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Keywords

entrepreneurship, churning, firm entry, firm exit, retail sales, rural, urban, thick market, thin market, location

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Churning in Rural and Urban Retail Markets[*]

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JEL Codes: L26, P25, R10

1. INTRODUCTION

The United States has long been characterized as benefiting from a dynamic and flexible labor market (Davis et al., 1998). The process by which less productive firms exit and are replaced by more productive firms, and by which less successful firm-worker matches are replaced by more productive matches, has been tied to rising productivity for the economy as a whole (Bartelsman and Doms, 2000). A notable feature of the turnover is that there

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are many more gross separations and accessions than necessary to fill the net growth in job vacancies. This churning is concentrated among younger firms that are responsible for a disproportionate share of both gross job creation and job destruction. As argued by (Davis et al., 2008), the churning appears to be a critical feature of a well-functioning economy. Recent research has pointed with some concern to the falling rate of churn in the U.S. labor market (Decker et al., 2014; Davis and Haltiwanger, 2014). The retail sector, which had been experiencing particularly strong productivity growth associated with the replacement of less productive incumbent firms by more productive entrants, appears to have been one of the first sectors to experience the decrease in rates of firm entry and exit (Foster et al., 2015). While most of the research on the implications of declining churning has focused on labor market turnover, recent papers have examined the implications of declining firm turnover. Bunten et al. (2015) showed that higher firm birth rates accompanied by higher firm death rates will increase employment growth. Alon et al. (2018) showed that the slowdown of firm entry and exit and the subsequent aging of firms has put a drag on productivity growth in the U.S.

This study examines churning of entering and exiting retail firms rather than focusing on labor market hires and separations. We show that the positive correlation in the rate of hiring and firing frequently observed in the labor market (Lazear and Spletzer, 2013; Lazear and McCue, 2017) is also found in the rates of entering and exiting retail firms in Iowa between 1992-2011. We show that the rate of both firm entry and firm exit is highest in metropolitan markets compared to rural markets. Finally, we show that national data of retail firm entry and exit also is consistent with the churning hypothesis. To the extent that higher labor market and firm churn rates have been associated with faster productivity growth, these findings imply that faster churn rate is another source of agglomeration advantages in thick markets.

2. LITERATURE REVIEW

Business start-ups have been responsible for more than one-third of gross job creation in the U.S. (Davis et al., 2008). The exit of inefficient firms and the entry of more productive replacements is responsible for one-quarter of the productivity growth of the U.S. economy Bartelsman and Doms (2000). High rates of job reallocation have been tied to improving employment opportunities for the younger and less-skilled (Davis and Haltiwanger, 2014) and to faster wage growth (Topel and Ward, 1992). This process of reallocating production activities from one worker to another and from one firm to another has been viewed as the mark of a dynamic economy capable of adapting fluidly to changing technologies and demands. Past recessions, which generate costs of unemployment and economic disruptions, have also generated the benefits of rapid productivity increases by winnowing out the weaker and less efficient firms, although the Great Recession resulted in less modest gains (Foster et al., 2016).

As summarized in the review by Foster et al. (2015), the retail sector had been a classic example of the role of firm entry and exit in fostering productivity growth. The retail sector is an attractive one to study the patterns of firm churning. For one, the sector is dominated by small firms with single stand-alone firms making up 95 percent of all retail firms, 58

percent of all retail establishments, 29 percent of all retail sales, and 30 percent of all retail payroll.[1] The importance of churning in retail markets is evident in that 75 percent of new job creation comes from the entry of new establishments and only 25 percent from growth of existing establishments. While the pace of new firm entry has decreased for both stand-alone and multi-establishment retailers, the rate of entry and exit is higher in retail than in most other sectors and start-ups still have a large presence in the industry. About 50 percent of stand-alone retail establishments and about one-third of chain establishments enter over a 5-year period. Establishment exit rates are also quite high with 5-year rates of about 43 percent for stand-alone retail stores and around 30 percent of 5-year establishment exit rates for multi-establishment retail firms.[2] Therefore, the retail sector offers a large number of new firm births and deaths for us to analyze.

