Job Creation, Job Destruction, and Firm Size

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1. Introduction

The compilation of the longitudinal research data base has provided economists with a broad set of interesting data on job and worker flows in the U.S. economy. One feature of the data, reported e.g. in Davis, Haltiwanger and Schuh (1996) is that both job creation and job destruction rates are higher in small firms than in large firms, but that net job creation rates are roughly independent of firm size. In this paper, I examine the possibilities of a dynamic general equilibrium model to match these findings and I consider policy implications of the model.

The basic model I use was developed by Hopenhayn and Rogerson (1993). It is an industry equilibrium model with entry and exit. Potential entrants are identical *ex ante* but after having entered, each firm is assigned an idiosyncratic productivity level. Each firm's productivity changes randomly over time but there are no aggregate shocks so the distribution of firms over a size-productivity space is constant. As a firm's productivity changes, it chooses to expand, contract or maybe to leave the market. The model results in flows of jobs and firms that, considering the model's simplicity, are remarkably similar to those in the U.S. economy.

Policy makers and politicians often emphasize the importance of small business for the economy. In practice, preferential treatment of entrepreneurs and small firms has not been uncommon. Davis, Haltiwanger and Schuh (1993) argue that small firms are not more important for job creation than large firms are since they do not have higher *net* job creation rates. They argue that government policies therefore should not be targeted at small firms. This policy discussion seems to be a bit out of line, since Davis et. al. do not have a model of the economy and thus neither an explanation for why the figures look the way they do. Even if net job creation in small firms were high, government policies would only be of benefit if there were market imperfections of some kind.

One possible reason for the high turnover rates in small firms could be that a lot of new, small firms turn out to have low productivity and they consequently soon exit from the market. A fraction of new firms would turn out to be very productive and then increase employment drastically. This is the basic mechanism of Hopenhayn and Rogerson's model. In the face of empirical findings of hiring and firing costs and of credit market imperfections, I find it relevant to consider what empirical effects adjustment costs and credit constraints have in the model. I therefore examine the consistency of Hopenhayn and Rogerson's framework with (i) the existence of adjustment costs only, and (ii) the existence of both adjustment costs and credit constraints. The first scenario would not motivate government intervention but the second scenario would.

Since there is a lot of hiring and firing in equilibrium in this model economy, imposing adjustment costs could have a large effect on labor market flows. It also turns out that hiring and firing costs of plausible magnitudes change firms' decision rules significantly. Firms do not change its employment in response to small productivity changes. However, the aggregate flows do not become very different from a scenario with no adjustment costs. The imposition of credit constraints also leaves most aggregate flows unchanged, but exit decisions and hiring decisions in small firms change significantly. This is not surprising. First, new firms that find their productivity to be very high would like to expand but might not be able to raise the funds needed to invest rapidly. Existing firms seldom see their productivity change sharply and thus more rarely need to do large investments. Also, if they do, they often can generate the necessary funds. Second, small firms that are not very productive might stay in the market, hoping that times will get better. If they are credit constrained they may be forced out of the market in those cases.

In the next section, I introduce the model and discuss how to solve it. Thereafter, in section three, I discuss parameter calibrations. Section four deals with a setup of the model where there are hiring and firing costs. I briefly survey the evidence of hiring and firing costs and motivate the choice of cost structure used in the model. I also report the resulting properties of the model economy. In the following section, credit constraints are imposed on small firms. In section six, I show that a subsidy to hiring in small firms can increase productivity and production when small firms do not have full access to financial markets. Finally, section seven concludes.

2. Model

I use a model similar to that of Hopenhayn and Rogerson (1993). The only significant difference is that I assume that labor supply perfectly inelastic. I will only summarize the model briefly. For further reference, see Hopenhayn and Rogerson (1993) for a description of the model and Hopenhayn (1992) for technical details on the existence of equilibria. Since I assume that labor supply is constant, I obviously violate Assumption 2 in Hopenhayn and Rogerson. However, since labor demand is strictly increasing in the number (mass) of entering firms, the number of entering firms will still be uniquely determined in the model.

The model is a basic industry equilibrium model that abstracts from capital. There are no aggregate shocks and thus no business cycles. In the empirical implementation of the model we will therefore assume that one time period is five years.

