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How could a COVID-19 pandemic wide insurance encourage workers to choose employment? And why choosing work over unemployment might be better?

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Abstract

This paper explore and propose a COVID-19 insurance payout(totalling to Y) that could encourage and increase the certainty of workers to choose employment during the pandemic. The paper shows how the expected utility of working would change if a proper employment prospect is created such as this ***paper proposed*** COVID-19 insurance payout. [1]

Then, in this model, we also add psychological costs(P) of not working and also give an insight on why it is important to work during the pandemic rather than delay it, if a proper market condition with employment prospects exists.

1 Introduction/Problem Statement

The COVID-19 has seen dynamic changes in the job market globally with changes in the way a lot of jobs operate, with new modes of operations and a new challenge that is to be tackled by both employees and employers - the fear of working and the fear of contracting the virus, overall creating a great extent of uncertainty in the global labour market. While, at the same time, with the market being extremely volatile i.e with day to day changes in the lockdown measures, and with new policies, the COVID-19 pandemic has been witnessing dynamic and fast changes in the consumption and production patterns. However, due to the volatility and complexity of these changes, these sudden changes in the model below are assumed to be kept to a minimum. Secondly, the common COVID-19 sights such as "stockpiling needed home goods and the inability to patronize retailers" (Baker and Yannelis, 2020, 02) are excluded in the model for simplicity.

This paper aims to present a model with COVID-19 insurance (Y) that is paid out during the pandemic (with the assumption that the pandemic lasts for no more than 1.5 years-2 years), as used in the model, 'the bad state'(π_1), which could work towards increasing the expected utility of working during the pandemic and also help to decrease the voluntary unemployment that exists due to the *'fear of working during the pandemic'*.

Also, it is important to note that there is no involuntary unemployment in the model i.e. The Neoclassical assumption (Everyone looking for a job will get it). While this is a heavy assumption to make considering the large involuntary unemployment that exists in the market during an economic downturn such as the ongoing pandemic.

However, this assumption is enforced as the main question this paper is trying to evaluate is whether to work or not and how would a COVID-19 insurance payout(Y) during a pandemic encour-

[1] I have Proposed a new COVID-19 Insurance Scheme model. More Details in the *model* details.

age workers to opt for work rather than delay or procrastinate their seeking of employment.

In the second half of the paper, we also add another feature to the model where psychological costs(P) could rise by not choosing employment.

Lastly, this model is applicable primarily to a certain skilled set of labour such as professional employees or recent graduates, who might be deciding to opt for work or rather continue with education or take a 'Gap Year'. The proposed model might not work for unskilled workers or traditional labours and would certainly not work in the informal labour market.

2 Setting up the model

In this section, the model is set up explaining few of the main parameters and variables involved in the final utility comparisons between when such a proposed insurance implements and when such a proposed is not implemented. Again, this COVID-19 insurance scheme Y is part of this paper based model only.

2.1 Setting up - Losses (L) and the bad state(π_1)

Throughout the model, L is referred to as COVID-19 losses. With the pandemic being the bad state (π_1), the losses that can occur could be of various forms such as loss of the income from various sources, the fall in the price of shares, loss of other earning family members, COVID-19 salary deductions to keep employees safe, additional expenditure to maintain personal hygiene, costs of sanitizers, additional electricity costs and household expenditure arising from staying at home etc. With the COVID-19 being the bad state, the pandemic would be referred to as π_1. Of course the model can be implemented on a case by case basis, where the bad state is implemented only when the person has actually been diagnosed with the COVID-19 disease.

However, considering the economic losses that many employees find themselves in, for the purpose of this model, the entire period of the pandemic is classified as the bad state. In addition, at any instant, the loss is considered to be a constant value depending on the worker or employee. The estimation of loss would depend on the kind of economic losses being faced by the worker.

2.2 Setting up the model: Insurance Payout (1- γ)Y and insurance premium γ

Identical to the insurance payout model, the consumption is raised by the Dollar $(1-\gamma)$Y during the entire pandemic period or π_1. While the COVID-19 insurance premium γ is paid in the good state (π_2. The insurance payout is given to employees of a certain company/enterprise E, on a monthly basis for a period t. It must be ensured that this t(or the period of the pandemic is no longer than 1.5

years or more.) The reason for this is that long periods of insurance payouts could lead to becoming unsustainable and increasingly risky for the insurance company.

The good state (π_2) when the insurance premium is paid, could be either or both of the two periods of times - pre-COVID or post-COVID.