Our interest extends past efforts to analyze churning across time to examine the extent of churning across markets. We are particularly interested in knowing whether churning is more common in thick, urban markets compared to thin, rural markets. If churning generates improved productivity, wage growth and employment opportunities, then evidence of greater churning in thick markets will be another type of agglomeration advantages in metropolitan areas over rural areas.[3]

The slow pace of firm entry in thin markets has been a focus of government policy designed to increase rural firm entry.[4] Such policies have not considered that constraints on firm exits may also be a source of slow rural firm entry.[5] Yu et al. (2011) showed that if rural firms have difficulty selling their assets due to a thin market of potential entrepreneurs, they must have a higher probability of success to compensate for their lower salvage value if the operation fails.[6] Artz and Yu (2011) found corroborating evidence of thin markets for rural capital in that rural entrepreneurs are more likely to anticipate passing the business on to relatives while urban entrepreneurs are more likely to anticipate selling the operation. To our knowledge, Bleakley and Lin (2012) is the only study to show that firm churning is

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[1]Data from the 2012 Economic Census of the United States.

[2]See Foster et al. (2015)

[3]For studies that identify other sources of agglomeration advantages in thick markets, see Glaeser et al. (1992); Feldman and Audretsch (1999); Porter (2003); Moretti (2004); Shapiro (2006); Glaeser and Gottlieb (2009); Ellison et al. (2010); Jofre-Monseny et al. (2011)

[4]The U.S. Department of Agriculture has initiated several programs aimed at increasing the pace of new rural startups including 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 aim at improving infrastructure such as building rural Broadband connections or improving rural housing while yet another strategy has been to encourage farmers to develop value-added products to their output mix.

[5]This idea is similar to the arguments in Lazear (1990) or Henrekson (2014) that firing costs or other limits on separations restrict hiring. DeTienne (2010) discussed how exit strategies are incorporated into entrepreneurial entry decisions.

[6]An implication is that rural firms face an asset fixity (Johnson, 1956; Edwards, 1959) or spatial fixity problem (Hite, 1997; Ward and Hite, 1999). 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 longer than urban firms (Buss and Lin, 1990; Huiban, 2011; Yu et al., 2011).

more common in thicker markets.

The retail sector is particularly useful for comparisons of churning in urban and rural markets. First, retail firms are universally present across all markets. Second, comparatively low costs of new firm entry and exit mean that the retail sector is characterized by high rates of firm entry and exit.[7] Finally, the sector has very good data on retail sales across geographically distinct markets because of the sales tax, and so we can tie market retail sales to firm entry and exit in the market, enabling us to assess whether factors that raise retail sales also attract both greater firm entry and greater firm exit.

3. THEORY

There is a long history of defining a local retail market by its pull factor: retail sales relative to expectations based on population and per capita income (Chase and Pulver, 1983; Hustedde et al., 1984; Shaffer, 1989; Yanagida et al., 1991; Gruidl and Andrianacos, 1994; Darling and Tubene, 1996; Thilmany et al., 2005). In suggesting a model of retail sales, it is useful to assess what other factors might lead to sales above or below that suggested by those two factors. Factors such as proximity to urban or metro markets, a net influx of job commuters into the area, availability of high-speed Internet, and agglomeration economies have been commonly suggested as enhancing the customer base for local retailers.[8] To capture the factors driving the strength of the local retail market, let the model of local real retail sales be of the form:

$$\ln(R_{jt}) = Z'_{jt}\alpha_Z + A'_j\alpha_A + \xi_{jt} \tag{1}$$

where j indicates the local market, Z_{jt} a vector of local attributes believed to affect the local economic climate for retail sales including per capita income and population plus other factors described below, and A_j is a vector of area j geographic measures that indicate the relative urbanity or rurality of a county. The dependent variable is the natural log of real county taxable retail sales and ξ_{jt} an error term that will measure unexplained retail sales above or below that expected by the observed strength of the local market.

