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ABSTRACT

In the past debates around protection are usual couched in terms of protection of the manufacturing sector from imports and are centered around the so called “ infant industry” argument. However, while this argument is difficult to apply in a post WTO world, the more pressing issue today seems to be in the realm of services where the unorganised sector is a major employer. Despite the usual efficiency arguments many developing and developed countries continue to restrict competition via zoning and other local restrictions. Yet there seems no analytical study to determine whether organised and unorganized sectors can co-exist in the absence of such restrictions. In this paper we have tried to model a scenario where organised and unorganised sectors compete and where the organised sector is only restricted by statutory rules of setting up business. The model indicates that coexistence of the two sectors is a knife-edge problem and generally unlikely. It is seen that while low growth rates of demand would eliminate the organised sectors, high growth rates and product competition will eliminate the unorganised sector. The political need to ensure coexistence for some time would require some market segmentation via regulatory restriction like zoning.

JEL Listing: D340, L52;L510

Can the Organised and Unorganised Sectors Co-exist: A Theoretical Study

I. Introduction

The possible conflict between the organized and unorganized sectors is an issue of much concern in most developing countries. The real concern seems to be that the unorganized sector is a large employer and disappearance of this sector in the short run could be an issue with serious political economy implications especially in democracies where governments have to go to the electorate every four or five years. In India, for example, in the area of manufacturing this issue was resolved to a certain extent by a policy where certain sectors like textiles and apparel which have high employment potential were reserved for production by the small scale industries (SSIs). This reservation was stressed in the Industrial Policy Resolutions (IPRs) of 1948 and 1956. This protection for the SSIs was strengthened by quantitative restriction on imports of these items. It was only later, following the reforms of 1991, that this protection was gradually eliminated over the next 15 to 20 years (see, Status, Growth and De-Reservation, RGICS, 2006).

However, in the area of services this conflict remains a hot political issue. One such area where this conflict is real and has raised serious political concerns is retail trade. At present while retail trade is open to the domestic organized sector, protection from foreign service providers remains and 100 percent foreign owned retail outlets are only permitted in single brand retail and, for multibrand retail only 51 percent foreign ownership is permitted apart from other restrictions on extent of domestic sourcing etc (see, for example, The Hindu, 2014; Arpita et.al, 2014). It may be noted that while the contentious political issue is one of foreign direct investment (FDI) in retail, the organized sector within India is free to operate at any level in the retail sector. However, the primary issue even in the case of FDI in retail trade is how it will affect employment as smaller unorganized retailers are eliminated from the sector. It may also be noted that while the large domestic players are free to enter the retail sector they are subject to government regulatory control which applies to all ventures which are classified as “organized”. Some form of regulation (example, zoning requirements, economic needs test etc. exists in most countries (see, for example, Mukherjee, op. cit.,). Hence, it is the regulatory framework that separates the organised and unorganized retailers. Two separate issues thus emerge. First, can the unorganized and unorganized retails sectors co-exist given market conditions or is government regulation necessary? Second, should foreign ownership (FDI) be permitted full access in retail services? In this article we will deal mainly with the first issue.

Surprisingly, no serious analytical work exists that deals with even the first issue. According to some estimates total retail business in India will grow at 15-20 percent annually from 2012-2017with a market size of about $518 billion in 2012 (Images, 2011; PWC, 2010) . While presently the organized retail sector accounts for about 9 percent of total retail trade this ratio was expected to grow to 20 percent by 2020 (Kearney, 2011). More important, it has been argued that “both unorganized and organized retail are bound not only to coexist but also achieve rapid and sustained growth in the coming years” (Joseph et.al., 2008). It is also argued that the fast growth of the organised sector is driving growth of other sectors too (see, Mukherjee, op.cit.)Other articles by and large contend that the two sectors could naturally co-exist (see, for example, Handa and Grover, 2012). However, none of the studies have any analytical basis and seem to be a collection of surveys and intra-country studies. In particular, the studies seem to indicate that co-existence of the organized and unorganized sectors would be a natural consequence of the growth of the market. However, the studies do not indicate what parameters would determine this coexistence and how the political economy issue of organised vs. unorganized sectors can be addressed. These are the factors we try to address in this article.

