

# How does Congestion-Induced Commuting Time affect a Worker's Time Allocation between Labour and Leisure?

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## ABSTRACT

The paper builds on a simple theoretical framework to investigate the issue of congestion as a factor influencing individual workers in terms of time allocation between work and leisure. The commuting time is taken into consideration as a fixed time endowment as part of the model, where congestion is introduced as a limitation to the available time. In this context, the optimum level of labour supply and leisure is obtained as a function of the effective available time, which is the total time minus commuting. The findings indicate a negative congestion effect, which means that the more the congestion, the fewer the hours worked and leisure, which consequently decreases income and utility. This result applies most directly to workers with flexible hours. For those on fixed contracts, congestion does not reduce hours worked; it reduces leisure time and lowers the effective wage when commuting time is factored in. Comparative statics also exhibit that even though preferences dictate how much time is allocated to work and leisure, congestion limits the amount of time that can be allocated. This model thus emphasises congestion as a binding time constraint in the model, where it gives a behavioural interpretation of the costs of congestion. The findings provide an addition to the literature by providing a worker-centred view that congestion is directly linked to time allocation decisions and economic outcomes.

## I. INTRODUCTION

In today's modern environment, individuals travel regularly between their place of residence and their workplace. Commuting has become an essential part of an individual's daily life, and due to cities expanding both spatially and economically, the distance between residential areas and commercial areas increase, making commuting unavoidable. In the modern era, commuting has become a necessary condition to become a part of the labour market; however, people are constrained by the amount of time commuting takes up of their day, which directly affects how the rest of their day is planned. Since each individual has a fixed amount of time per day, i.e., 24 hours, the time must be allocated mainly between 2 different activities, i.e., work and leisure. Work provides individuals' income through wages and enables individuals to consume commodities, whereas leisure provides individuals with utility and well-being. As

June 2026

Vol 8. No 2.

a result, individuals face a trade-off in deciding how to allocate time between these activities. Commuting adds another component to this allocation problem, as commuting does not generate wages, hence does not produce income, and commuting does not generate utility or well-being. While commuting imposes a time constraint, this constraint is significantly increased due to congestion, which arises due to traffic in densely populated areas. Congestion increases the amount of time spent commuting, and as a result, individuals face additional delays that are not under their control, which reduces time left for other activities. This transforms commuting from being a necessary activity into becoming a major source of inefficiency, as congestion has a direct cost on utility, as it reduces both income and leisure. On one hand, increased commuting time may reduce the number of hours an individual is willing or able to work, which lowers income. On the other hand, increased commuting time reduces time available for leisure, which leads to a fall in overall well-being. This effect depends on the type of worker. For those with flexible hours, increased commuting time may reduce hours worked. For those on fixed contracts, congestion cuts into leisure instead; commuting effectively becomes unpaid time. The worker earns the same income but commits more total time, which lowers their effective wage.

The effect of congestion is more pronounced in high-density urban centres, which are highly populated and economically active and exert a lot of pressure on transport systems. Cities like Mumbai have an average commute time of over 60-90 minutes per day, and during peak times in certain parts of the city, the speed of travel is below 20km/h, indicating the extreme limitations of congestion on the time of workers (“Mumbai Traffic Report | TomTom Traffic Index 2026”). Singapore, in contrast, presents an example of a city that has implemented stricter policy interventions to control congestion. The relatively efficient traffic conditions have been ensured by measures like the Certificate of Entitlement (COE) system, which restricts the number of vehicles, and Electronic Road Pricing (ERP), which imposes charges on drivers during the peak times (Xiang). Consequently, the average commute times in Singapore are kept to 45-60 minutes with more predictable commute times than in other cities around the world (“Singapore Traffic Report | TomTom Traffic Index 2026”), but it does not mean that commuting should be abolished. Employees still need to spend time getting to work, implying that commuting still presents a limitation to the ways that time is spent at work and leisure. This implies that despite the management of congestion by good policy, the time cost of commuting is an inescapable aspect of economic life in the city.