The pre-Covid case is possible when the employees were covered under a paid company insurance in the past considering the employees were working with the company in the past. By a paid company insurance, whereby the employee was paying a certain premium to insure themselves and now upon the pandemic, this insurance is immediately converted to a COVID-19 monthly insurance payout in the bad state. If this was not the case, a higher insurance premium could be paid in the post-COVID state. The risk and details associated with this would be covered towards in the Firm/Insurance Side Section of the paper.

However, the primary benefit of this monthly payout or rather entire insurance claim is that it would help the insured or in other words the worker to recover themselves from the losses faced by the pandemic.

For the purpose of the model, the γ (insurance premium) is kept to be lower than Dollar 0.5 per dollar.

3 The model - The Utility Function and the Expected Utility without the above COVID-19 insurance and after the above COVID-19 insurance.

$U(\tilde{\mathbf{c}}, \tilde{\mathbf{la}}) = \ln\left[c_1^{1-\alpha}\left(T - la_1\right)^{\alpha}\right] + \beta \ln\left[c_2^{1-\alpha}\left(T - la_2\right)^{\alpha}\right]$

As in the regular labour leisure problem where c_1 is the consumption during the pandemic (bad state) and c2 is the consumption after the pandemic. And β is the measure of impatience or rather the discounting factor. It is important to note that the c_1 is equivalent to W-L or the 'wages - losses' in period 1 or state 1 (the pandemic). This is with the assumption that all the wages are used on consumption.

In our model, we assume β is 1 for simplicity and there is a high expectation of impatience in the market post COVID (the Good state), when things come back to normal. (T-la) is the measure of leisure time in the respective time period with la_1 and la_2 being the labour supply in the bad state and good state respectively. α is the signal of the employee's preferences to working and consuming versus leisure time. A lower α refers to a greater inclination to consumption.

Therefore the Expected Utility of the employee without the above insurance scheme but with economic losses would be as follows;

$$EU(\tilde{\mathbf{w}}, \tilde{\mathbf{la}}) = \pi_1 \ln\left[(W-L)^{1-\alpha}\,(T-la_1)^{\alpha}\right] + \pi_2 \ln\left[w^{1-\alpha}\,(T-la_2)^{\alpha}\right]$$

The expected utility of the employee considering the economic loss L and this *paper proposed* COVID-19 period insurance payout would be as follows;

$$EU(\tilde{\mathbf{w}}, \tilde{\mathbf{la}}, \tilde{\mathbf{Y}}) = \pi_1 \ln\left[((W-L)+(1-\gamma Y))^{1-\alpha}\,(T-la_1)^{\alpha}\right] + \pi_2 \ln\left[((w-\gamma Y)^{1-\alpha}\,(T-la_2)^{\alpha}\right]$$

In both of the expected utility functions above π_1 is considered to be greater than π_2 as the probability of being in the bad state is extremely high considering the pandemic situation and the model employee is considered to be finding themselves in the bad state with a high probability right now. In addition, like always, π_2 would be $1-\pi_1$.

4 The Model - The Budget Constraint

Upon modification of the typical budget constraint. Considering the loss in wealth during a pandemic (L), the new budget constraint as part of the model would be as follows;

$$c_1 + \tfrac{1}{1+r}c_2 = (w-L)(la_1) + \tfrac{1}{1+r}w(la_2),$$

where r is the rate of interest earned in the one period. This is assuming that the base wage w remains the same across the two periods. As can be seen in the budget constraint above, the second state or good state does not have any loss. (i.e no COVID-19 economic losses).

5 Consumption before the insurance payout and after the insurance payout

In this part, we begin to zoom into the bad state (Pandemic) or π_1.

$\max_{c_1,la} u(c,la) \equiv c_1^{1-\alpha}(T-la)^{\alpha}$ s.t $c_1 = (w-L)la$,

Note: This is only for the state 1(The pandemic Period).

Upon solving the First Order Conditions, the following Consumption c_1 is observed.

$c_1 = \frac{(1-\alpha)}{\alpha}(w-L)(T-la)$

However, with this *paper proposed COVID-19 Insurance*, the following utility maximisation problem would be present;

$\max_{c_1,la} u(c,la) \equiv ((w-L)+1-\gamma)Y)^{1-\alpha}(T-la)^{\alpha}$ s.t $c_1 = (w-L)la$,

Upon solving the First Order Conditions, the following Consumption c_1^* is observed.

$c_1^* = \frac{(1-\alpha)}{\alpha}(w-L)(T-la) + (1-\gamma)\tilde{Y}$,

where c_1^* is the consumption throughout the pandemic/bad state when the paper proposed insurance payout exists.