We would expect that retail entrants would be attracted to markets that have stronger than average sales. That suggests that the factors for which $\alpha_z > 0$ in equation (1) should induce firms or branch establishments to enter that market.[9] To investigate that possibility, we embed the same factors used in (1) into a firm entry equation:

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[7]Retail firms represent 28 percent of all establishments but only 18 percent 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 U.S.

[8]Thilmany et al. (2005) show that the local number of retail establishments is positively but weakly related to the surrounding population. Our use of the local employment rate is a measure of the net in-commuting rate which we use to capture the effect of retail demand from the surrounding area. Amior and Manning (2018) argue that the local employment rate is a persistent sufficient statistics for the strength of local economic opportunity.

[9]For simplicity, we will use the term 'firm' to represent the retail establishment, whether it is a stand-alone establishment or part of a multi-establishment firm. Fifteen percent of our establishments are branch sites. Our entry equation controls for establishment-specific fixed effects, and so we hold constant whether the establishment is stand-alone or a branch.

$$\Pr\left(V_{ijt} > V_{ij't}\right) = \left(Z'_{jt} - Z'_{j't}\right)\beta_Z + \left(A'_j - A'_{j'}\right)\beta_A + \varepsilon_{ijt} \tag{2}$$

where V_{ij} the expected present value of firm i entering market j in year t. Note that the error term will not include firm- and entrepreneur-specific fixed effects as these would be common across all locations and are differenced away in the estimation. The firm will enter that market if its expected present value entering j dominates its present value in any other market j'. If the error term follows the type-1 extreme value distribution, we can estimate (2) using the conditional logit estimator. If our churning hypothesis is correct, we should find that $\mathrm{sgn}\left(\alpha_Z\right) = \mathrm{sgn}\left(\beta_Z\right)$ in equations (1) and (2).

Churning in firm settings would be the simultaneous entry and exit of firms, which suggests that the same factors that would cause firm entry would cause firm exits.[10] To test this hypothesis, we embed the same factors that lead to firm entry into a model of firm exits. 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 exit at time $t + \tau$ is:

$$H\left(\tau_i\right) = \Pr\left(T_i \leq \tau_i\right) = \Pr\left(\left[V\left(t_{ij} + \tau_i\right] \leq 0\right) = H\left[Z_{jt}, A_j, \tau_i\right] \tag{3}$$

Note that the vector of market attributes Z_{jt} are measured at the time of entry to correspond to the same variables used in equations (1) and (2). This limits the chance that time varying market measures $Z_{jt+\tau_i}$ will endogenously reflect the performance of firm i.

If the density function has a log-logistic distribution, we can estimate (3) using log-logistic survival analysis to estimate the parameters that increase the likelihood of persistence in business. The estimation controls for unobserved heterogeneity across entrepreneurs. If retail markets are characterized by churning, then $\mathrm{sgn}\left(\beta_Z\right) \neq \mathrm{sgn}\left(\frac{\partial H}{\partial z_{jt}}\right)$ in equations (2) and (3).

A common concern in studies of local economic growth is that the factors believed to influence growth are themselves functions of that growth.[11] Our use of establishment data allays these concerns to the extent that firms are deciding whether to enter one of 99 possible markets based on the known information in the market. Past firm actions have not been factored into the market measures because the firm did not exist. Similarly, firm exits are conditioned on the market information at the time of entry and so the market information will not reflect the firm's actions as a going enterprise. Market-level dependent variables such as retail employment, firm entry rates, firm exit rates, or our retail sales include information on incumbent firms that are more directly incorporated into the existing market information such as employment, internet access, store clusters, and per capita income. Nevertheless, the validity of our tests rest on the assumption that the unobserved firm- and location-specific profit that leads to entry in equation (2) and exit in equation (3) are not themselves

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[10]A formal argument that shows why the same factors that lead to firm entry could also lead to firm exits and that rural markets will have less firm turnover than urban markets is provided in the Appendix.