Given the importance of commuting and congestion, it becomes essential to understand how these factors affect an individual's economic behaviour and how workers allocate their time between work and leisure. This research develops a theoretical model to analyse the impact of congestion on individual workers. The model considers a representative worker who allocates time between work and leisure, constrained to a fixed amount of time. This model is most relevant to employees who enjoy some form of flexibility in their work-time arrangements, such as the self-employed, freelancers, those working in the informal sector, part-time workers, or people with flexible work arrangements. In the case where the hours of work are fixed by the contract terms, one should interpret the theory a bit differently, as congestion mainly reduces leisure and lowers the effective wage rather than reducing hours worked directly. With this distinction in mind the main model focuses on the flexible-hours case, where the worker can adjust hours worked in response to congestion. For each hour worked, the individual earns a wage  $w$ , where hours

June 2026

Vol 8, No 2.

worked is denoted by  $h$ , and leisure is represented by  $l$ . The more congestion, the more commuting time and the less time available to  $l$  and  $h$ . Consequently, they will have to change their mix of time, making the trade-off between the utility of leisure and the utility of income through work. This emphasises the fact that congestion does not merely give an unchangeable price, but directly affects the behavioural decision-making process by reducing the time limit on which workers are operating.

In this context, this model indicates that increased congestion will cause a decrease in the number of hours worked and leisure time. This means that people lose income through loss of hours worked and utility through loss of leisure. Congestion in this respect has a two-fold cost, reducing economic productivity and the welfare of the people. While much of the existing literature is devoted to the measurement of the cost of congestion or its effects on productivity, this paper stands out by directly modelling the time allocation choices of workers. The model entails the inclusion of commuting as part of the time constraint, hence giving a more detailed picture of the impact of congestion on economic performance. This method enables a more practical study of worker behaviour, because it allows one to understand the trade-offs that people make between work and leisure when they have limited time.

The rest of the paper is structured as follows:

Section 2 reviews the relevant literature.

Section 3 develops the individual worker's time allocation model.

Section 4 derives the optimal allocation between work and leisure.

Section 5 analyses the comparative statics and discusses the main results.

Section 6 concludes.

## **II. LITERATURE REVIEW**

The existing literature on urban congestion and its economic and productivity effects can be broadly divided into three strands. The first strand of literature conceptualises congestion as an economic cost. This strand treats time as an economic resource, where delays can cause a loss in output. The second strand of literature examines the impact of congestion on labour productivity and efficiency. This strand does not treat time loss as an economic cost but investigates the effects of time loss due to congestion by measuring the efficiency and effectiveness of labour. The third strand of literature frames congestion in the wider context of urban economics, the relationship of congestion to agglomeration and city structure. This literature does not see congestion as a single inefficiency, but as an inseparable result of economic activity in the city. Each of the strands discusses the inefficiencies that congestion introduces, but varies in the areas and mechanisms that they focus on to understand how congestion influences productivity and the economy.

The first strand focuses on the direct economic cost of congestion by giving time lost in traffic a value, and by assigning time a monetary value, these studies can convert congestion into a quantifiable economic burden. A study by Jayasooriya, C. S., & Bandara, Y. M. adopts this approach by developing a quantitative framework which estimates congestion cost via the valuation of time. Their study concludes

that a significant portion of economic losses arises due to congestion/time-related inefficiencies. Along similar lines, Osman and Mohammed (2025) extend the approach of developing a mathematical model and apply it to the urban environment of Riyadh. The results of this study conclude that 50-55% of productivity loss occurs due to time-related inefficiencies. The results from both pieces of literature imply that congestion leads to a time loss and affects the overall economy negatively, and is a contributor to economic inefficiency. However, this strand is limited to measuring costs of congestion and does not look at it through a behavioural lens.

The second strand focuses on how commuting influences the efficiency and effectiveness of labour. These studies claim that congestion affects a worker's efficiency and productivity as congestion affects an individual's time for consumption, rest and working hours. A study by Mun and Yonekawa (2005) has a well-defined theoretical framework which builds on the bottleneck model of congestion by incorporating worker behaviour and scheduling decisions. It highlights that time lost in commuting leads to reduced effective labour input and causes fatigue and stress to workers. The model of this study captures congestion as a cost which arises due to travel delays, which reduce the net benefits of employment. This model also incorporates elements of agglomeration economies, showing that productivity depends on the number of workers present simultaneously.

This study concludes that workers will always face welfare and efficiency losses due to time, as time costs are unavoidable. Importantly, their work is closely related to the method adopted in this research, as both frameworks attempt to model the impact congestion has on workers using a theoretical model. However, this research models congestion as a constraint on total available time where individuals must allocate time amongst work, leisure and commuting, whereas in the approach adopted by Mun & Yonekawa, workers maximise income net of congestion costs, essentially treating congestion as a deduction from total wages. The model adopted by this research provides a more realistic representation of worker decision-making by not treating congestion as a deduction from wages.

