200
ln(emp_rate): *log of county employment by place of work divided by the county residential population*	3.964	0.186
HSIProviders: *total number of providers per county*	1.517	2.794
Cluster: *number of firms in the same industry*	0.859	0.196
Herfindahl:*sum of employment shares^2*	0.233	0.070
Upstream: *firms producing for the local retail sector*	0.301	0.493
Year	2.06	0.66

Beale codes: 3: *Metro area with population <250,000; 4: Urban population of 20,000 or more, adjacent to metro area; 5: : Urban population of 20,000 or more, not adjacent to metro area;* 6: *Urban population of 2,500 to 19,999, adjacent to metro area; 7 Urban population of 2,500 to 19,999, not adjacent to metro area; 8: Completely rural or less than 2,500 urban population, adjacent to metro area;* 9: *Completely rural or less than 2,500 urban population, not adjacent to metro area*

Table 2: Coefficients and Standard Errors

Variable	lnRetail Sales[a] (1)		Firm Entry[b] (2)		Survival (3)	
	Coefficient (t)	Std Err.	Coefficient (z)	Std Err.	Coefficient (z)	Std Err.
ln(pop)	1.181** (33.62)	0.035	0.936** (72.95)	0.013	-0.013 (1.11)	0.012
ln(pc_inc)	0.093 (0.62)	0.151	0.206** (3.22)	0.064	-0.747** (13.25)	0.056
ln(emp_rate)	1.246** (9.37)	0.133	0.505** (11.00)	0.046	0.055 (1.36)	0.041
HSIP	0.004 (0.97)	0.004	0.011** (3.60)	0.003	-0.082** (29.37)	0.002
Cluster	0.174* (1.97)	0.088	0.342** (10.09)	0.034	-0.269** (8.72)	0.031
Herfindahl	-1.080** (4.00)	0.270	-0.146 (1.58)	0.092	-0.110 (1.32)	0.083
Upstream	-0.035 (1.05)	0.033	0.034** (4.30)	0.008	-0.001 (0.09)	0.007
Year	-0.015** (4.68)	0.003	-0.023** (12.06)	0.002	0.065** (35.47)	0.002
R^2	0.978		0.773			
N	1,979		1,978		160,170	

*=statistically significant at the 0.05 level. **=statistically significant at the 0.1 level
Regressions included dummy variables for Beale Codes
[a]Standard errors corrected for clustering at the county level.
[b] We use the Guimaraes *et al* (2003) Poisson regression equivalent form of the conditional logit estimator.

Table 3: Elasticities

Variable	lnRetail Sales		Firm Entry		Survival	
	ey/ex (t)	Std Err.	ey/ex (z)	Std Err.	ey/ex (z)	Std Err.
ln(pop)	1.181** (33.62)	0.035	9.198** (72.95)	0.126	-0.618** (4.91)	0.126
ln(pc_inc)	0.093 (0.62)	0.151	1.025** (3.22)	0.318	1.004** (3.90)	0.257
ln(emp_rate)	1.246** (9.37)	0.133	2.048** (11.00)	0.186	-0.174 (1.04)	0.167
HSIP	0.004 (0.97)	0.004	0.025** (3.60)	0.007	-0.006 (0.84)	0.007
Cluster	0.174* (1.97)	0.088	0.293** (10.09)	0.029	-0.395** (13.37)	0.228
Herfindahl	-1.080** (4.00)	0.270	-0.034 (1.58)	0.022	-0.063** (3.62)	0.172
Upstream	-0.035 (1.05)	0.033	0.010** (4.30)	0.002	-0.024** (3.04)	0.008
Year	-0.015** (4.68)	0.003				

Figure 1: Population growth for Iowa metro, urban nonadjacent and rural nonadjacent counties, 1976 - 2014