We assume that there is a continuum of possible entrants. All firms are identical in expectation, before they decide whether to enter or not. Once a firm has entered and incurred the entry cost, c_e, it can observe its productivity, s_t. The productivity for entrants is drawn from the distribution v and it is independent across all firms.

In the beginning of period t, existing firms have to decide if they want to exit or stay. If they decide to stay, they incur the fixed operating cost c_f units of output and observe their productivity at t. The fixed operating cost does not fall upon new firms. We assume that log productivity for a staying firm, i, follows the AR(1)-process

$$\log(s_{i,t}) = a + \rho \log(s_{i,t-1}) + \varepsilon_{i,t},$$

where

$$\varepsilon_{i,t} \sim Niid\left(0, \sigma_{\varepsilon}^2\right).$$

Production is given by

$$f(n_{i,t}, s_{i,t}) = s_{i,t} n_{i,t}^{\theta}.$$

We also allow for hiring and firing costs. The cost of changing the labor stock from n_{t-1} to n_t is given by the function $g(n_t, n_{t-1})$. Wages are normalized to unity and output is sold at price p_t. Firm i's cash flow at time t is then

$$\pi_{i,t} = p_t s_{i,t} n_{i,t}^{\theta} - n_{i,t} - g\left(n_{i,t}, n_{i,t-1}\right) - p_t c_f,$$

and the Bellman equation to the firm's dynamic optimization problem is given by

$$V\left(s_{i,t}, n_{i,t-1}\right) = \max_{n_{i,t}} \left[\pi_{i,t} + \beta \max\left\{E_{s_{i,t+1}} V\left(s_{i,t+1}, n_{i,t}\right), -g\left(0, n_{i,t}\right)\right\}\right].$$

Here, β is the discount factor and $E_{s_{i,t+1}}$ is the expectation of $s_{i,t+1}$ conditional on $s_{i,t}$. The interpretation of the Bellman equation is straightforward. Once the firm has decided to stay, it observes its level of productivity and chooses the current employment $n_{i,t}$. It will not get any new information before it has to decide if it wants to stay for an other period. Therefore, it will choose to exit if the exit cost, $-g\left(0, n_t\right)$, is larger than the expected value of staying, $EV\left(s, n\right)$.

Hopenhayn and Rogerson allow firms with zero employees to exist. I have set the lowest number to three employees. This value gives a better conformity with data and it is also more accurate since the LRD data set only includes firms with at least five employees. The expected value of entering, net of entry costs, is then

$$V^e = \int V\left(s, 3\right) dv\left(s\right).$$

2.1. Solution Algorithm

In equilibrium all aggregate variables will be constant since there are no aggregate shocks. We can therefore, at least momentarily, normalize the price level to unity with out loss of generality. The solution algorithm is then to first solve the Bellman equation. This is done numerically, and I use a discrete state space with 250 grid points for employment and 30 grid points for productivity. This solution also results in decision rules for exits, $X\left(s, n\right)$, and employment levels, $N\left(s, n\right)$. Thereafter, since we only are interested in equilibria where there is entry and exit, we set the entry cost equal to the value to enter, i.e. $c_e = V^e$.

Finally, we simultaneously look for the stable distribution of firms over the state space, denoted μ, and the mass of entering firms, M. In the stable equilibrium, the mass of entering firms is equal to the mass of exiting firms implied be the decision rules in combination with the distribution of firms over the state space. To find μ and M we first guess a distribution, μ_0, and then calculate the implied mass of entry, M_0. This M_0 in turn implies a new value if μ and we iterate on this mapping until convergence.

3. Basic Calibration

I first look at a setting where there are hiring and firing costs but no credit constraints. This setup is similar to those in Hopenhayn and Rogerson. In a second setup, I also impose credit constraints. The first setup is calibrated with values from Hopenhayn and Rogerson's model as far as possible. Unfortunately, they do not report all the parameter values they use. In these cases (a and c_f) I have simply used the parameter values that give the best fit with data.

In the setup with credit constraints, I use the same parameter values as in the first model, but I recalibrate the distribution of productivity for entrants. Hopenhayn and Rogerson chose this distribution by pure calibration - they did not claim any empirical evidence for doing so. I also change the entry cost so that entry equals exit in equilibrium. In stead of changing the entry cost, I could look for the price level that makes the entry and exit flows equally large. That is not an approach I have chosen however.

