

POLITICAL ECONOMY OF PEACEKEEPING: A MACRO-THEORETIC INTROSPECTION

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Abstract: The paper develops a closed economy macro-theoretic framework in the light of Keynes (1936) to explore the macroeconomic implications of peace disruption due to geo-political disturbance. The basic idea underlying disruption of peace having macroeconomic fallout is rather simple in as much as it derives from the fact that outbreak of civil or cross-border military conflict will result in uptick in government expenditure in defence and peace-keeping ventures. This, amidst fiscal deficit restriction, will potentially curtail the fiscal space for directly productive expenditure, particularly in the areas of health, education and infrastructure, as what, is considered as the opportunity cost of defence and military expenditure. To this end, the current paper attempts to illuminate how a plausible diversion of government spending from the directly productive areas, as noted earlier, in the wake of civil or military conflict, can have macroeconomic backlash, by setting in cumulative contraction of aggregate production or output. Thus, the paper seeks to indicate how events causing disruption of peace and order in a country can pave the way to macroeconomic recession.

Keywords: Geo-political Tensions, Military Expenditure, Government Expenditure, Peace-keeping, Macroeconomics

Introduction

The modern world is increasingly shaped by the complex interplay of economic and geopolitical factors, and peace

disruptions, in the form of civil unrest or cross-border conflicts, pose significant threat to economic stability and growth.

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The political economy of peacekeeping, therefore, emerges as a critical area of research, particularly in examining how such disruptions impact a country's macroeconomic stability. Building on the seminal work by John Maynard Keynes (1936), this study postulates that expenditures on defence and social sector, although imperative during periods of geopolitical turmoil, precipitate wide-ranging ripples in the economy, generating the possibility of macroeconomic fallout. Specifically, the augmentation of government spending on defence in response to peace disruptions tends to come at the expense of directly productive expenditures, encompassing critical domains of healthcare, education and infrastructure. These expenditures are not only of paramount significance for long-term economic growth, but are also instrumental to improving societal welfare and ameliorating rising inequalities. However, in a fiscal landscape constrained by budgetary limitations, the redirection of public money towards defence often curtails the availability of resources for these essential areas. Consequently, the study raises an important economic question about the opportunity cost of military and defence expenditure, a concept central to understanding the broader impact of such fiscal choices on a country's aggregate output and growth potential. In many instance, economic and social marginalization act as precursors to extremism and militancy; hence,

combating these issues through decentralized policy planning and strengthened governance structures are crucial. By fostering economic inclusivity and addressing systemic inequalities, governments can mitigate the socio-economic conditions that often give rise to instability - a perspective purporting to a holistic approach to peacekeeping, where economic policy is integrated into broader strategies to maintain peace and order.

The crux of the present study lies in establishing a theoretical link between defence expenditures and aggregate output; it highlights how the risk of ongoing conflict and peacekeeping efforts may lead to a cascading decline in aggregate production, ultimately ending in an economic recession. Hence, this discourse posits the notion of inter-economy peacekeeping, not merely as a geopolitical concern, but as an indispensable factor influencing the trajectory of a nation's economic health. In this vein, the current seeks to take a more nuanced approach than are existing literature, incorporating both conflict resolution and economic development, addressing the root causes of conflict and vitalizing an inclusive economic environment. Additionally, the study highlights the need for rethinking of peacekeeping strategies by ensuring their benefits are well-adjusted with their adverse effects on the broader economy.

Finally, the paper reaffirms the importance of addressing socio-economic

deprivation among the bottom rungs of the population as a fundamental aspect of peacekeeping policy.

Review of Literature

The economic perspective on political instability and peacekeeping is a much-explored area in academics. Vogel, B. (2022) brings into light the emerging paradigm of economic peace building through localized lenses, analysing the overarching influence of economic interventions in the areas prone to conflicts. The study envisaged alternative ways to integrate economic and political aspects of peacekeeping efforts, suggesting interlinkage between economic issues and peace-making efforts.

Maekawa (2022) investigates the factors that influence the transition from UN peacekeeping operations (PKOs) to UN political missions (PMs), focusing on both demand- and supply-side views. The study, which uses data from 1993-2016, examines how UN exit plans are influenced by multilateral decision-making and conflict dynamics. This contributes to peace building literature and discussions on international collaboration in the context of competing national interests. Kathman, J. M., et al. (2016) examines the reason behind the contribution of troops by member states to UN peacekeeping missions. They argue that security concerns play a key role, with troop contributions influenced by high insecurity levels elsewhere. Their empirical study finds that interstate

rivalries and fear of future coups are strong predictors of participation. The UN has increasingly relied on personnel from less stable nations, creating a de facto division of labour. To enhance peacekeeping quality, the authors suggest raising per-soldier and state reimbursement rates.