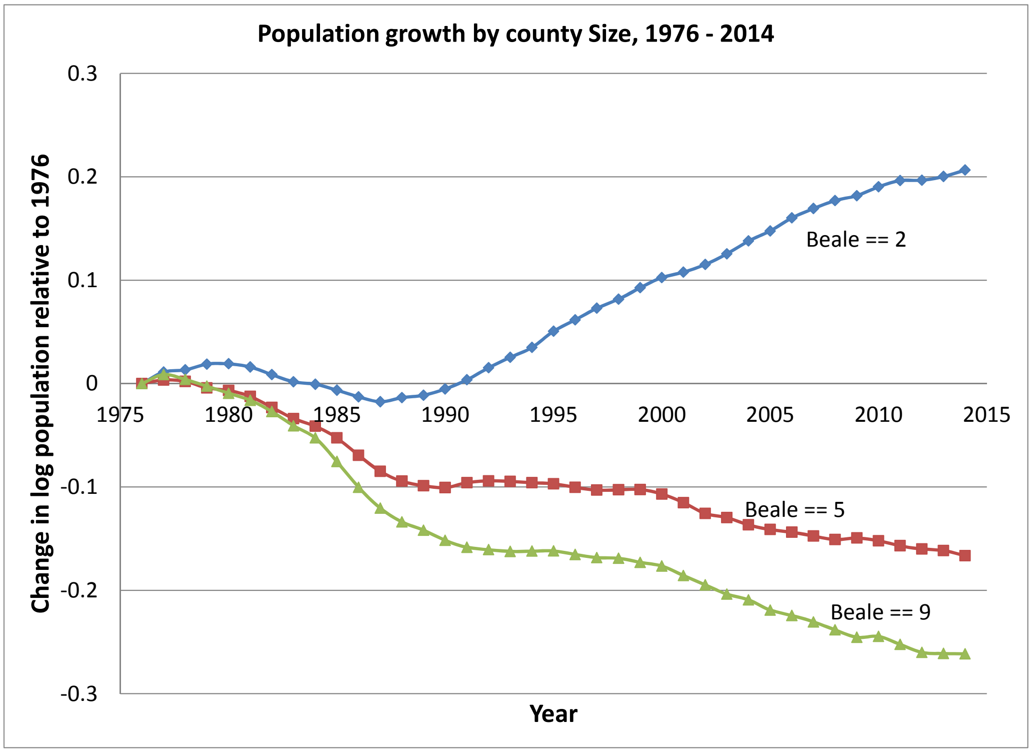


Figure 2: Growth in the ratio of employment by place of work to population in the county for Iowa metro, urban nonadjacent and rural nonadjacent counties, 1976 - 2014

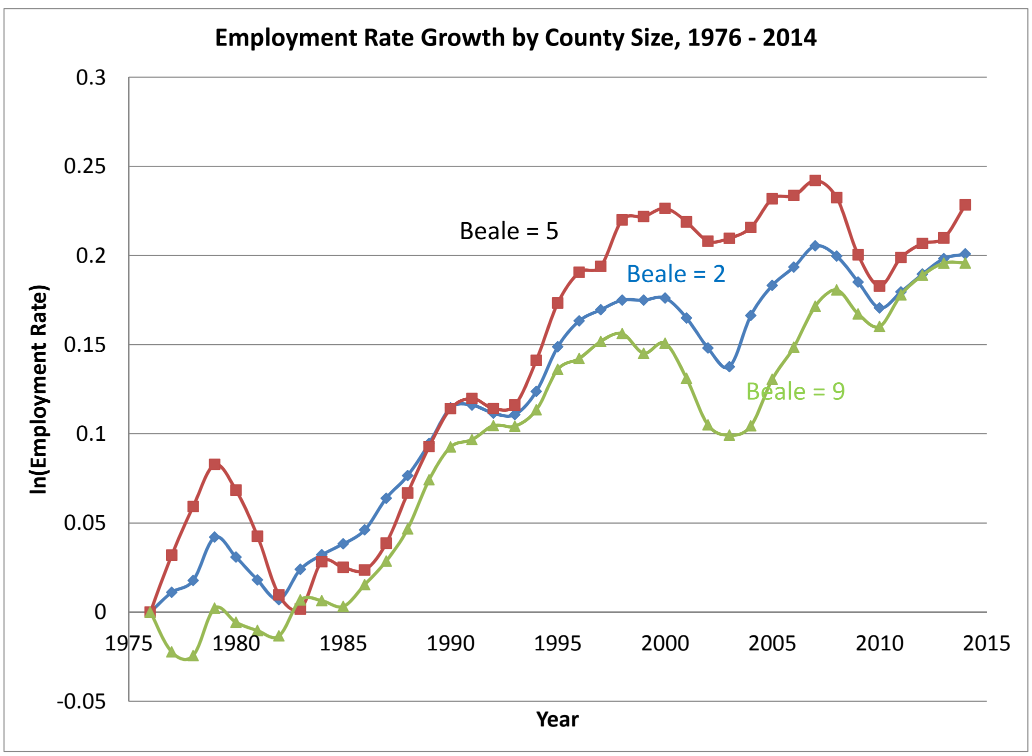


Figure 3: Simulated time path of Iowa rural retail sales had population or employment rate remained at their 1991 levels compared to the actual time path of rural retail sales