Hopenhayn and Rogerson report that they set $\beta = .8$ and $\theta = .64$. They also report that the serial correlation in log employment, i.e. ρ, is .93 and that $Var[\Delta \log(n_i)] = .53$. In their setup there are no adjustment costs so $\sigma_\varepsilon^2 = (1-\theta) Var[\Delta \log(n_i)]$. (I think this is only an approximation). I found $c_f = 12$ and $a = .078$ to be good values. Finally, I let the productivity of new firms be uniformly distributed on $[\underline{s}, \underline{s} + 0.65(\bar{s} - \underline{s})]$ where $[\underline{s}, \bar{s}]$ is the span of productivity for existing firms. Hopenhayn and Rogerson report that they used a uniform distribution on the "lower part" of $[\underline{s}, \bar{s}]$.

4. Adjustment Costs

Recent literature has found evidence of significant hiring and firing costs. Hamermesh and Pfann (1996) provide a good survey of the recent literature. According to this survey, adjustment costs are typically found to be non-quadratic and asymmetric with hiring more expensive than firing. That adjustment costs are non-quadratic implies that adjustments are lumpy. Firms typically do not change the level of employment until the desired level of employment is far from the actual level. If adjustment costs were quadratic, adjustment would tend to be smooth and gradual.

Caballero, Engel and Haltiwanger (1995) used the Longitudinal Research Database to look at quarterly employment flows of approximately 10,000 large U.S. manufacturing establishments from 1972 to 1980. They estimated adjustment hazards for individual firms as a function of an estimated level of desired employment minus actual employment. That is, they estimated the probability that a firm will adjust the employment level given a percentual deviation between the employment level the firm desires and the employment level the firm has. Caballero, Engel and Haltiwanger found the adjustment hazard to be clearly increasing in the absolute value of the deviation and roughly symmetric around zero. This is strong evidence against quadratic adjustment costs and it indicates that the adjustment costs are not very asymmetric.

There does not seem to be much direct evidence on the exact size of the adjustment costs. Most examinations have, like Caballero, Engel and Haltiwanger's, focused on the deviation needed before a firm adjusts. It is often found that firms do not adjust until the deviation between actual and desired employment is 50 percent or even more (e.g. Hamermesh, 1989). However, it is not possible to directly calibrate my model to fit a value like that since the needed deviation does not only depend on the adjustment costs. The value also depends on the length of time periods in the model and, more importantly, on the persistence of shocks. In their survey, Hamermesh and Pfann report evidence that the adjustment costs per worker hired or fired might be as high as one year of payroll cost of the average worker.

With the evidence reported above in mind, I decided to assume that adjustment costs are linear and symmetric and that the cost of hiring and firing is 25 percent of one years payroll cost. With this structure of adjustment costs there will be a band of deviations where no adjustment takes place, i.e. $n_t = n_{t-1}$ if $n_{t-1} \in [\underline{n}(s_t), \bar{n}(s_t)]$. Hopenhayn and Rogerson (1993, p. 935) claim that if n_{t-1} lies outside of this band, n_t will be independent of n_{t-1}. Their claim is not correct, however. That result would hold if there were fixed adjustment costs in addition to the proportional costs, and if the fixed costs were high enough. When adjustment costs are linear and there are no fixed costs, it is a general result that $n_t = \underline{n}(s_t)$ if $n_{t-1} < \underline{n}(s_t)$ and $n_t = \bar{n}(s_t)$ if $n_{t-1} > \bar{n}(s_t)$. There will thus be a range of inaction and when adjustment takes place it is only partial. That this is the case is also confirmed by the decision rules obtained when solving the model.

A look at the decision rules also shows that the difference between actual and desired employment typically has to be just above ten percent before any adjustment takes place. This range of inaction seems to be of a plausible size. Since we work with five-year intervals, shocks are persistent and adjustment costs are relatively small compared to cash flows in the time interval. It is therefore reasonable that firms are prepared to adjust to smaller deviations than in a model where time periods are one year or one quarter.