Beber, B., et al. (2019) probes into the effects of UN peacekeeping activities on host nations, making a profound case for peacekeeping missions to have significant economic impact. The outcomes of the “peacekeeping economies” are twofold: on one hand increased economic activity, employment constitutes positive outcomes, while on the other hand the negative consequences comprise distortions in local markets and potential exploitation. The research delineates the multifaceted economic dynamics associated with the deployment of substantial financial resources with peacekeeping missions. It further asserts that these intricate economic processes have the potential to both strengthen and weaken the larger goals of peace building. Jennings et. al (2018, 2015), examines how peacekeeping missions affect local economies and social structures, unrevealing the mechanism through which locals adapt to peacekeeping-induced economic changes, that often leading to increased dependence and exacerbated inequalities. Håvard Hegre et.al (2018) evaluates the effectiveness of United Nations (UN) peacekeeping missions in reducing conflict and promoting peace by

formulating a novel method to evaluate the cumulative impact of intensity, duration, recurrence and diffusion based on a statistical model of efficacy of UN Peace Keeping Missions. Using standard simulation procedures, the study highlights that the PKOs have a clear conflict reducing effect. Budget and the Mandates given to the PKOs are important factors positively impacting the chance of peace in the following years. Kathman et.al (2018) through their research has tried to explain the willingness of the member states to contribute a substantial number of troops needed to achieve peacekeeping goals. Arguing that narrow member state security interests offer an important explanation, the paper went on to suggest that the provision of security by peacekeeping operations to their host states is somewhat dependent on the high insecurity levels elsewhere in the international system through an empirical study in order to understand and explore the role that security concerns of the member states play in the process of deciding their contribution to on-going peacekeeping missions. Distler, W., et al. (2018) examines the impact of economic reforms and socio-economic peace building efforts on the dwellings of individuals belonging to the societies emerging from conflict. It reveals the concept of post-conflict economy construction, which includes both official and informal processes that impact institutions, economic structures, and social norms in the aftermath of a

conflict. According to the study, failing to consider the economic implications of peace would lead to gaps in our knowledge of how economies recover from war. Yamarik et. al (2010), through an econometric analysis, constructively scrutinizes the long-term economic repercussions of interstate wars through a “deep determinants “framework, assessing how geography, institutions, and trade openness impact economic outcomes; underscoring the necessity of robust institutions and trade networks to mitigate the enduring economic impacts of conflict.

Notwithstanding the existing studies aimed at demystifying the trade-off between peacekeeping and economic growth, there is a lacuna when it comes to the impact of security threats on peacekeeping of a nation, and the macroeconomic fallout of that follows. Moreover, it remains essential to focus on how correcting the fault lines of the economy may help in preventing conflict and unrest and avoiding its undesirous consequences.

The Baseline Model

The paper develops a closed economy model following Keynes (1936) with extension to supply side in what is considered in standard notion as Complete Keynesian Model (CKM). The closed economy as modeled in this paper is comprised of real sector with goods and labour market and financial sector including money market and the bond market. The fundamental motivation

underlying such framework is to show how threat to national security of country stemming from internal insurgency or cross-border tensions led by militant outfit or any geopolitical disturbance in general can potentially put the macroeconomic order at stake, by resulting in a cumulative contraction of real aggregate output, on the one hand and spiraling of prices on the other. The disruption of peace and order due to such adverse events can dent the economic sentiment of people impairing the state of aggregate demand for goods and at the same time can result in technological outage leading to an adverse shock to aggregate supply of goods.

To show how these adverse developments take shape from emerging security threat and peace disruption, the paper develops a macroeconomic model as depicted in terms of the following structural equations:

$$Y = C \left[(1 - \tau)Y, \frac{M}{P} \right] + I(r, \theta) + G \quad \dots (1)$$

$$\frac{M}{P} = L(Y, r) \quad \dots (2)$$

$$Y = A(\theta) F(N, K), A' < 0 \quad \dots (3)$$

$$A(\theta)F_N = \frac{\bar{W}}{P}, F_N > 0, F_{NN} < 0 \quad \dots (4)$$

Let us now elaborate of significance of the equations. The first one indicates the level of aggregate output commensurate with aggregate demand for goods arising out of private final consumption expenditure

(C), interest-sensitive gross investment by private sector (I) and government expenditure (G). The second equation signifies the market clearing condition for financial sector from which gets determined equilibrium interest rate in

terms of given Y and $\left(\frac{M}{P}\right)$, as $r = r\left(Y, \frac{M}{P}\right)$,