As can be seen in the above, c_1* (consumption during the bad state with proposed COVID-19 insurance model) is greater than c_1(consumption during the bad state without the proposed COVID-19 payout) due to the additional insurance payout during the entire duration of the pandemic).

6 Utility Comparisons

As can be seen in the Expected Utility and the Utility functions above, the expected utility in the bad state is likely to be greater with the paper proposed COVID-19 insurance payout than without this insurance scheme. Similarly due to the higher consumption as shown above, when deeper focus is paid on the utility function itself, the utility is likely to be higher when the proposed COVID-19 insurance payout exists.

Thus, the following situation arises, as the bad state cannot be avoided (as we find ourselves in it); Let Bad State without this paper proposed insurance scheme = BSO Let Bad State with this paper proposed insurance scheme = BSW Hence, BSW is weakly preferred to BSW i.e BSW $\succeq$ BSO

Therefore, the below can be concluded;

The Expected Utility when the bad state exists with the proposed insurance payout scheme would be greater than the utility of not working and being on N (Non Labor income). In this model, we can assume N is close to zero (as in the case of India and many other developing countries, there is very minimal or almost no non-labour income such as no unemployment benefits etc).

Hence,

Main Statement:

$EU_{\pi_1}((W-L)la_1, ((1-\gamma)\tilde{Y}) \geq$ u(N,0),

where $\tilde{Y}$ is the optimal insurance under the *paper proposed* COVID-19 insurance scheme and '0' would be the labour supply (la_1) when the labour chooses not to supply their services i.e. Opt out of employment during COVID-19.

The reason for using Expected Utility here is that this utility is dependent on whether or not we are in π_1. However, since we know we are in π_1 considering the current pandemic, we can also instead say the *'Utility'* instead of the *'Expected Utility'*.

Therefore, as represented in the **Main Statement** above, a COVID-19 insurance scheme as framed above, encourages the agent to work and opt in to employment, as the insurance payout increases the utility of opting to work. And this choice is further deepened when psychological costs are taken into account in the second part (Psychological Costs) of the model.

The difference between the Expected Utility in the bad state(COVID-19) with the insurance payout and the utility of not working and being on N can be said to be θ, where this θ refers to the keenness of the worker to work rather than stay unemployed. The higher the θ the greater the incentive the worker has as greater the expected utility of working when this proposed insurance payout exists during the pandemic. Thus, the insurance scheme can be crafted to encourage workers to choose employment by maintaining a higher θ.

The above conclusions have been made keeping in mind the assumptions stated in the sections above - γ is less than 0.5. And β is 1. And that we are currently in the bad state (π_1) with consumption c_1.

7 The Firm/Insurance Company Side Argument and the Good State Insight

As mentioned in the initial set up of the model, this *paper proposed* COVID-19 insurance payout system could be very risky for the Employer (if the employer is initiating the scheme) or the Insurance Company or the (Employer AND Insurance Company Partnership), depending on who is providing the insurance.

As the premium would have to be paid in the Good State (π_2), the COVID Insurance Premiums could be paid in two ways. One way is to use the past insurance premiums collected as a security if there was a paid Insurance Scheme earlier and convert it to be used in the bad state (now). And if that was not the case, a proper agreement could be signed between the employer and the employee, that would insure the insurance provider that the premiums would be paid at a higher rate (For instance at γ + Added Fee) at a later stage in the good state (post the pandemic). This is also the primary reason why we assume that the pandemic is short lived($<$ 1.5 years) in the above proposed COVID-19 insurance model, and that this model only occurs/exists at a professional firm (company) level in the formal sector).

However, if the higher premiums are not paid in the good state, the firm might have to take the burden of the employee's premium. This would add to the costs and the firm would be at risk of reduced profit. Thus to cut costs and to lower this burden, firms might decide to lower wages in period

2 (the Good, Post Covid State) and thus, overall this could add uncertainty to the post COVID-19 situation while adding certainty in the bad state itself.

As per the partial equilibrium market with human capital(h) and unskilled labour(l), with a typical Cobb Douglas production function when,

$\max_{l,h} pf(l,h) - w.l - w_h.h$ And First Order Conditions; $pf'_l = w; \quad pf'_h = w_h$.
$f(l,h) = la.h^{\mu}; \quad \mu > 1$

And μ being the measure of relative advantage of using h over l. Here h is the human capital and l is the unskilled labour supply.

Upon solving the above with the first order conditions, the below relationship will be formulated;

$h = \left(\frac{w}{p}\right)^{1/\mu}$

$l = \left(\frac{w}{p}\right)^{1/\mu} \frac{W_h}{w}$, where W_h being the wage of the human capital and the w being the wage of the unskilled/lower skilled labour.