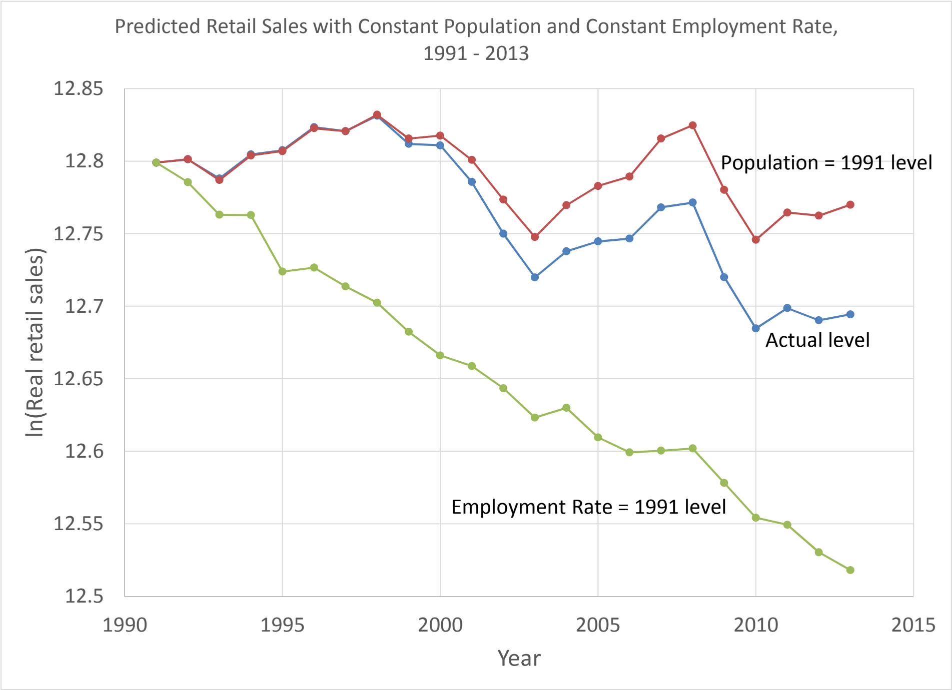
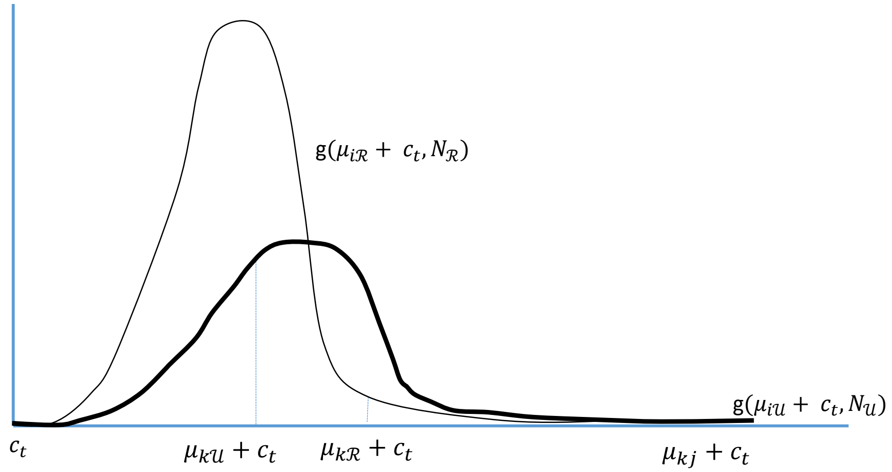


Figure 4: Expected distribution of idiosyncratic firm value in thick and thin markets

Density Function $g(\mu_{ij} + c_t, N_j)$ of the marginal firm's idiosyncratic value plus replacement cost in thick ($\mathcal{U}$) and thin ($\mathcal{R}$) markets



Area to the right of $\mu_{ij} + c_t$ is the probability $G(\mu_{kj} + c_t, N_j) = \int g(\mu_{kj} + c_t, N_j) d\mu_{kj}$ that another entrepreneur will have a dominating use of the location