$r_y > 0, r_m < 0 \left[m \equiv \left(\frac{M}{P}\right) \right]$. The third equation

reflects the aggregate production condition with the parameter A indicating the economy's overall state of production technology, which here is shown to be vulnerable to security threat, denoted by θ . Thus, we make A a decreasing function of θ . Lastly, the equation (4) describes the market clearing condition for labour market which solves for the equilibrium

level of employment as $N = N\left(\theta, \frac{\bar{W}}{P}, K\right)$,

$N_w < 0, N_\theta < 0, \left[\frac{\bar{W}}{P} \equiv W \right]$. The operation

of constant returns to scale leads to diminishing marginal productivity of labor which couples with the standard assumption of production firms are profit-maximising in behavior to explain $N_w < 0$. On the other hand, disruption in logistics due to geo-political tensions has adverse implication for labour productivity, much invariably and thus is explained how $N_\theta < 0$ [see the fig.]. Thus, plugging r as derived from equation (2) in equation (1) and similarly, plugging N derived from equation (4) into equation (3), the baseline model can be further

consolidated in what encompasses the two key macroeconomic variables, namely, aggregate output (Y) and aggregate price level (P). Thus, the aforesaid model, can be summerized in terms of following equations

$$Y = C \left[(1-\tau)Y, \frac{M}{P} \right] + I \left(r \left(Y, \frac{M}{P} \right), \theta \right) + G \dots (1)'$$

$$Y = A(\theta) F \left(N \left(\theta, \frac{\bar{W}}{P}, K_0 \right), K_0 \right), A' < 0 \dots (2)'$$

It is important to note equation (1)' represents aggregate demand-price relationship, while equation (2)' represents that between aggregate supply and price level [refer to fig (2)]. Therefore, the overall model can be solved for Y and P from equations (1)' and (2)', where, each of Y and P is a function of θ besides the fiscal and monetary policy parameters. For the aggregate employment N, we

consider it as a function of $\theta, \frac{\bar{W}}{P}, K_0$, where K_0 is fixed since it is a static framework. We solve this to derive equilibrium value of N as a linearly homogenous function of $\frac{\bar{W}}{P}$. Now, using

comparative statics, it can be shown how an increase in θ produces a fall in equilibrium Y and rise in equilibrium P, as well, although such price outcome being contingent on degree of repercussion of security threat on supply side relative to the demand side [see fig.(2)]

Working of the Model

From the equational structure of the model, the goods market and the money market clearing conditions can be represented as follows:

$$Y_D - Y = 0 \dots (5)$$

$$Y_S - Y = 0 \dots (6)$$

Further, from equations (1)' and (2)', we can derive the functional forms of Y_D and Y_S as follows:

$$Y_D = Y_D (P, G, \tau, \theta, Y) \dots (5')$$

$$Y_S = Y_S (\bar{W}, P, K_0, \theta, Y) \dots (6')$$

Now, solving equations (5)' and (6)', we get the equilibrium values of P and Y as

$$Y_E = Y_E (M, G, \tau, \theta, \bar{W}, K_0) \dots (7)$$

$$P_E = P_E (M, G, \tau, \theta, \bar{W}, K_0) \dots (8)$$

Similarly, from equation (2)', we derive the equilibrium employment as:

$$N_E = N_E \left(\theta, \frac{\bar{W}}{P}, K_0 \right) \dots (9)$$

Now, we trace the impact of an increase in θ on equilibrium value of Y and equilibrium value of P, the price outcome being contingent on degree of repercussion of security threat on supply side relative to the demand side. Further, we make the government expenditure partly endogenous, and trace the impact of the same on the key macroeconomic variables in the model.

Impact of Security Threat on Aggregate Output, Employment and Price Level

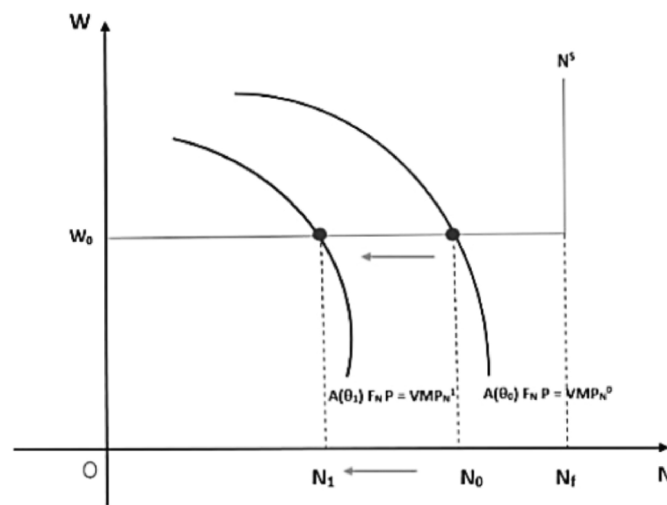
As elaborated in the preceding section, the security threat has been represented by an exogenous variable θ , which exerts an

impact on labour employment and aggregate output. In lieu of this, we consider the following proposition:

Proposition 1: Macroeconomic stability is potentially vulnerable to security threats on account of geo-political disorder.

Further said, in the wake of events impinging on security and peace, the macroeconomic stability remains at potential in as much as it leads a contraction of real sector and fuels inflations as well.