Overall, this strand provides deeper insight into labour market outcomes, highlighting both direct and indirect productivity effects. This distinction is relevant to the current research, as congestion may have varying impacts on workers. Congestion can directly reduce the labour supply of workers with flexible hours. But for workers with fixed hours, congestion can erode leisure and reduce the effective wage, because commuting adds to the total unpaid time associated with employment. Thus, the model employed in this paper should be seen as most directly applicable to workers whose labour supply is flexible.

The third strand places congestion within the broader framework of urban economics and agglomeration effects. This literature views congestion as an inherent cost which arises due to urban economic activity and growth. A study by Graham (2007) examines the relationship between agglomeration and road traffic congestion, providing empirical evidence that urban density gives rise to greater congestion and reduces effective density, which weakens the productivity gains from agglomeration. This study introduces the idea of diminishing returns to density, i.e. the benefits which arise from agglomeration are offset by congestion-related inefficiencies. This strand therefore suggests that congestion is both a consequence of urban growth and a constraint on it, creating a trade-off between urban efficiency and congestion which cannot be fully eliminated.

June 2026

Vol 8, No 2.

Although each of the three strands has a different focus, they are all based on one underlying question: what is the impact of congestion on economic efficiency? Whereas cost-based researchers emphasise direct loss of time, productivity researchers emphasise indirect loss to labour performance, and urban economic theories explain why congestion continues to increase in expanding cities. Nevertheless, these views are normally examined in isolation, which does not give a holistic picture of the economic effect of congestion.

All in all, the literature confirms the role of congestion as a time cost, productivity constraint, as well as a structural aspect of urban economies. The present study builds on these premises by incorporating all three of these views into a single model, which models congestion as a loss in the available time which directly influences labour supply choices and output in the economy.

### **III. MODEL**

Consider an individual who represents the entire economy who allocates a fixed amount of time each day across three activities: work, leisure, and time lost to congestion. Since the analysis focuses on a single representative individual, the chosen hours worked can be interpreted as the total labour supply of the economy at the micro level. Where we assume all workers are identical. It is important to note that this model assumes the individual's ability to vary their working hours. Therefore, the model best suits those workers whose labour supply is elastic. However, where workers have to put in fixed hours of work, congestion would reduce leisure rather than  $h$ . A reduction in leisure lowers the worker's effective wage because commuting time becomes part of total working hours.

Let the total available time be denoted by  $T$ , which must be allocated across all activities and is a fixed amount. This gives the fundamental time constraint:

$$T = l + h + c$$

Where  $l$  represents leisure,  $h$  represents hours worked, and  $c$  represents time lost to congestion. This equation shows the opportunity cost in the model, i.e., time is limited, so spending more time in one activity necessarily reduces the time available for others. In particular, congestion reduces the time that can be freely allocated between work and leisure.

For fixed-hour workers, the time allocation problem can alternatively be represented as:

$$l = T - H - c$$

where  $H$  represents fixed contractual working hours. In this case, congestion does not reduce working hours because  $H$  is fixed. Instead, an increase in commuting time directly reduces leisure.

Since working hours are fixed, income is given by:

$$y = wH$$

This means that the worker earns the same income from work even when commuting time increases. However, the worker must now commit both working time and commuting time to the job. Therefore, the effective wage can be written as:

$$w_e = \frac{wH}{H+c}$$

Where  $w_e$  is the effective wage per total hours spent on work. From this formula, it is clear that an increase in the amount of time spent travelling, while keeping the nominal wage constant, reduces the worker's effective gain due to the fixed income being distributed over larger hours.

As congestion increases, the effective wage falls:

$$\frac{dw_e}{dc} = -\frac{wH}{(H+c)^2} < 0$$

This confirms that, for fixed-hour workers, congestion does not reduce formal working hours but instead reduces leisure and lowers the effective wage.

Since the central aim of this paper is to model how workers actively adjust their labour supply in response to congestion, the flexible-hours case provides the more analytically relevant framework

With this fixed-hour interpretation clarified, the remainder of the model focuses on the flexible-hours case, where  $h$  is a choice variable. This allows the model to examine how congestion affects the worker's optimal allocation between hours worked and leisure.

To calculate the individual's income earned, we multiply the wage rate of the individual by the no. of hours worked. The individual earns a wage  $w$  for each hour worked, implying that income is determined by hours worked:

$$y = wh$$

This establishes a direct link between time allocation and income, as choosing to work more, increases income earned, but at the cost of reduced leisure.