In Section II we outline the model. . Section III then presents an analysis the stability properties of the model and iconditions for coexistence while in Section IV we conclude with some policy suggestions.

II.The Model

In modelling the issue we consider an economy which has two sectors: an organized modern sector (*Y*) and an unorganized sector. In retail trade, for example, the unorganised sector consists of many “mom and pop” stores often called kirana stores (*X*) in the Indian context. Our concern is with investigating the issue of the existence and stability of an interior solution where both the *Y* and *X* set of stores can coexist. Given the market size, both types of stores can grow at certain rates and the number of each type of store is limited by what the market can support. Hence the growth pattern of both types of stores is assumed to follow a logistic function. It is also assumed that when both types of stores exist simultaneously each impacts the growth rate of the other negatively. Here we are assuming that the market is one of "differentiated goods" so that the products of the organised sector are imperfect substitutes for the products of the unorganised sector. However the market is of the "contestable" type so that there is free entry in both sectors and the number of entrants into each sector is only limited by the size of the market. It is also assumed that the organised sector is subject to regulatory constraints (trade unions, bankruptcy laws, registration etc) which do not apply to the unorganised sector where players are more in the nature of "self employed” owners. As we have noted earlier, this regulatory structure exists in most countries.

In addition, standard models of industrial organisation would not serve our purpose as these are models which assume co-existence of competing producers. On the other hand, for our purposes it is the co-existence that is itself the endogenous variable suggesting the use of a dynamic model. Hence to model our story we have used a modified Lotka-Volterra (*LV*) “predator prey” model (see, Barnes and Fulford, 2002). The *LV* model is given by a set of simultaneous differential equations

$$\frac{dx(t)}{dt} = xf(x,y) \quad \text{and} \quad \frac{dy(t)}{dt} = yg(x,y) \text{......................(1)}$$

where x refers to the number of *X* type of firms (or stores in the context of retail trade) and y the number of *Y* type. We modify this model for our purpose as

$$\frac{dx(t)}{dt} = ax(t)\left\{1 - \frac{x(t)}{K_1}\right\} - bx(t)y(t) \text{.......................(2)}$$

and

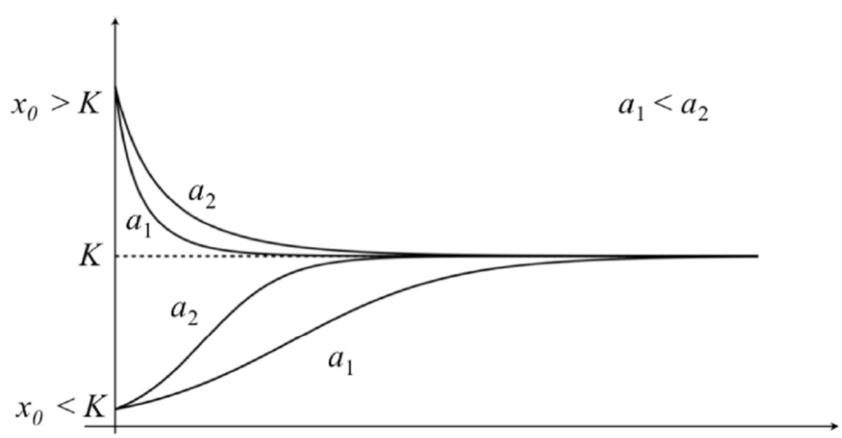
$$\frac{dy(t)}{dt} = cy(t)\left\{1-\frac{y(t)}{K_2}\right\} - dx(t)\,y(t) \text{.................. (3)}$$