Figure 1: Impact of Security Threat on Labour Employment



An increase in θ disrupts the overall production chain, causing a negative shock to A , as denoted by fall in A , say from $A(\theta_0)$ to $A(\theta_1)$, where $(\theta_1) > (\theta_0)$. This negative shock is channeled by a ceteris paribus fall in A , per se.

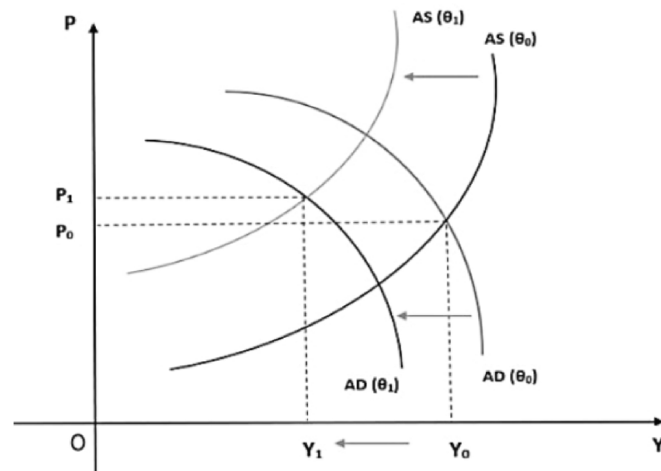
On the other hand, the aggregate price level is also affected, the intuitive underpinning of which, is explored in the subsequent figure (fig (2)); thereby a counter-balancing effect is exerted by the change in price level, on the aggregate employment. Nevertheless, the value of marginal product of labour ($VMP_N = P \cdot MP_N$) falls overall, [since, the fall in A happens in a proportion larger than that of rise in MP_N], leading to a leftward shift

in VMP_N curve.

The fall in VMP_N , i.e. the value of marginal product of labour, from $A(\theta_0)F_N P$ to $A(\theta_1)F_N P$ at a given level of each of N , K and P , is represented in the figure. Demand for labour contracts thereof. With money wage being fixed at W_0 , this fall in labour demand translates into a fall in equilibrium level of labour employment for given level of K and that of P . This explains the sign of N_θ being negative. The detailed mathematical workout is calibrated in the appendix.

The subsequent figure explores the ramifications of this change on the aggregate demand and supply.

Figure 2: Impact of Security Threat on Aggregate Output and Price Level



In Fig (2), an increase in theta will have ripples on aggregate demand and aggregate supply. Here, the AD curve shifts leftward from $AD(\theta_0)$ to $AD(\theta_1)$ due to a contraction of investment, given by $I(r, \theta)$. Subsequently, the AS curve shifts leftward from $AS(\theta_0)$ to $AS(\theta_1)$ via two effects - a contraction in A and a contraction in N . [from eqn.(2')]. Thereafter, due to the strength of the supply side being stronger, the AS curve shifts by a greater proportion compared to the AD curve. Thereby, there is an overall increase in aggregate price level from P_0 to P_1 and a fall in aggregate output from Y_0 to Y_1 . In other words, the security threat exerts ramifications in the form of inflation and contraction of the real sector, which eventually snowballs into stagflation in the economy.

Security Threat, Peace-keeping and Macroeconomic Stability

The foregone analysis reveals

macroeconomic consequence of wake of geopolitical tension triggering security threat. Now, let us proceed to examine how government's response in the interest of peace keeping, can potentially magnify the macroeconomic disorder already in place. To that end, we shall introduce a little modification in the baseline model to merit the making peace-keeping expenditure on part of government comes at an opportunity cost in terms of reduced expenditure on social sector, particularly when there is binding constraint on government borrowing. Accordingly, the total government expenditure may be divided into - (a) directly productive expenditure (the one on health, education, infrastructure and other social overhead) as denoted by G_p and (b) defence expenditure not directly productive, as denoted by G_D . Moreover, the government borrowing required for financing deficit spending is limited to a given fraction of Y , say α , i.e., $G - \tau Y = \alpha Y$.

Now, for obvious reason, G_D can be treated as an increasing function of θ , i.e. $G_D = G_D(\theta)$. Thus, we can rewrite G as: $G = G_p + G_D$. Further, to accommodate this modification, the structural set up of the present model needs to be revamped, as what follows.