[11]See Bunten et al. (2015) for a discussion of how endogenous firm entry affects employment growth.
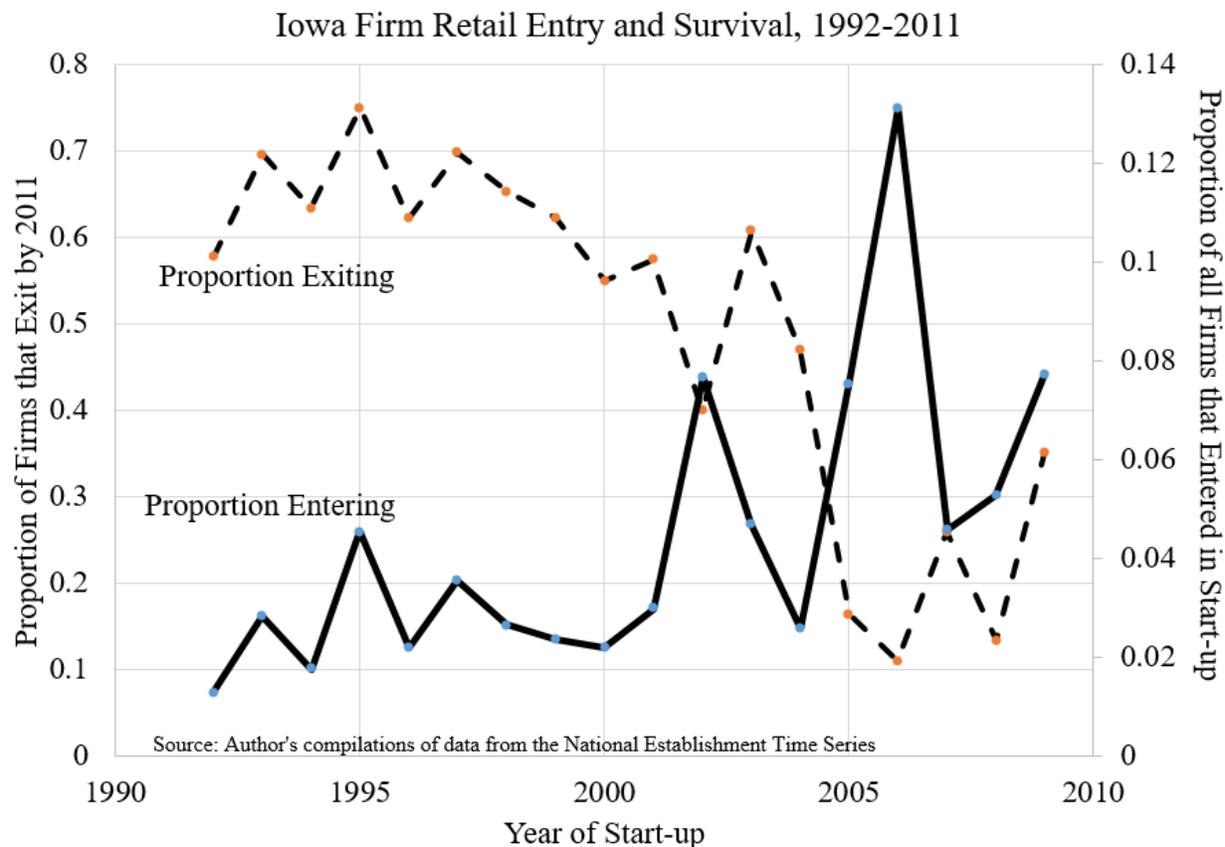
Figure 1: Illustration of the Time Paths of the Dependent
Variables: Iowa Firm Retail Entry and Exit, 1992-2011

correlated with innovations in the market measures Z'_{jt}. This assumption is not plausibly testable. If the assumption is violated, we would require another vector of instruments with as many elements as the vector Z'_{jt}.

