Model Report

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General Description.

Our model simulates two promotion policies in the context of a lawyer firm.

Policy A Lawyers work with a colleague chosen randomly and gain *skill points* by doing so. At the end of every year, the ones in the top 10% of performance are promoted to partners. After a certain amount of time (varies according to every lawyer's experience), if an agent is not made into a partner, she leaves the firm and a replacement is hired.

Policy B Lawyers work with a colleague chosen randomly and gain *skill points* by doing so. At the end of every year, the firm fires the lawyers in the bottom 10% of performace and a replacement is hired.

It is important to note that in both policies, **skill** is not the same as **performace**: the latter is visible by the firm and is affected by skill and experience, whereas the former is an attribute of every lawyer not visible by the rest or by the firm.

Design of the Model

Figure 1 is a summary of the classes used in our model. Also, there are some components we will describe with more detail.

Lawyer (Agents in our model)

Each Lawyer has some attributes, which we will group in three main categories. First, the experience since passing the bar (`self.bar`) and working in the current firm (`self.firmxp`). Both are updated at the end of the year. Second, a variable with a value of 1 if the lawyer is a partner and 0 otherwise. The third group are the skill and performace, already described above. Every year, lawyer i works with lawyer j and gains *skill points*:

$$\text{skill}_i = 0.2(\text{performance}_j) + \text{skill}_i \tag{1}$$

At the end of every year, performance of lawyer i is updated by:

$$\text{performance}_i = \text{skill}_i + \text{bar}_i + \text{firmxp}_i \tag{2}$$

Note that we allow for $i = j$, in case the lawyer works alone, but also gains skill points.

Interactions

Interactions with other lawyers are defined by (1) and with the firms, whenever a lawyer gets promoted (policy A) or gets fired (policy B).

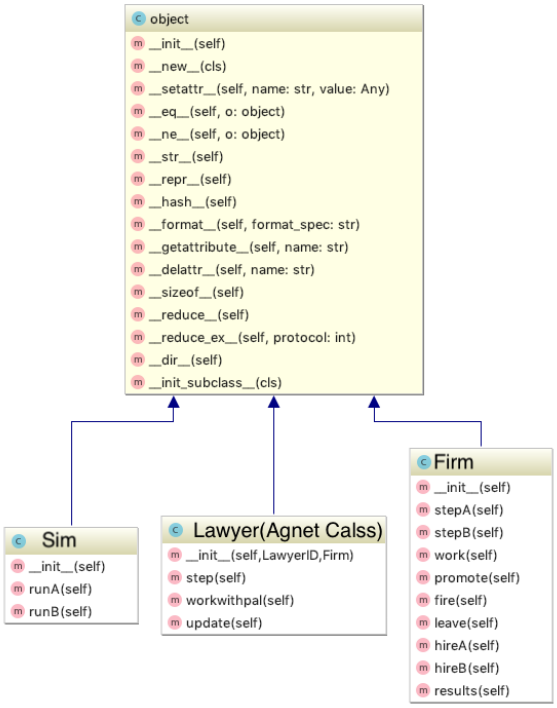

Figure 1: Class Diagram

Firms

As previously mentioned, there are two policies in our model, and in coherence, two policies defines in functions `StepA()` and `StepB()`

```
def stepA(self): # Time step for firm with Policy A
    self.work()
    self.promote()
    self.leave()
    self.hireA()
    self.results()

def stepB(self): # Time step for firm with Policy B
    self.work()
    self.fire()
    self.hireB()
    self.results()
```

Since both policies hire new lawyers, it is important to explain why Policy B remains every year with the same amount of lawyers and the numbers in policy B increase. This is due to those being promoted in policy A remain in the firm, who only replaces those lawyers who choose to leave.

Simulation and Results

We ran the model 10 timestime steps (10 years) for policy A and ten times for policy B. Our results in Table 1 are the mean and standard deviation of skill for the lawyers in every one of those years. Also, at every year there is the number of lawyers leaving (in policy A for not being promoted and in policy B for their performance).