$$Y = C \left[(1-\tau)Y, \frac{M}{P} \right] + I(r, \theta) + (G_p + G_D) \quad \dots (1)''$$

$$G_p = (\alpha + \tau)Y - G_D(\theta) \quad \dots (1''a)$$

$$\frac{M}{P} = L(Y, r) \quad \dots (2)''$$

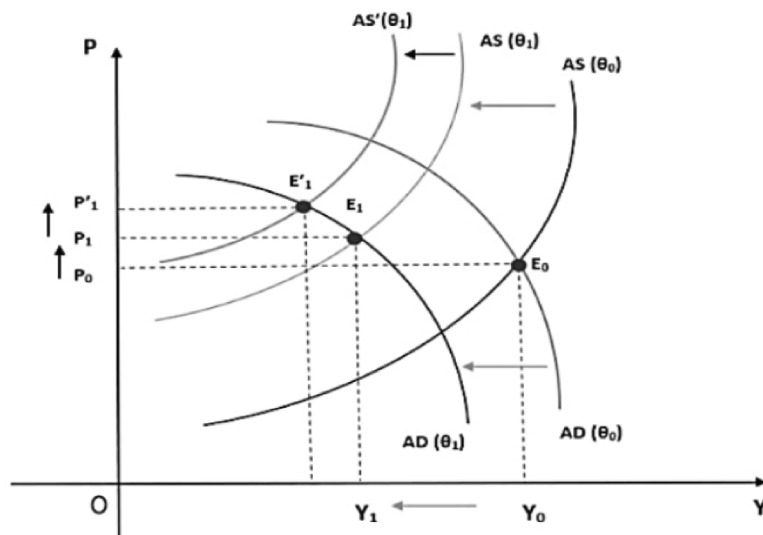
$$Y = A(\theta, G_p) F(N, K_\theta), A' < 0 \quad \dots (3)''$$

$$A(\theta, G_p) F_N = \frac{\bar{W}}{P}, F_N > 0, F_{NN} < 0 \quad \dots (4)''$$

Now, solving these equations, one can determine the equilibrium values of Y and P as functions of θ . Interestingly, the emergence of security threat, indicated by an increase in θ , will involve a supply side shock with greater magnitude compared to what happens to the demand side [see, fig. (3)]. Thus, we move on to the second proposition.

Proposition 2: Introduction of peace-keeping effort in the aftermath of mayhem threatening national security, will amplify the macroeconomic disorder already in place, as government is forced to cut back on directly expenditure to support increased spending on defence in face of binding limit on deficit spending.

Figure 3: Impact of Security Threat on Macroeconomic Variables when Government Expenditure is Partly Endogenous



After the incorporation of peacekeeping into the framework by making the government expenditure component partly endogenous, the graphical exposition undertaken before, undergoes further ramifications, as elucidated in fig (3).

This time round, when there is an increase in security threat θ , the first impact is on A, which represents the technological condition including logistic structure of the economy. It falls from $A(\theta_0)$ to $A(\theta_1)$, [where $(\theta_1) > (\theta_0)$] because the logistics of the economy goes out of order, at the face of security threats, and shifts the AS curve leftward from $AS(\theta_0)$ to $AS(\theta_1)$, likewise to the previous proposition.

The second phase of change occurs when government, at this juncture, starts allocating funds towards defence expenditure, thereby cutting back on the productive expenditure on social sectors. So, P invariably falls. In the figure, there is a more pronounced leftward shift in AS to $AS'(\theta_1)$, thereby increasing P even more. This shows that the opportunity cost of increasing permeates to a macroeconomic level. As the security threats continue to challenge economic order, this eventually takes the form of a price spiral, subsequently causing stagflation in the economy.

Conclusion

In conclusion, the macro theoretic analysis developed in this paper of the political economy of peacekeeping points to the persistent ripple effect of security threats on the political economy of a nation. It has been found that increased

defence expenditure can precipitate macroeconomic adversities, including curtailed social overhead investment and the spectre of economic contraction, which when is sustained, can snowball into a potential stagflation by means of a price spiral in the economy, at the face of security threats. Thus, the paper presents an alternative line of discourse on economic angle to management of security threats and pursuit of peacekeeping with an imperative on having the conflict resolution strategies being well-adapted to its economic set-backs.

Conflict of Interests

The authors declare that there is no conflict of interests that are directly or indirectly related to this research work.

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APPENDIX

(MATHEMATICAL DERIVATION: COMPARATIVE STATICS OF THE MODEL)

Proposition 1

Totally differentiating equation (5), we obtain,

$$Y_D (P_E, G, \tau, \theta, Y) - Y_E = 0$$

[from equation (5) and (7)]

$$\text{or, } \frac{\partial Y_D}{\partial \theta} d\theta + \frac{\partial Y_D}{\partial P_E} dP_E - dY_E = 0$$

$$\text{or, } \frac{\partial Y_D}{\partial P_E} dP_E - dY_E = (-) \frac{\partial Y_D}{\partial \theta} d\theta$$

$$\text{or, } dY_E = \frac{\partial Y_D}{\partial \theta} d\theta + \frac{\partial Y_D}{\partial P_E} dP_E \quad \dots \text{ (A.1)}$$

This shows the change in the aggregate output from the demand side.