Simulation results from this setup are reported in Table 4.1 and Table 4.3. The results are of course very similar to Hopenhayn and Rogerson's setups since this setup only differs slightly in the adjustment costs. From the tables we see that the model economy behaves very well in comparison with the U.S. data reported in column (i) of Table 4.1 and in Table 4.2. I have not been able to find U.S. data for all characteristics of the economy but a rough evaluation is still possible for some of the other statistics. Job reallocation is on average 19.4 percent on an annual basis in the United States (see Davis et. al., 1995). This figure does not increase linearly with the time horizon since some jobs will be "reallocated" several times if the time horizon increases. This reallocation will only be counted once when the time horizon is long but several times when the time horizon is short. Davis et. al. report that job reallocation is 10.7 percent on a quarterly basis, i.e. that the job reallocation rate increases by less than 100 percent when we go from quarterly to annual data. This indicates that a value of 46 percent, i.e. slightly more than twice the annual value, is a plausible value for the job reallocation rate when using five-year intervals.

Similar problems arise when evaluating job creation and job destruction rates. These values seem to give a mixed fit with U.S. data, judging from one-year figures. On average the figures seem satisfactory (since the average is connected to the reallocation value). Moreover, job creation and job destruction seem to be higher in small firms, just as in the U.S. economy. However, the values are very high for small firms, about four times the annual values. Further, for firms with 20 to 99 employees and firms with more than 500 employees, there is a large discrepancy between job creation and job destruction rates. The explanation to the result for large firms is probably the way my state space is set up. There are not many points on the size grid for large firms. Since size groups are based on the initial size, large firms are more likely to shrink than to grow.

5. Credit Constraints

In combination with hiring and firing costs, the existence of credit constraints might have a significant effect on the dynamics of job creation and job destruction. In particular, if a new firm turns out to be very productive, it cannot raise the money needed to increase its employment level sharply in a short time. Here, my model suffers from not including capital. If capital were included, increasing the production capacity would require a build up of the capital stock simultaneously

Table 4.1: Characteristics of the U.S Economy and Simulated Models

	U.S.	(i)	(ii)	(iii)
Average firm size	61.7	58.9	62.7	62.0
Variance of growth rates (survivors)	.53	0.44	0.46	.47
Serial correlation in $\log(n)$ (survivors)	.93	.93	.93	.93
Exit rate of firms	.37	.31	.42	.42
Job reallocation		.46	.44	.45
Fraction of hiring by new firms		.40	.56	.58
Average size of new firm		5.4	7.9	8.0
Average size of exiting firm		3.4	5.7	5.8
Adjustment costs / wage bill		.02	.02	.02
Price level			1.0000	0.9955
Productivity			1.4580	1.4626

Notes: U.S.: Values in U.S. economy, adapted from Hopenhayn and Rogerson (1993). (i): Adjustment costs. (ii) Adjustment costs and credit constraints. (iii): Subsidy to hiring in small firms.

Table 4.2: Employment and Plant Size in the U.S.

Size Distribution	1-19	20-99	100-499	500+
Employment	.05	.19	.34	.41

Source: Davis, Haltiwanger and Schuh (1996).

Table 4.3: Adjustment Costs

	1-19	20-99	100-499	500+
Size Distribution				
Firms	.53	.33	.11	.02
Employment	.06	.22	.37	.35
Hiring	.09	.32	.41	.18
Firing	.11	.18	.34	.37
Other Characteristics				
Job creation	.32	.32	.25	.11
Job destruction	.44	.20	.23	.26
Average firm value (survivors)	-4.94	63.45	301.42	1152.13
Exit rate	.58	.00	.00	.00

with hiring more workers. In that case, credit constraints would matter even if there were no hiring and firing costs.[1] Therefore, this setup must be viewed as a model of how credit constraints alone influence the dynamics of the economy. The adjustment costs for labor cannot be interpreted literally.

The interest in credit constraints has mainly focused on its connection to business cycles. However, this is not a model of the business cycle so that will not be the case here. Nevertheless, I think the connection between credit constraints and business cycles is both an interesting and an important field of study. Moreover, the theoretical basis in the field is rather undeveloped, so to the extent that this model is able to fit the long-run data, I think it might be worth trying to introduce aggregate fluctuation into the model. For now, I will concentrate on the model's possibilities to fit the data, implications on the productivity distribution for entrants and possible policy implications.