In order to consider the preference of the person, it is assumed that the utility depends on the level of income and leisure. The reason for this is that people prefer consumption possibilities that depend on income and also enjoy leisure activities. It can be shown using the following Cobb-Douglas utility function:

$$U(y, l) = y^\alpha l^{1-\alpha}, 0 < \alpha < 1$$

*How does Congestion-Induced Commuting Time affect a Worker's Time Allocation between Labour and Leisure?*

where  $\alpha$  measures the relative importance of income, and  $(1-\alpha)$  reflects the importance of leisure. This formulation ensures that both income and leisure contribute positively to utility, while also capturing the trade-off between them.

Given these relationships, the individual's objective is to maximise utility by choosing how much to work and how much leisure to enjoy, subject to the constraints imposed by time and income. Formally, the problem can be written as:

$$\max_{h,l} U(h, l) = (wh)^\alpha l^{1-\alpha}$$

subject to:

$$T = l + h + c$$

At this point, the problem has two decision variables,  $h$  and  $l$  are linked by a constraint. It is hard to solve a multivariate problem that has some kind of constraint. So, we make the problem easier by using our time limit to fully show how leisure relates to work hours and traffic:

$$l = T - h - c$$

This substitution is important as it allows us to eliminate one variable and rewrite the problem in terms of a single decision variable. Substituting this expression into the utility function, we obtain:

$$U(h) = (wh)^\alpha (T - h - c)^{1-\alpha}$$

The problem is now defined in terms of hours only, such that once  $h$  one is chosen, both income and leisure are automatically determined. By making use of the time constraint, we transform the problem into a single-variate maximisation problem, which is easier to solve. We use logarithms on the utility function to make the maximisation problem even easier. Since the logarithm is a strictly increasing transformation, maximising utility is equivalent to maximising its logarithm, meaning the optimal choice remains unchanged.

Applying logarithmic properties, we obtain:

$$\ln U = \alpha \ln(wh) + (1 - \alpha) \ln(T - h - c)$$

This can be expanded as:

$$\ln U = \alpha \ln w + \alpha \ln h + (1 - \alpha) \ln(T - h - c)$$

This final expression provides a much more tractable form of the problem. By transforming the utility function into a sum of logarithms, we simplify the process of differentiation, allowing us to solve for the optimal allocation of time in the next section.

June 2026

Vol 8. No 2.

#### IV. OPTIMISATION

Having expressed the utility function in a tractable logarithmic form, the next step is to determine how the individual allocates time optimally between work and leisure. At this stage, the problem has been reduced to a single decision variable,  $h$  meaning that once hours worked are chosen, both income and leisure are automatically determined through the relationships established earlier. The task, therefore, is to identify the value  $h$  that maximises utility.

We begin from the transformed utility function:

$$\ln U = \alpha \ln(wh) + (1 - \alpha) \ln(T - h - c)$$

This representation is particularly useful because it converts the original multiplicative form into an additive one, allowing us to more clearly separate and interpret the different components of utility. To further clarify the role of each term, we expand the logarithm of income:

$$\ln(wh) = \ln w + \ln h$$

Substituting this back into the expression yields:

$$\ln U = \alpha \ln w + \alpha \ln h + (1 - \alpha) \ln(T - h - c)$$

This step makes it evident that utility depends on hours worked through two channels: positively through income (captured by  $\ln h$ ) and negatively through its effect on leisure (captured by  $T - h - c$ ). With this structure in place, we can now examine how a marginal change in hours worked affects overall utility.

To do so, we differentiate  $\ln U$  with respect to  $h$ , which gives:

$$\frac{d(\ln U)}{dh} = \frac{\alpha}{h} - \frac{1-\alpha}{T-h-c}$$

(marginal log utility gained from an additional hour worked). This expression captures the core economic trade-off faced by the individual. The first term,  $\frac{\alpha}{h}$ , represents the marginal utility gained from increasing hours worked through higher income. The second term  $\frac{1-\alpha}{T-h-c}$  reflects the marginal utility lost as working more reduces the time available for leisure. The individual must therefore balance these opposing effects when deciding how much to work.