Here, $\frac{\partial Y_D}{\partial \theta} d\theta < 0$; $\frac{\partial Y_D}{\partial P_E} dP_E < 0$, pertaining

to fig (2) and the law of demand, respectively. Hence, the two effects cumulatively result in a leftward shift in the aggregate demand which has been shown in fig (2) in the preceding section of the paper.

Similarly, totally differentiating equation (6), we get the supply side expression, as,

$$\frac{\partial Y_S}{\partial \theta} d\theta + \frac{\partial Y_S}{\partial \frac{\bar{W}}{P}} \left\{ (-) \frac{\bar{W}}{P^2} \right\} dP - dY_E = 0$$

$$\text{or, } \frac{\partial Y_S}{\partial \frac{\bar{W}}{P}} \left\{ \frac{\bar{W}}{P^2} \right\} dP + dY_E = \frac{\partial Y_S}{\partial \theta} d\theta$$

$$\text{or, } dY_E = \frac{\partial Y_S}{\partial \theta} d\theta + \frac{\partial Y_S}{\partial \frac{\bar{W}}{P}} dP \left\{ \frac{\bar{W}}{P^2} \right\} \quad \dots \text{ (A.2)}$$

Here, we have, $\frac{\partial Y_S}{\partial \theta} d\theta < 0$; $\frac{\partial Y_S}{\partial \frac{\bar{W}}{P}} dP \left\{ \frac{\bar{W}}{P^2} \right\} > 0$.

Hence, the leftward shift of aggregate supply as shown in fig(2).

Lastly, we can totally differentiate N_E to get the impact on labour employment as,

$$N_E = N_E (\theta, W, P_E, K_0) \text{ [from equation (9)]}$$

$$\text{or, } dN_E = \frac{\partial N_E}{\partial \theta} d\theta + \frac{\partial N_E}{\partial P_E} dP_E$$

$$\text{or, } dN_E = \frac{\partial N_E}{\partial \theta} d\theta + \frac{\partial N_E}{\partial Y} \frac{\partial Y}{\partial P_E} dP_E \quad \dots \text{ (A.3)}$$

Now, $\frac{\partial N_E}{\partial \theta} d\theta < 0$; $\frac{\partial N_E}{\partial Y} > 0$; $\frac{\partial Y}{\partial P_E} dP_E < 0$

(by the law of demand). Hence, the first term in the afore-mentioned equation shows the direct impact of the security threat on labour employment, whereas the second term highlights the counterbalancing effect exerted by an increase in aggregate price level. However, as stated in the preceding section, the value of marginal productivity of labour undergoes an overall fall due to the relative dominance of the impact of security threat, as is supported by fig (1).

Therefore, from the above equations, $dY_E < 0$; $dN_E < 0$ and $dP_E > 0$ when there is an exogenous rise in the variable θ which captures security threats in a political economy. Therefore, Proposition 1 lucidly illustrates that inflation and unemployment are the natural consequences at the face of threats to a nation's security.

Proposition 2

In case of defence expenditure being associated with a significant opportunity cost on account of the sacrifice the government of the said economy has to make in the expenditure on social overhead, the aggregate production becomes:

$$Y = A(\theta, G_p) F(N, K_0)$$

$$\text{where } G_p = (\alpha + \tau)Y - G_D(\theta)$$

$$A((\alpha + \tau)Y - G_D(\theta), \theta) F(N, K_0) - Y = 0$$

When $N \equiv N_E \equiv N_E \left(\theta, \frac{\bar{W}}{P}, K_0, G_p \right)$

and $G_p(\alpha, \tau, \theta, Y)$

$$\frac{\partial G_p}{\partial Y} = (\alpha + \tau) > 0$$

$$\frac{\partial G_p}{\partial \alpha} = Y > 0$$

$$\frac{\partial G_p}{\partial \tau} = Y > 0$$

$$\frac{\partial G_p}{\partial \theta} = -G_D(\theta) < 0$$

Finally, totally differentiating the aggregate supply equation (6), holding α , τ , \bar{W} , K_0 constant, we get,

$$\text{or, } \left(\frac{\partial A}{\partial G_p} \frac{\partial G_p}{\partial Y} dY \right)_F + AF_N \left[\frac{\partial N_E}{\partial G_p} \frac{\partial G_p}{\partial Y} dY + \frac{\partial N_E}{\partial \left(\frac{\bar{W}}{P} \right)} \left\{ \frac{\bar{W}}{P^2} \right\} dP \right]$$

$$\frac{\partial A}{\partial G_p} \frac{\partial G_p}{\partial \theta} d\theta + AF_N \frac{\partial N_E}{\partial \theta} + AF_N \frac{\partial N_E}{\partial G_p} \frac{\partial G_p}{\partial \theta} d\theta = 0$$

$$\text{or, } \left[\frac{\partial A}{\partial G_p} (\alpha + \tau) + AF_N \frac{\partial N_E}{\partial G_p} (\alpha + \tau) + 1 \right] dY$$

$$+ \frac{\partial N_E}{\partial \left(\frac{\bar{W}}{P} \right)} \left\{ \frac{\bar{W}}{P^2} \right\} dP = \left[\frac{\partial A}{\partial \theta} + \frac{\partial A}{\partial G_p} \frac{\partial G_p}{\partial \theta} + \right.$$

$$\left. AF_N \frac{\partial N_E}{\partial G_p} \frac{\partial G_p}{\partial \theta} + AF_N \frac{\partial N_E}{\partial \theta} \right] d\theta \quad \dots (13)$$