There is a lot of empirical evidence on the existence of credit constraints. In particular, small firms do not seem to have full access to financial markets. Most of the evidence is weak but taken together the evidence seems rather robust. A lot of this evidence is summarized in a recent survey by Hubbard (1996). Evans and Javanovic (1989) looked at entrepreneurial choice for young men. They found that the probability that an individual starts up his own business is increasing in his initial wealth, controlling for other factors that might influence the choice. Gilchrist and Himmelberg (1995) found that investment in small firms and in firms that do not have a bond rating is sensitive to cash flows. Roughly half of the response cannot be explained by neoclassical models of investment in these firms. Both these papers thus support the existence of credit constraints for small firms. Further, Gertler and Gilchrist (1994) analyzed the response of small and large manufacturing firms to shifts in monetary policy. The response of small firms indicated that they did not have full access to financial markets. These findings suggest that it is relevant to consider the effects of credit constraints in a model of firm dynamics, in particular when entry and exit are important properties of the model.

Before I turn to the implementation of credit constraints into the model, I will make a short theoretical motivation for why credit constraints might be an optimal response from creditors in this framework. There are basically two possible explanations, depending on how the framework is interpreted. First, if the model is taken literally, firms are expected to fulfill its financial obligations when

[1] The way I implement the credit constraints, they would have effects even in the absence of adjustment costs.

they leave the market. Bankruptcies are not allowed in the model. However, there could be an other way of seeing this. This model can be seen as a rough approximation of a setting where (i) in case of bankruptcy creditors are given lower priority than workers, (ii) all creditors are given the same priority and (iii) creditors get some decision rights over firms with financial troubles..[2] The third point is important since it makes firms (i.e. creditors) care about what happens in a bankruptcy.. Firing costs makes exit costly. Therefore, it might be optimal for the firm and for existing creditors, to stay in the market even if the expected value of staying is negative. New, potential, creditors do not incur the exit cost if they stay out of the relationship and are therefore only interested in supplying funds to firms with a positive expected value. From Table 4.3, we see that small firms on average have a negative expected value and that the value increases in firm size. (A more careful look at the data shows that expected value is not always increasing in firm size, but that it almost always is.)

Second, if we do not expect firms to fulfill their financial obligations when they exit, it is evident that small firms are much more risky than large firms. From the exit rates in Table 4.3, we see that all firms that leave are small. Also, the exit rates are very high for small firms. Firm size will therefore be a very good proxy for a firm's financial risk and financial capacity given that, for example, its productivity is not perfectly observable to a creditor. Obviously, this setup is not consistent with the model I use but it might still have some relevance.

In implementing the credit constraints, I chose to require that small firms have a cash flow which does not fall below $-3p$. This value was chosen rather arbitrarily, but it seems to influence the behavior of firms without imposing an excessively sharp constraint. I tried using both higher and lower values. I also experimented with other structures of the credit constraints. Letting the constraint apply to all firms did only have a minor effect on the results. However, making the constraint depend on previous cash flows or production possibilities in the firms resulted in totally different outcomes. Productive firms then became very insensitive to credit constraints if adjustment costs were moderate.

In order to preserve the model's good fit with the size distribution of firms in the U.S. economy, and in particular to keep the good values for average firm size and average size of new firms, I changed the distribution of productivity allotted to new firms. I found that letting the distribution be uniform on the interval $[\underline{s} + 0.35\,(\bar{s} - \underline{s})\,, \underline{s} + 0.65\,(\bar{s} - \underline{s})]$ gave a good fit. I also tried using the ergodic

[2] I am not sure about how well this setup fits the U.S. institutions but it roughly captures how bankrupcies and financial distress is handled in Sweden.

distribution implied by the AR(1)-process for s_t. With that distribution, though, some entrants are very productive and will hire huge amounts of workers at the time of entry, even if credit constraints are made very restrictive. This is not what we see in reality. New firms tend to be very small. One reason is probably that new firms do not know their own productivity. They might have to try it out in the market before being able to assess it. Further, it is plausible that very high productivity is something a firm only can acquire over time. It takes time to learn to know the market, to get contacts, build networks get market power etc. Thus, both the empirical implementation of the model, and some reasoning indicates that new firms should not be able to directly be as productive as the most productive of the existing firms.

It can also be argued that it is plausible that new firms are not very unproductive, i.e. that they are not assigned draws from the lowest part of $[\underline{s}, \bar{s}]$. Entrepreneurs might have some idea of their productivity before entering. Those with the lowest prior beliefs will then probably not enter. As time goes, an entrepreneur, or the firm he started but left, might lose some of the productivity, thereby making it possible for existing firms to get lower productivity than entering firms.

