Computational Problem Set 6

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1 Solving for static choices

The labor choice problem of the firm is the following:

$$\begin{aligned}
\pi(s;p) &= \max_{n\geq 0} psn^{\theta} - n - pc_f \\
\Rightarrow \theta psn^{\theta-1} &= 1 \\
\Rightarrow n &= (\theta ps)^{\frac{1}{1-\theta}}
\end{aligned}$$

The steady state equilibrium implies a static choice on the household side:

$$\begin{aligned}
&\max_{C,N} log(C) - AN \\
&\text{s.t. } pC \leq N + \Pi \\
&\Rightarrow \frac{1}{C} = \lambda p, \lambda = A \\
&\Rightarrow N = \frac{1}{A} - \Pi.
\end{aligned}$$

We computed the results. The table is as follows:

Variable	Standard	alpha=1	alpha=2
Price Level	0.74	0.69	0.72
Mass of incumbents	8.32	9.55	8.35
Mass of exits	2.64	4.22	3.51
Aggregate Labor	179.83	188.89	182.62
Labor of Incumbents	142.63	139.51	136.65
Labor of Entrants	37.21	49.38	45.97
Frac of Labor in Entrants	0.21	0.26	0.25

Under the TV1 shocks, the price level is lower as the EV shocks increase value in expectations (this is a standard finding in IO, but in that context the presence of EV shocks improve welfare instead of profits. In order for the entry conditions to be satisfied the price level needs to drop to lower profitability back down. The mass of incumbents still ends up being a bit higher, however the mass of exits shoots up (as now there is 1) more mass overall and 2) firms from all states exit with positive probability). Labor levels are higher as there are more firms, and more firms in high-productivity states. Most of the increase in labor comes from the entrants, as the incumbents actually now demand slightly less labor (as more incumbent firms will be low productivity firms that received a high shock to not exiting). More entrants does imply more labor as the entrants have the same distribution (invariant distribution) of types, but have more mass entering. As a result, the fraction of labor in entrants is higher under the TV1 shocks. Note that the $\alpha = 2$ shock is somewhere in the middle of the standard version and $\alpha = 1$ versions, as anticipated.

We now document the exit rules:

Figure 1: Exit probabilities, $c_F = 10$

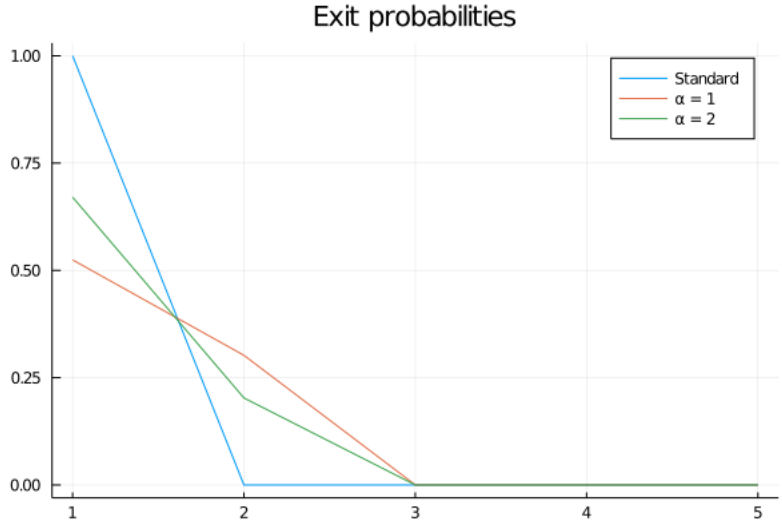
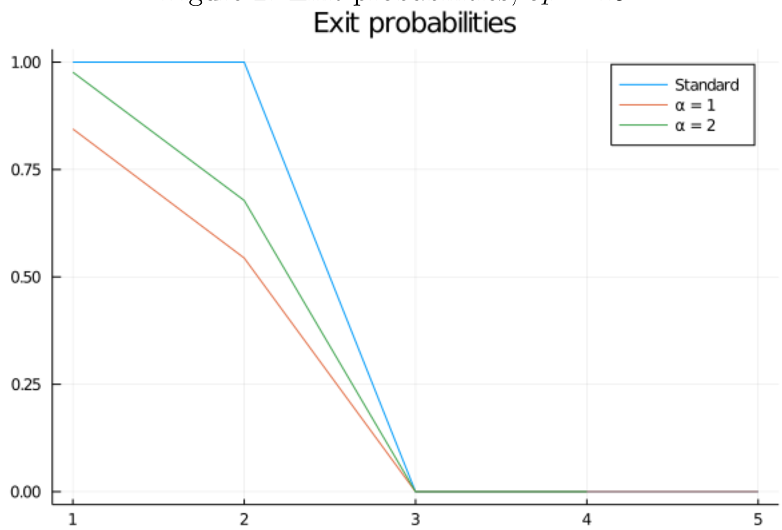


Figure 2: Exit probabilities, $c_F = 15$



As we can see from our figures above, the standard version has state-dependent exit probabilities $\in \{0, 1\}$ as their is no noise to their value of exiting and staying. Under the TV1, firms have some positive probability of exiting in any state, but essentially zero probability of exiting in states 3-5. State 2 has a sizable amount of exits, around 20-30 percent of firms exit between the two values of α. When we change $c_F = 15$ then the cost of producing is substantially higher than before, and under the standard version all firms exit in states 1 and 2, not just 1. Under TV1, most firms in these stsates leave but a substantial chunk of firms in state 2 remain (roughly 30-40 percent across the two α values). Almost all firms in states 3, 4, and 5 stay in all versions. As before, the $\alpha = 2$ lies somewhere between $\alpha = 1$ and the standard version for all numbers and figures.