Here, $\left\{ \frac{\partial A}{\partial \theta} + AF_N \frac{\partial N_E}{\partial \theta} \right\}$ highlights the direct impact of the security threat, whereas the second component $\left\{ \left(\frac{\partial A}{\partial G_p} + AF_N \frac{\partial N_E}{\partial G_p} \right) \frac{\partial G_p}{\partial \theta} \right\}$ highlights the indirect impact due to the incorporation of the opportunity cost arising from a financial constraint in the government's budget.

In an analogous manner, we solve the demand side as shown subsequently

$$Y_D = C \left((1 - \tau)Y, \frac{\bar{M}}{P} \right) + I \left(r, \left(Y, \frac{\bar{M}}{P} \right), \theta \right)$$

[from equation (1) of the baseline model]

Totally differentiating (1), we have,

$$\left[\left(\frac{\partial A}{\partial G_p} \right) (\alpha + \tau) + AF_N \left(\frac{\partial N_E}{\partial G_p} \right) (\alpha - \tau) - 1 \right] dY +$$

$$\left[AF_N \frac{\partial N_E}{\partial \left(\frac{\bar{W}}{P} \right)} \left(-\frac{\bar{W}}{P^2} \right) \right] dP - \left[\frac{\partial A}{\partial \theta} + AF_N \left(\frac{\partial N_E}{\partial \theta} \right) + \left\{ \frac{\partial A}{\partial G_p} + AF_N \left(\frac{\partial N_E}{\partial G_p} \right) \frac{\partial G_p}{\partial \theta} \right\} d\theta \right] = 0$$

$$\left[\left(\frac{\partial C}{\partial Y} + (\alpha + \tau - 1) + \left(\frac{\partial I}{\partial r} \right) \left(\frac{\partial r}{\partial Y} \right) dY \right) + \left(\frac{\partial C}{\partial \left(\frac{\bar{M}}{P} \right)} \left(-\frac{\bar{M}}{P^2} \right) + \frac{\partial I}{\partial r} \frac{\partial r}{\partial \left(\frac{\bar{M}}{P} \right)} \left(-\frac{\bar{M}}{P^2} \right) \right) \right] dP + \frac{\partial I}{\partial \theta} = 0$$

... (14)

Now, we can pen down the equations (13) and (14) in a matrix form, as follows:

$$\begin{bmatrix} \frac{\partial A}{\partial G_p} (\alpha + \tau) + AF_N \left(\frac{\partial N_E}{\partial G_p} \right) (\alpha - \tau) - AF_N \left(\frac{\partial N_E}{\partial \left(\frac{\bar{W}}{P} \right)} \right) \left(-\frac{\bar{W}}{P^2} \right) \\ \frac{\partial C}{\partial Y} + (\alpha + \tau - 1) + \left(\frac{\partial I}{\partial r} \right) \left(\frac{\partial r}{\partial Y} \right) & \frac{\partial C}{\partial \left(\frac{\bar{M}}{P} \right)} \left(-\frac{\bar{M}}{P^2} \right) + \frac{\partial I}{\partial r} \frac{\partial r}{\partial \left(\frac{\bar{M}}{P} \right)} \left(-\frac{\bar{M}}{P^2} \right) \end{bmatrix} \begin{matrix} dY \\ dP \end{matrix}$$

$$= \left[\left(\frac{\partial A}{\partial \theta} + AF_N \left(\frac{\partial N_E}{\partial \theta} \right) \right) + \left\{ \frac{\partial A}{\partial G_p} + AF_N \left(\frac{\partial N_E}{\partial G_p} \right) \right\} \frac{\partial G_p}{\partial \theta} \right] \frac{\partial I}{\partial \theta} d\theta$$

where, $|x| =$

$$\begin{bmatrix} \left\{ \left(\frac{\partial A}{\partial G_p} \right) (\alpha + \tau) + AF_N \frac{\partial N_E}{\partial G_p} (\alpha - \tau) \right\} \\ \left\{ \frac{\partial C}{\partial \left(\frac{\bar{M}}{P} \right)} \left(-\frac{\bar{M}}{P^2} \right) + \frac{\partial I}{\partial r} \frac{\partial r}{\partial \left(\frac{\bar{M}}{P} \right)} \left(-\frac{\bar{M}}{P^2} \right) \right\} \\ - \left\{ \frac{\partial C}{\partial Y} + (\alpha + \tau - 1) + \frac{\partial I}{\partial r} \frac{\partial r}{\partial Y} \right\} AF_N \frac{\partial N_E}{\partial \left(\frac{\bar{W}}{P} \right)} \left(-\frac{\bar{W}}{P^2} \right) \right\} \end{bmatrix}$$