4. DATA

We define a local retail market as a county, and so the dependent variable for this stage of the analysis 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.

We match our market retail sales revenue data with data on new retail firm start-ups compiled from the Iowa edition of the National Establishment Time Series (NETS) data set. This data includes the universe of all Iowa retail firm start-ups from 1992 through 2011. That defines the years we incorporate into our analysis. We illustrate the time paths of firm entrants and exits in Figure 1. About 31 percent of the retail firms had exited by 2011. The cumulative probability of exit rises with age of firm, and so 60 percent or more of the earliest entrants had exited by the end of the sample period. The number of entrants has trended upward modestly over time, but with considerable variation in the years following

recessions.

Our vector of potential locational attributes that would enter the vector Z_{jt} includes local population and per capita income, factors commonly incorporated into the computation of retail pull factors.[12] 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 percent 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 et al. (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 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

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[12]Pull factors have been used to measure retail trade capture in applied studies (Chase and Pulver, 1983; Shaffer, 1989; Yanagida et al., 1991; Gruidl and Andrianacos, 1994; Gale Jr, 1996; Darling and Tubene, 1996). Increased out- commuting and declining transportation costs have also contributed to the decline of rural retail markets (Shields and Deller, 1998; Hammond and Thompson, 2001).

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 et al. (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.[13]

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 unexplained strength of the local retail market.

5. RESULTS

We first establish the factors that affect the natural log of real county taxable retail sales using equation 1. The elements of the vector Z_{jt} were defined in the previous section. Our controls for the area-specific factors A_j include a vector of nine possible Beale code dummy variables plus a time trend. We use these to remove variation across localities and time that are attributable to prices and costs. We cluster the standard errors at the county level.[14] Our findings 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 percent increase in population raises taxable retail sales by 1.2 percent. In contrast, a 1 percent increase in per capita income only increases taxable sales by 0.1 percent and the effect is not significantly different from zero. Much more important is the employment rate by place of work. A 1 percent increase in the ratio of workers in the county relative to the county population raises taxable sales by 1.2 percent, 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 percent per year, other factors constant.

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[13]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

[14]We also estimated the model 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.

Table 1: Summary of Key Exogenous Variables, 1992-2011

Variables and definitions	Full Sample		Metro Beale Codes 1-3		Rural Beale Codes 6-9	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
ln(pop): *log of county population*	9.85	0.79	10.72	1.03	9.47	0.43
ln(pc_inc): *log of real county per capita income*	4.92	0.2	5.08	0.14	4.98	0.16
ln(emp_rate): *log of county employment by place of work divided by the county residential population*	3.96	0.19	4.0	0.23	4.07	0.15
HSIP: *total number of providers per county*	1.52	2.79	3.12	3.29	2.46	2.87
Cluster: *number of firms in the same industry*	0.86	0.2	0.92	0.17	0.81	0.19
Herfindahl: *sum of employment shares^2*	0.23	0.07	0.19	0.03	0.25	0.07
Upstream: firms producing for the local retail sector	0.30	0.49	0.72	0.94	0.17	0.09

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[c] (3)	
	Coefficient	Std Err.	Coefficient	Std Err.	Coefficient	Std Err.
ln(pop)	1.181** (33.62)	0.035	0.936** (72.95)	0.013	-0.014 (1.18)	0.012
ln(pc_inc)	0.093 (0.62)	0.151	0.206** (3.22)	0.064	-0.775** (13.20)	0.059
ln(emp_rate)	1.246** (9.37)	0.133	0.505** (11.00)	0.046	0.043 (1.00)	0.043
HSIP	0.004 (0.97)	0.004	0.011** (3.60)	0.003	-0.090** (30.85)	0.003
Cluster	0.174* (1.97)	0.088	0.342** (10.09)	0.034	-0.305** (9.51)	0.032
Herfindahl	-1.080** (4.00)	0.27	-0.146 (1.58)	0.092	-0.190** (2.19)	0.087
Upstream	-0.035 (1.05)	0.033	0.034** (4.3)	0.008	-0.008 (1.01)	0.008
Year	-0.015** (4.68)	0.003	-0.024** (12.06)	0.002	0.070** (36.52)	0.002
Unexpected Sales: ξ_{jt}			0.388** (12.31)		0.044 (1.45)	0.03
Beale Code Dummies	Included		Included		Included	
R^2	0.978		0.773			
N	1,980		1,980		147,402	