The optimal allocation of time occurs when no further reallocation can increase utility. This is achieved when the marginal gain from working an additional unit of time is exactly equal to the marginal loss from reduced leisure. Formally, this first-order condition is obtained by setting the marginal utility equal to zero:

$$\frac{a}{h} - \frac{1-\alpha}{T-h-c} = 0$$

Rearranging this expression gives:

$$\frac{a}{h} = \frac{1-\alpha}{T-h-c}$$

This condition provides a clear interpretation of optimal behaviour: at the optimum, the marginal utility per unit of time spent working is equal to the marginal utility per unit of time spent in leisure. In other words, the individual is indifferent at the margin between allocating time to work or to leisure. This means that any additional work would make the marginal utility of hours worked higher than the marginal utility gained.

To obtain an explicit solution, we solve this equation for  $h$ . Cross-multiplying, we have:

$$\alpha(T - h - c) = h(1 - \alpha)$$

Expanding both sides allows us to isolate the terms involving  $h$ :

$$\alpha T - \alpha h - \alpha c = h - \alpha h$$

Rearranging the expression to collect like terms:

$$\alpha T - \alpha c = h$$

Thus, the optimal level of hours worked is given by:

$$h^* = \alpha(T - c)$$

This result applies specifically to workers whose hours are flexible. For workers with fixed contractual hours,  $h$  would not adjust in response to congestion. In that case, the relevant effect of congestion would be captured through reduced leisure and a lower effective wage, rather than a reduction in formal hours worked.

This result provides an important insight into the structure of the model. Labour supply is a constant proportion of effective available time, defined as total time net of congestion. The parameter  $\alpha$ , therefore, determines the share of this available time that the individual chooses to devote to work. Importantly, congestion reduces the total time available but does not affect the proportion allocated, meaning that both work and leisure adjust proportionally.

To fully characterise the individual's time allocation, we now return to the time constraint. Since leisure is determined residually, substituting the optimal value of  $h$  into  $l = T - h - c$  gives:

$$l^* = T - \alpha(T - c) - c$$

which simplifies to:

$$l^* = (1 - \alpha)(T - c)$$

This confirms that leisure, like work, is a fixed share of the time remaining after congestion. Together, these results show that the individual divides their effective time between work and leisure according to their preferences, while congestion acts to shrink the total amount of time over which this allocation takes place.

Finally, since income is directly determined by hours worked, the implications for earnings follow naturally from the labour supply decision. Starting from:

$$y = wh$$

We substitute the optimal value of  $h$  to obtain:

$$y^* = wh^*$$

and therefore:

$$y^* = w\alpha(T - c)$$

This expression makes explicit the economic cost of congestion. By reducing the time available for work, congestion lowers income, even though the wage rate itself remains unchanged. In this sense, congestion operates as a constraint on productive time, translating directly into a loss of earnings.

Overall, the optimisation results demonstrate that congestion reduces both labour supply and income by limiting the time available for productive activity. The proportional nature of this adjustment reflects the structure of preferences, while highlighting how time lost to commuting can have clear and measurable economic consequences.

## **V. DISCUSSION**

To understand the implications of this model, it is essential to examine how changes in key parameters can affect the optimal allocation of time. From the optimisation results derived earlier:

$$h^* = \alpha(T - c), l^* = (1 - \alpha)(T - c)$$

We can analyse how labour supply and leisure respond to changes in preferences and congestion.

*How does Congestion-Induced Commuting Time affect a Worker's Time Allocation between Labour and Leisure?*

First, consider the effect of a change in  $\alpha$ , which shows the importance placed on income. Differentiating optimal hours worked with respect to  $\alpha$ :

$$\frac{dh^*}{d\alpha} = T - c > 0$$

This shows that an increase in  $\alpha$  leads to an increase in hours worked. This is because individuals who place greater value on income will naturally choose to allocate a greater amount of time to work.

However, for leisure, differentiating with respect to  $\alpha$  gives:

$$\frac{dl^*}{d\alpha} = -(T - c) < 0$$

This indicates that as the importance of income increases, leisure decreases. Showing the trade-off between work and leisure as the importance of income increases, where more time spent working comes at the expense of free time

Now, to consider the effect of congestion. Differentiating optimal hours worked with respect to  $c$ :

$$\frac{dh^*}{dc} = -\alpha < 0$$

This shows that an increase in congestion reduces hours worked. Since congestion directly reduces the total time available, hence lowering the hours worked by individuals.

This result applies most directly to workers who can adjust their hours worked. For fixed-hour workers, working hours remain constant, so:

$$\frac{dH}{dc} = 0$$

This means that congestion does not reduce formal labour hours for fixed-hour workers. Instead, the loss falls on leisure time.