Therefore, as per the relationship above, when wages are likely to fall in period 2 (i.e overall wages of all labour), there could be a fall in labour supply in the good state. This means that the labour would be less willing to supply their services in the good post Covid state.

This fall in supply of labour could put further strain on the insurance provider adding further risk, to a provider that has risked itself in providing the proposed insurance without any present premiums.

Thus, this model is more likely to work if other insurances such as a General Insurance or a paid employer insurance were converted into this model or both of the strategies of premium collection were used i.e Pre-Covid Premium conversion and Post-Covid Premium Collection.

8 Add-on to the Model - Psychology Costs

During a pandemic, if the worker chooses not to work, the leisure time (LE) could increase leading to a situation where;

$T - la_1 > c_1$, or $LE_1 > c_1$, when labor chooses to remain unemployed.

And as per the Cobb Douglas labour leisure model subject to C=(W-L)*La_1, the first derivative of the utility function with respect to the Leisure Time (LE) or the MU_{LE} (Marginal Utility of Leisure Time) would be;

U (C, LE) = $c^{1-\alpha}$. LE^{α}

MU_{LE} = $c^{(1-\alpha)}.\alpha.(LE)^{\alpha-1}$

And the second derivative would be as follows;

$c^{(1-\alpha)}.\alpha(\alpha-1)(LE^{\alpha-2}) = c^{(1-\alpha)}.(\alpha^2-\alpha).(LE^{\alpha-2})$,

where when $\alpha \leq 1$, $\alpha^2 - \alpha \leq 0$. Thus, the second derivative would be less than or equal to zero (0).

This ascertains the law of diminishing Marginal Utility. I.e The Marginal utility is increasing but at a decreasing rate. This is a representation of “Too much leisure time can be unhealthy”, where leisure keeps increasing but at the same time, the joy/satisfaction of leisure is not as much as it would be initially with the first unit of leisure time. Thus, this could add to psychological costs such as mental health issues, tendency to commit suicide, depression etc (which are problems that have been visible through out the Global COVID-19 lock downs). And an additional psychological cost (P) could lead to a dis-utility of staying unemployed. This coincides with other studies that with experimentation have proven that "too much time to leisure can lead to more stress"(Pattry and Mask, 2007). However, this is also dependent on the kind of leisure activities that the subject indulges in. But it is important to note the diminishing marginal utility of Leisure time. And also the psychological impact it might have over a prolonged period of time.

Due to the dis-utility and the psychological cost of excessive leisure,

$$U(c_1, la, P) = (c_1^{1-\alpha}).(T - la)^{\alpha} - P^M$$

where M is the number of months of the pandemic (i.e The psychological costs would increase with months of no work during the pandemic). When unemployed La = 0.

Thus, the labour supply(La) would be 0 and without wages there will be no consumption (assuming no savings and borrowings) and thus, there will only be utility of leisure and dis-utility of psychological costs. i.e. u(0,0,-P)

And on the other hand, by working and being employed with the proposed COVID-19 insurance model above, the utility of working though with economic losses but with the proposed insurance would certainly be higher than the utility of not working with complete leisure and negative psychological costs (P) as shown below, assuming that N (Non labour benefits such as unemployment pays is zero).

$$U((W - L), \tilde{La}, (1 - \gamma)\tilde{Y}) \geq u(0, 0, -P)$$

9 The Human Capital Issue and Conclusion

A lot of people believe that instead of working, it might be better to up-skill or stay in education. This is with the expectation of getting a better utility and a higher consumption level when in good state. However there is a problem with this too. If everyone becomes more skilled, the overall labour supply of skilled workers would increase and provided the demand is constant for skilled workers in the market, there is a likelihood of a surplus skilled workers especially with the increased ability of up-skilling with online education where it tends to be quicker to finish courses on platforms such as Coursera, e-degrees etc. But rapid upskilling during a time like a pandemic itself has a range of problems and there is a chance of the kind of upskilling happening becoming increasingly less valuable in the good state. And with a surplus of workers, there is a major chance of lower wages, in addition to a lot of the employers finding it difficult to judge whether the kind of online upskilling being done today would ensure better returns for the employer or not.

A model such as the above with a special COVID-19 insurance could help increase the expected utility of working during a pandemic and also help cover some of the losses faced during the health crisis. In addition, since the pandemic voluntary unemployment could lead to psychological costs such as depression, it is advisable to work rather than stay unemployed.

Therefore, overall to sustain ourselves both economically and psychologically, provided a proper market conditions is created (such as with *this paper proposed* COVID-19 insurance payout model to cover for the losses) along with proper safety measures, working rather than being unemployed might be ideal...

References

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