Now, applying Cramer's rule, with dY and dP as the choice variables, we have,

$$\frac{\partial Y}{\partial \theta} = \frac{\begin{vmatrix} \frac{\partial A}{\partial \theta} + AF_N \left(\frac{\partial N_E}{\partial \theta} \right) + \left\{ \frac{\partial A}{\partial G_p} + AF_N \left(\frac{\partial N_E}{\partial G_p} \right) \right\} \frac{\partial G_p}{\partial \theta} & AF_N \left(\frac{\partial N_E}{\partial \left(\frac{\bar{W}}{P} \right)} \right) \left(-\frac{\bar{W}}{P^2} \right) \\ \frac{\partial C}{\partial Y} + (\alpha + \tau - 1) + \left(\frac{\partial I}{\partial r} \right) \left(\frac{\partial r}{\partial Y} \right) & \frac{\partial C}{\partial \left(\frac{\bar{M}}{P} \right)} \left(-\frac{\bar{M}}{P^2} \right) + \frac{\partial I}{\partial r} \frac{\partial r}{\partial \left(\frac{\bar{M}}{P} \right)} \left(-\frac{\bar{M}}{P^2} \right) \end{vmatrix}}{|x|}$$

$$\frac{\partial Y}{\partial \theta} = \frac{\begin{vmatrix} \left\{ \frac{\partial A}{\partial \theta} + AF_N \left(\frac{\partial N_E}{\partial \theta} \right) \right\} + \left\{ \frac{\partial A}{\partial G_p} + AF_N \left(\frac{\partial N_E}{\partial G_p} \right) \right\} \frac{\partial G_p}{\partial \theta} \\ + \left\{ \frac{\partial C}{\partial \left(\frac{\bar{M}}{P} \right)} \left(-\frac{\bar{M}}{P^2} \right) + \left(\frac{\partial I}{\partial r} \right) \frac{\partial r}{\partial \left(\frac{\bar{M}}{P} \right)} \left(-\frac{\bar{M}}{P^2} \right) \right\} \\ - AF_N \left(\frac{\partial N_E}{\partial \left(\frac{\bar{W}}{P} \right)} \right) \left(-\frac{\bar{W}}{P^2} \right) \left\{ \frac{\partial I}{\partial \theta} \right\} \end{vmatrix}}{|x|}$$

In a similar way, we get dP as,

$$\frac{dP}{d\theta} = \frac{\begin{vmatrix} \left\{ \frac{\partial A}{\partial G_p} (\alpha + \tau) + AF_N \left(\frac{\partial N_E}{\partial G_p} \right) (\alpha - \tau) - 1 \right\} & \frac{\partial A}{\partial \theta} + AF_N \left(\frac{\partial N_E}{\partial \theta} \right) \\ + \left\{ \frac{\partial A}{\partial G_p} + AF_N \left(\frac{\partial N_E}{\partial G_p} \right) \right\} \frac{\partial G_p}{\partial \theta} & \\ \frac{\partial C}{\partial Y} + (\alpha + \tau - 1) + \left(\frac{\partial I}{\partial r} \right) \left(\frac{\partial r}{\partial Y} \right) & \frac{\partial I}{\partial \theta} \end{vmatrix}}{|x|}$$

$$\text{or, } \frac{dP}{d\theta} = \frac{\left\{ \frac{\partial I}{\partial \theta} \right\} \left\{ \left(\frac{\partial A}{\partial GP} \right) (\alpha + \tau) + AF_N \left(\frac{\partial N_E}{\partial GP} \right) (\alpha - \tau) - 1 \right\} - \left\{ \frac{\partial C}{\partial Y} + (\alpha + \tau - 1) + \left(\frac{\partial I}{\partial r} \right) \left(\frac{\partial r}{\partial Y} \right) \right\}}{\left\{ \frac{\partial A}{\partial \theta} + AF_N \left(\frac{\partial N_E}{\partial \theta} \right) + \left\{ \frac{\partial A}{\partial GP} + AF_N \left(\frac{\partial N_E}{\partial GP} \right) \right\} \frac{\partial GP}{\partial \theta} \right\} |X|}$$

Here, clearly $\frac{\partial Y}{\partial \theta} < 0$ and $\frac{\partial P}{\partial \theta} > 0$ which

attests to the fact that there is an incidence of pronounced stagflation in the economy where the government expenditure component is made partly endogenous and a fiscal constraint imposed on it. The intuition of the same has been thoroughly explored in the preceding sections of the paper.