*=statistically significant at the 0.05 level. **=statistically significant at the 0.01 level
[a] Standard errors corrected for clustering at the county level with 99 clusters.
[b] We use the Guimaraes et al. (2003) Poisson regression equivalent form of the conditional logit estimator.
[c] Regression also controls for whether the establishment is a branch of a multi-site firm and the size of the initial
establishment to control for differences in initial capitalization.

5.1. Firm Entry

The second column of Table 2 estimates equation (2) 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 includes fixed effects for the county Beale codes as a control for price and cost variation. Results show that firm entry is strongly positively influenced by market density (population and employment rate) and per capita income. Entry is enhanced by internet access, clustered presence in the sector, and upstream suppliers. The rate of entry in retail has been declining over time. Entry is also encouraged by sales that exceed the level expected by observable market attributes. The coefficient on ξ_{jt} is 0.39 with a z-statistic of 12.3, but the implied effect is modest. 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 percent. Consequently, local firm entry is driven more by the observable factors that encourage retail sales and not unexpectedly large sales.

Table 3: Elasticities Based on Coefficients in Table 2

Variable	lnRetail Sales		Firm Entry		Survival	
	ey/ex(t)	Std Err.	ey/ex(t)	Std Err.	ey/ex(t)	Std Err.
ln(pop)	1.181** (33.62)	0.035	0.936** (72.95)	0.126	-0.148 (0.55)	0.134
ln(pc_inc)	0.093 (0.62)	0.151	1.025** (3.22)	0.318	-3.94** (12.86)	0.3
ln(emp_rate)	1.246** (9.37)	0.133	2.048** (11.00)	0.186	0.177 (1.72)	0.178
HSIP	0.004 (0.97)	0.004	0.025** (3.60)	0.007	-0.330** (-31.53)	0.01
Cluster	0.174* (1.97)	0.088	0.293** (10.09)	0.029	-0.289** (8.99)	0.031
Herfindahl	-1.080** (4.00)	0.27	-0.034 (1.58)	0.022	-0.040** (2.18)	0.182
Upstream	-0.035 (1.05)	0.033	0.010** (4.3)	0.002	-0.009 (1.01)	0.009

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 random probability of that result is only 3.1 percent.[15] The only exception is for local upstream supply which has a significant positive effect on firm entry but an insignificant effect on retail sales. Therefore, we have no significant exceptions to the prediction.

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 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 without cost 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.

5.2. Firm Exits

The results of the estimation of equation (3) are presented in the third column of Table 2. The findings might be viewed as surprising taken in isolation. Factors that should improve the climate for local retail sales such as higher per capita incomes, greater local

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[15]Using the binomial distribution, the probability of k outcomes of n possible trials in a trial with two equally probable outcomes is defined by $\mathcal{P}(n,k) = \binom{n}{k} p^k (1-p)^{n-k} = \frac{n!}{k!(n-k)!} \cdot 0.5^n$. In our case, $p = 0.5$. n is 8 and k is 7, so P(8,7)=0.031.

population, more in-commuting, better access to high-speed Internet, and larger clusters of similar firms either do not affect firm longevity or even hasten firm exits. The pattern becomes understandable when viewed as indicative of the process of churning. The prediction that we should get sign reversals from column 2 holds up reasonably well, occurring in 6 of 9 possible cases. The random probability that the nine comparisons would result in six sign reversals is 16.4 percent. Moreover, in none of the three exceptions to the prediction are both paired coefficients significantly different from zero, and so we have no significant departures from the predicted sign reversals.