The properties of the model with credit constraints are presented in column (ii) of Table 4.1 and in Table 6.1. This economy behaves very much as the setup with adjustment costs only. The main difference, except for the changed productivity distribution for entrants, is that the job destruction rate for firms with fewer than 20 employees is even higher now, and that the exit rate is very high. In total, this setup seems to fit well with the properties of the U.S. economy, just as did the previous setup.

6. Policy Implications

In the introduction to the paper, I set out to show that the job creation and job destruction rates we observe in U.S. data are consistent with a scenario where there are positive benefits from government subsidies to small firms. The two scenarios studied so far, the scenario with adjustment costs and the scenario with both adjustment costs and credit constraints, both seem consistent with U.S. data. I have treated the hiring and firing costs as real cost, i.e. not as pure transfers between workers and firms. Under the first scenario, government policy cannot increase production. When there are credit constraints, however, there is a clear scope for government interventions. Productive small firms, in particular new firms, invest (hire) too little since they cannot raise the funds needed. I have looked at the effects of subsidizing hiring in small firms. An alternative would of course be for the government to supply funding to small firms, but that looks more complicated and would in practice probably introduce moral hazard and adverse selection problems.

To evaluate the effects of this policy action, I let all firms with less than 50 employees get a subsidy of ten percent of a yearly wage for each worker they hire. This reduces the effective hiring cost to 15 percent of a yearly wage. The subsidy is financed by imposing a size based tax on all large firms. All firms with more than 50 employees have to pay the tax $\tau(n)$,

$$\tau(n) = 0.009\bar{w}(n - 50),$$

where n is the number of employees in the firm and $\bar{w}$ is one years payroll costs.

Since we want to compare the average productivity of this economy with the economy without government intervention, we cannot change the entry cost c_e. In order to keep equilibrium exit and entry rates at the same levels, the price level must in stead fall to 0.9955. The total subsidies payed per time period then turns out to be slightly less than the total taxes collected. The properties of this economy are described in column (iii) in Table 4.1, and in Table 6.2. From the first table, we see that the average productivity has increased after the policy intervention. Since labor supply is assumed to be constant, this also implies that total production has increased and that the policy, as expected, was positive.

7. Concluding Remarks

In this paper, I have used a general equilibrium model with firm and job dynamics. The differences in job and worker turnover for firms of different sizes have been of particular interest. I have shown that the framework can be made consistent with U.S. data, both when there are no credit constraints and when credit constraints are imposed on small firms.

I think the merits of the paper are twofold. First, it has reinforced the impression that the framework provided by Hopenhayn and Rogerson (1993) has a lot of potential in explaining job market flows. I think it would be interesting, though difficult, to try to allow for aggregate fluctuations in this framework. Doing that could shed some light both on business cycle phenomena and on unemployment persistence.

Table 6.1: Adjustment Costs and Credit Constraints

	1-19	20-99	100-499	500+
Size Distribution				
Firms	.48	.37	.12	.02
Employment	.05	.23	.37	.35
Hiring	.08	.33	.41	.18
Firing	.14	.21	.31	.34
Other Characteristics				
Job creation	.35	.31	.25	.11
Job destruction	.68	.24	.23	.26
Average firm value (survivors)	-23.55	49.34	250.15	958.64
Exit rate	.88	.00	.00	.00

Table 6.2: Policy Experiment

	1-19	20-99	100-499	500+
Size Distribution				
Firms	.54	.33	.10	.02
Employment	.07	.25	.33	.35
Hiring	.11	.34	.37	.18
Firing	.17	.21	.28	.34
Other Characteristics				
Job creation	.34	.29	.25	.12
Job destruction	.62	.23	.23	.26
Average firm value (survivors)	-5.72	59.27	272.04	943.36
Exit rate	.78	.00	.00	.00

I have also looked at policy implications of the model. Clearly, if small firms are credit constrained, government intervention can have positive effects. As expected, I found that a subsidy to hiring in small firms increases productivity and production in this model economy. However, the setup with no credit constraints also fits data. The two setups I looked at only differ in the implied productivity of entrants, a statistic hard to observe. Nevertheless, the evidence of capital market imperfections for small firms might make us lean toward the scenario with credit constraints.

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