For leisure:

$$\frac{dl^*}{dc} = -(1 - \alpha) < 0$$

This shows that congestion also lowers leisure. Therefore, congestion reduces work and leisure as it takes away total available time to allocate to both these activities.

For fixed-hour workers, the leisure effect is even more direct. Since:

$$l = T - H - c$$

differentiating with respect to congestion gives:

$$\frac{dl}{dc} = -1 < 0$$

This shows that when working hours are fixed, every additional unit of commuting time directly reduces leisure by the same amount.

Overall, these results are consistent with the structure of the model. Changes in preferences affect how time is allocated between work and leisure, while congestion reduces the total time available, thereby lowering both.

The above results show that congestion acts as a time constraint, i.e., reduces the total available time ( $T - c$ ) for both leisure and work. This explains why congestion has a broader economic cost as less time for work and leisure, which impacts an individual's income, overall well-being and efficiency. This shows that congestion has broader economic costs rather than just lower income. In cities like Mumbai, which have very long commute times leads to less effective time for productive or meaningful activities. Congestion also affects an individual's energy levels, focus, and efficiency, even if hours worked remain constant. Individuals with a higher preference for income  $\alpha$  will maintain work levels despite congestion, which can affect the individual's efficiency in the long term. Similarly, individuals with a lower preference for income  $\alpha$  may reduce working hours more significantly than individuals with a high preference for income  $\alpha$ . This shows that preferences affect how people respond to congestion; overall, congestion leads to a loss in economic output and quality of life

Therefore, the model has two interpretations. For flexible-hour workers, congestion reduces both labour supply and leisure. For fixed-hour workers, congestion mainly reduces leisure and lowers the effective wage. In both cases, congestion worsens the worker's position by reducing the value of the time available to them.

Our model successfully illustrates the effects of congestion on time allocation and its broader economic impact. However, there are some limitations to the model used to show the effects of congestion. Firstly, we assume only one representative individual, ignoring the differences across workers. This leads to overgeneralisation as real individuals have different wages, preferences and commute times. Our model also treats congestion as a fixed factor and exogenous, whereas in real life, individuals can adjust their travel behaviour. We also assume that congestion has no effect on productivity, fatigue and reduced efficiency from long commutes. Additionally, we also assume that the wage rate is fixed and that individuals can choose their working hours, which is unrealistic in real-life due to job constraints. This is especially important because many workers have fixed contractual hours and cannot reduce  $h$  when commuting time increases. For such workers, the stronger interpretation is that congestion reduces leisure and lowers effective wage, rather than reducing labour supply directly. Lastly, our model only focuses on

June 2026

Vol 8. No 2.

the household side, and the model does not account for general equilibrium effects, meaning it ignores how congestion might affect wages, prices, or firm behaviour across the entire economy, ultimately leading to a reduction in overall production.

## **VI. CONCLUSION**

This paper develops a theoretical model to examine how congestion affects a worker's allocation of time between work and leisure. The optimisation outcome demonstrates that the supply of labour and leisure is proportional to the effective available time,  $(T - c)$  which means that the more the congestion, the fewer the hours worked and the less the leisure. This conclusion applies mainly to workers with a flexible labour supply. For workers with fixed contractual hours, congestion does not necessarily reduce hours worked, but instead reduces leisure and lowers the effective wage by increasing the total unpaid time attached to employment. Therefore, congestion still imposes an economic cost in both cases, but the channel through which it operates differs depending on the worker's ability to adjust hours. Under the flexible-hour interpretation used in the main model, income is also reduced, which proves that congestion is a direct economic cost, as it restricts productive time. The comparative statics also indicate that although the level of preferences dictates the distribution of time between work and leisure, congestion decreases the overall amount of time spent on the two. In general, the model emphasises that congestion is a binding time constraint resulting in loss of income and utility. Despite its simplicity, the framework provides a clear explanation of how congestion generates broader economic costs by affecting both economic output and individual well-being.

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June 2026

Vol 8. No 2.

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Zorawar is an IB Diploma student at Singapore International School, Mumbai, with a strong interest in economics, public policy, and urban development. His academic interests focus on how economic theory can be applied to real-world issues, particularly in areas such as urban congestion, labour behaviour, and productivity. Through this research, he explored how traffic congestion affects workers' time allocation between work and leisure. He is also actively involved in debate and Model United Nations, where he has developed a strong interest in policy analysis, international affairs, and structured argumentation.