5.3.   Churning in Thick and Thin Markets

Taken together, our finding that the same factors that increase local retail sales increase both the rate of firm entry and the rate of firm exit is consistent with the view that churning is a sign of a healthy local retail market. Past studies have highlighted that the pace of churning is falling in labor markets (Davis and Haltiwanger, 2014) and product markets (Alon et al., 2018). Our results show evidence of declining churn rates in Iowa retail firms also. Holding constant retail market conditions, the pace of new firm entry and firm exit have both declined as indicated by the coefficients on year in Table 2. This potentially signals a decrease in the pace of productivity growth for the sector as a whole.

We can also measure the importance of churning across thick and thin markets. Using the parameters in Table 2, we can aggregate across market factors to measure the added churning that occurs in metropolitan markets compared to rural markets. The results suggest that, based on observed market attributes, metropolitan markets have a 9.6 percent higher firm entry rate and a 4.1 percent higher firm exit rate than in rural markets. To the extent that this higher rate of churn results in greater productivity, the higher churn rate of firms in dense markets is yet another source of agglomeration benefits that favor labor productivity in urban areas. The implied churning gap has been widening over time as populations have shifted from rural to metropolitan areas.[16]

5.4.   A National Test

There are advantages to the Iowa data in that we can match firm entry and exit to measures of market-wide retail sales. However, it is possible that the Iowa case is not generalizable. To test that, we compiled information on new firm entry and incumbent firm exits by county over the 1990-2016 period for the 48 contiguous states as reported by the U.S. Bureau of the Census Statistics of U.S. Businesses (SUSB). This is not firm-level data, and so our estimates cannot control for firm-specific and entrepreneur-specific effects and are consequently more prone to endogeneity concerns. The regressors are comparable to those used in Table 2. We report Poisson regressions on the number of entrants and exits in the county in Table 4.

If churning holds in Table 4, the entry and exit coefficients will have the same sign. Of the eight coefficients, six have the same sign, an outcome that would occur randomly 10.9 percent of the time. Only one of the eight pairs have significant differences in the signs, a result that occurs randomly just 3.1 percent of the time. While a definitive test awaits

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[16]Since 1976, population rose 21 percent in Iowa metropolitan areas and fell 26 percent in Iowa rural areas.

Table 4: Poisson Regression of County Retail Firm Births and Deaths using
all Counties in the Continental U.S., 1990 2016

	Firm Entry (1)		Firm Exit (2)	
	Coefficient (z)	Std Err.	Coefficient (z)	Std Err.
ln(pop)	1.063** (73.0)	0.015	1.038** (96.5)	0.011
ln(pc_inc)	0.701** (6.40)	0.109	-0.48** (6.55)	0.073
ln(emp_rate)	0.656** (11.1)	0.059	0.711** (16.0)	0.044
HSIP/1000	0.028** (2.08)	0.013	-0.014 (1.41)	0.01
Cluster	0.497** (10.09)	0.034	0.721** (9.51)	0.042
Herfindahl	-0.101 (0.39)	0.26	-0.738** (4.11)	0.179
Upstream	0.358** (11.20)	0.032	0.218** (7.37)	0.03
Year	-0.035** (31.0)	0.059	-0.023** (31.5)	0.044
State Dummies	Included		Included	
Beale Code Dummies	Included		Included	
Log-likelihood	-137652.7		-132032.6	
N	45,073		45,073	

*=statistically significant at the 0.05 level. **=statistically significant at the 0.01 level
[a] Standard errors corrected for clustering at the county level with 3049 clusters.
[b] Poisson regression of the conditional logit estimator.
[c] Regression also controls for whether the establishment is a branch of a multi-site firm and
the size of the initial establishment to control for differences in initial capitalization.

firm-level data across many states, the findings in Table 4 are supportive of churning among
retail firms.