Table 1: Results from 10 years, both firms

Year	Mean skill	s.d.	Lawyers leave	Mean skill	s.d.	Lawyers leave
	POLICY A			POLICY B		
0	102.59	21.51	0	98.83	20.55	8
1	121.85	26.92	0	121.38	20.64	9
2	144.83	32.95	0	148.21	25.62	6
3	163.42	48.85	12	180.81	31.48	7
4	186.59	60.37	15	217.63	42.57	5
5	199.49	76.98	20	265.88	53.02	5
6	227.92	88.17	5	320.93	72.55	5
7	259.93	105.74	6	390.72	88.47	6
8	303.22	126.63	8	470.73	118.86	5
9	345.41	152.90	10	574.98	144.92	5

As expected, in Policy A there are no lawyers who leave in the first years, since they are expecting to become partners. In both groups, means tend to increase, the same as the standard deviation. However, the mean of skill for policy B grows faster in the same time period, as can be seen on Figure 2.

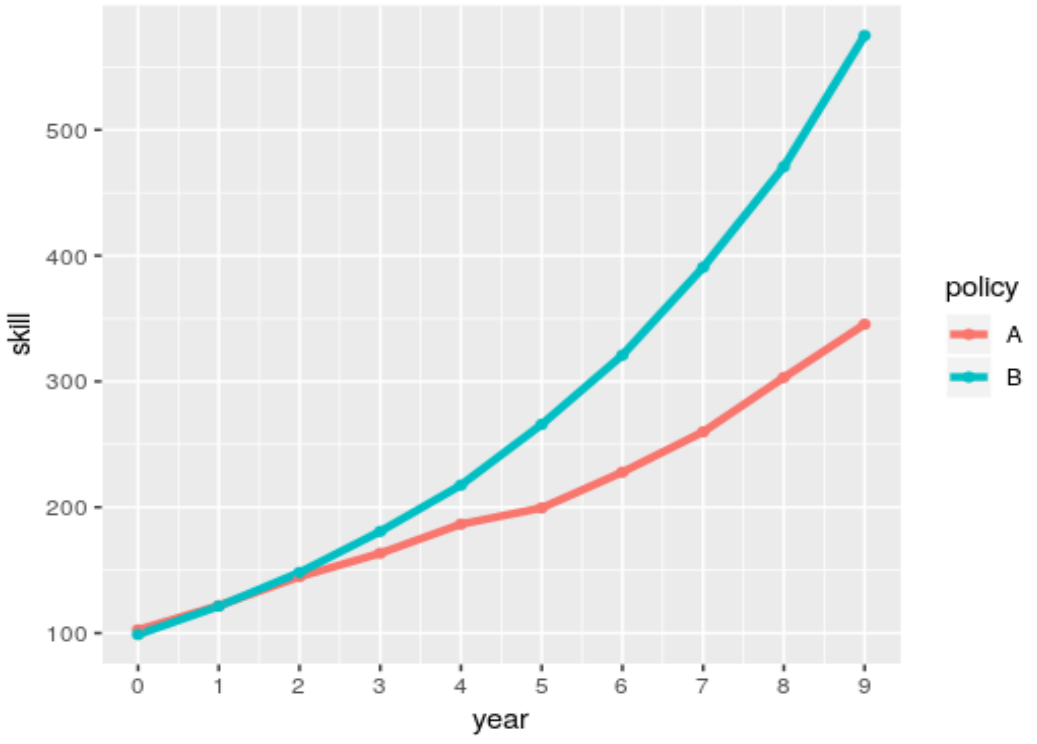

Figure 2: Means of skill for both policies

All this information favors Policy B over Policy A, because as time passes, the difference between the skill of the lawyers in both types of firms will grow and firms with Policy B will end with the most skillfuls.