**Jason:**

**4. Enhanced Employee Scheduling Problems**

**4.1 Investigating the Mathematic Model of Which Worker to Lay-off**

We look at an alternative decision to minimize the makespan (or elapsed time), by comparing the outcome of minutes required to complete New Policies and Claims by sending individual workers home. For instance, if either workers 1, 2, or 3, had to take an excused sick absence from work; how this would affect the insurance company and which worker would the insurance company rather have not work. We used the linear programming approach known as Simplex Minimization to tackle the process of determining the most time efficient combination of a particular group of two workers if say, a particular worker were to get sick or be laid off.

We will continue to consider pi and qi, the fraction of New Policy tasks and the fraction of Claim tasks that is assigned to the ith employee, respectively. Our objective function is t, the elapsed time (in minutes) required to complete all the tasks.

**4.1.1 Parameters**

We will also consider all of the average processing times listed in Table 1 to be model parameters.

**4.1.2 Variables**

We will formally define the model variables again.

(Insert chart of 2.1.2 here)

**4.1.3 Constraints**

We know that the constraints for the Mathematics Model of which worker to lay-off is very similar to Basic Model in 2.1.3 as all we are assuming is either worker 1, 2, or 3 will be sent home based on the optimal decision of the insurance company.

**4.1.6 Economic Approach that supports the Mathematical Model**

We propose an alternative model that maximizes every worker’s productivity by assigning them to tasks that they have a comparative advantage on. Comparative advantage is the ability of one worker producing a specific good at a lower marginal and opportunity cost over other workers; even though a worker may be more efficient than other workers in the production of a specific good, their trading and specialization in one good will benefit the whole company.[[1]](#footnote-1) The opportunity cost is the next best alternative to the choice that has been made. [[2]](#footnote-2) Using the approach of comparative advantage, we can show which worker would be preferred to be laid-off or optimal for a firm to have sick-absence with to optimize the time used to complete all the tasks of New Policy and Claims[[3]](#footnote-3).

Variables: mrnp1, mrnp2, mrnp3- minutes required to accomplish New Policy assigned to each employee.

Mrc1, mrc2, mrc3- minutes required to accomplish Claim assigned to each employee.

Opportunity cost of Finishing New Policy: mrnp1, mrnp2, mrnp3- minutes required to accomplish New Policy assigned to each employee

In examining the opportunity cost of finishing both New Policy and Claims; we can determine which workers would be assigned what task, whether to focus on New Policy or Claims. The comparative advantage is when a worker produces a good at a lower cost than someone being compared to.

As you can see from the chart, mrnp/mrc is the opportunity cost of a worker finishing New Policy. Since worker 1 has the lowest opportunity cost compared to workers 2 and 3; 0.357<0.682, 0.722; we can see that worker 1 has a comparative advantage in finishing New Policy.

As you can see from the chart, mrc/mrnp is the opportunity cost of a worker finishing Claims. Since worker 3 has the lowest opportunity cost compared to workers 1 and 2; 1.385<1.467, 2.800; we can see that worker 3 has a comparative advantage in finishing Claims.

The lack of comparative advantage on any task for worker 2 would result in his termination of employment or preferred sickness days compared to workers 1 and 3. The economics model of comparative advantage further supports the linear programming of Simplex Minimization of preferring the combinations of workers 1 and 3 as to any worker with workers 2.

**4.1.7 Cost efficiency of firing workers**

The result of the Linear programing Simplex Minimization approach of comparing time efficiency of laying-off either workers 1,2, or 3 suggest that worker 2 would be the optimal choice as the firm utilizes the least amount of time to accomplish the tasks of New Policy and Claims.

1. http://en.wikipedia.org/wiki/Comparative\_advantage [↑](#footnote-ref-1)
2. http://en.wikipedia.org/wiki/Opportunity\_cost [↑](#footnote-ref-2)
3. http://econweb.tamu.edu/aglass/econ452/Krugman03Slides.pdf [↑](#footnote-ref-3)