6.   CONCLUSION

This study identifies distinctions in entrepreneurial decision-making between thin rural mar-
kets and thick urban markets. The study focuses on retail sales because of the sector's low
cost of entry and exit and its universal presence across markets. Our key finding is that the
same factors that increase retail sales also increase new retail firm entry. These same factors

also increase or do not affect the rate of firm exits. Our explanation is that markets with strong productive attributes that attract more firm entry will also have a faster arrival rate of dominant entrepreneurs who would displace the original entrants, and so the same factors that attract entry will also lead to greater firm turnover.

Yu et al. (2011) found that rural firms live longer than urban firms, but that is not necessarily a mark of a strong economy. Thick markets have higher rates of both firm entry and firm exit. Metropolitan markets have a 9.6 percent higher firm entry rate and a 4.1 percent higher firm exit rate than do rural markets. Presumably, 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. To the extent that churning contributes to productivity growth (Alon et al., 2018) or faster employment growth (Bunten et al., 2015), the higher rate of churning in urban than in rural markets serves as an additional source of agglomeration advantages in thick markets.

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7.   APPENDIX

Explaining why the same factors that lead to firm entry will also lead to firm exit and why urban markets will have more firm turnover than rural markets. Define the error term in equation (2) to be $\varepsilon_{ijt} = \varepsilon_i + \varepsilon_j + \varepsilon_{ij} + \eta_{ijt}$ where ε_i is the fixed unobserved ability of the ith entrepreneur, ε_i is the fixed unobserved productivity of market j, ε_{ij} is the unique match capital between entrepreneur i and location j and η_{ijt} is a transitory productivity term. Let $\mathcal{U}$ represent an urban market and $\mathcal{R}$ represent a rural market. On the margin, ventures in $\mathcal{U}$ and $\mathcal{R}$ have to return the same expected profit. Suppose that there is an entrepreneur who is indifferent between the urban and rural markets. Applying eqution (2) and the error structure, $(Z'_{ut}) \beta_Z + (A'_u) \beta_A + \varepsilon_u + \varepsilon_{iu} + \eta_{iut} = (Z'_{\mathcal{R}t}) \beta_Z + (A'_{\mathcal{R}}) \beta_A + \varepsilon_{\mathcal{R}} + \varepsilon_{i\mathcal{R}} + \eta_{i\mathcal{R}t}$

We know that the thin market $\mathcal{R}$ will have low values of $Z_{\mathcal{R}t}$ compared to the thick, urban market $\mathcal{U}$ (see Table 1). We might expect that the urban market will also have advantages in the unobserved locational fixed effects so that $\varepsilon_u > \varepsilon_{\mathcal{R}}$.[17]. We also expect that $(A'_u) \beta_A > (A'_{\mathcal{R}}) \beta_A$ if more urban markets generate more sales than rural markets. The expected value of the transitory errors are zero. Consequently, it must be true that $\varepsilon_{i\mathcal{R}} > \varepsilon_{iu}$, which means that the rural market will have entrepreneurs with atypically strong match productivity. That implies that it will be harder to find another entrepreneur with a larger locational match than the incumbent rural entrepreneur, and so we would expect to have less firm turnover in rural markets.

In general, markets that have strong observed productive advantages Z_{jt} or unobserved productive advantages $\mathcal{E}_j$ can attract entry by weaker entrepreneurs with relatively low draws on ability $\mathcal{E}_i$ or locational match productivity $\mathcal{E}_{ij}$. That means that there is a higher probability of the arrival of a rival entrepreneur ℓ who would have dominant skills so that $\varepsilon_\ell > \varepsilon_i$ and $\varepsilon_{\ell j} > \varepsilon_{ij}$. The implication is that markets with strong productive attributes that attract more firm entry will also have a faster arrival rate of dominant entrepreneurs who would displace the original entrants, and so the same factors that attract entry will also lead to greater firm turnover.

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[17]One advantage we had in mind is that the urban areas will have a larger number of potential buyers for the site, and so firms will have a better chance of recapturing a share of their capital investment at resale were they to exit the urban market, an argument advanced by Yu et al. (2011)