and the initial conditions are given by

$$X(0) = X_0 \text{ and } \quad Y(0) = Y_0 \text{ .... (4)}$$

Equations (2)-(4)describe our model. The second term on the RHS of the equations (2) and (3) represent the negative impact of one type of firm on the growth rate of the other, thus, *b* represents the rate at which the proportional growth of *X* type of firms is retarded by the presence of the *Y* types. A similar interpretation applies to *d*. Here K_1 and K_2 are the carrying capacities of the market for the unorganised and organised firms, respectively, and represent the maximum number of the two types that the market can sustain. If there were no organised firms (so $b = 0$) the number of *X* types of firms would grow logistically at the rate *a* and the parameter K_1 would provide the limit to the growth. However, if the organised sector firms come into competition then *b* would be the rate at which they would retard the growth of the *X* type of firms. The interpretation of the parameters *c*, *d*, andK_2 for the organised sector is analogous.

It is clear that in the absence of the *Y* firms ($b = 0$) the growth path of *x* would be as shown in Graph 1 below and *x* would approach K_1 in equilibrium from above or below depending on the initial conditions.



Graph 1

A similar graph would trace the growth path of y when d=0**.** We also assume that a, b, c and d are all positive.

III. Analysis of the Equilibrium

In equilibrium, we must have $\frac{dx(t)}{dt}$ and $\frac{dy(t)}{dt}$ equal to zero. Using this and solving equations (2) and (3), the four possible equilibrium points are given by (0, 0), (K_1, 0), (0, K_2), (x^*, y^*) where the first is the trivial solution and the second and third represent corner solutions where either only X type firms exist ($x = K_1$) or only Y type ($y = K_2$)**.**The fourth represents the solution where both types of firms exist and is of special interest to us.

The interior solutions for x and y are then given by

$x^* = \frac{c.k_1(a-bk_2)}{a.c-b.d.k_1.k_2} > 0$ and $y^* = \frac{a.k_2(c-dk_1)}{a.c.-b.d.k_1.k_2} > 0$................ (5)

which implies that, in equilibrium (assuming that both x^* and $y^* > 0$),

$\frac{a}{b} > k_2$, $\frac{c}{d} > k_1$ or $\frac{a}{b} < k_2$, $\frac{c}{d} < k_1$..........................(6)

However, before commenting on the parameters it is necessary to see if all internal equilibra are stable.

III.2. Stability Analysis[1]

We will conduct our stability analysis using phase diagrams (null clines) representing equations (2) and (3) after equating the RHS in both to zero. We will ignore the trivial solution (0, 0). We concentrate here on the solutions x^*, y^***>** 0**.** From Equations (2) and (3), equating the RHS of each to zero we can solve for the slopes of the two phase lines as

[1] The Lyapunov stability conditions can be worked out for the model shown in Equations (2) - (4) and is shown in Appendix A. We have here preferred to derive this graphically for ease of presentation.

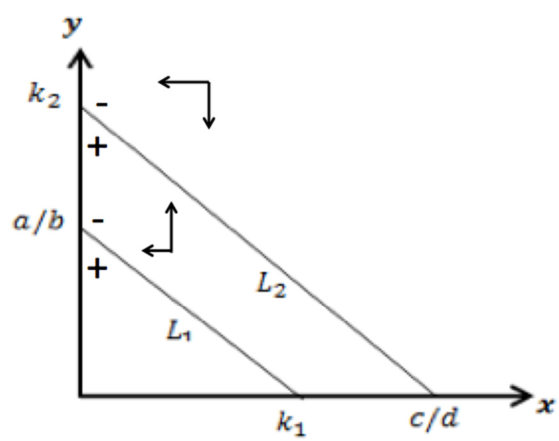
$$\frac{dy}{dx} = -\frac{a}{bK_1} \text{.......................}(7)\left(\frac{dx}{dt} = 0\right)$$

$$\frac{dy}{dx} = -\frac{dK_2}{c} \text{.......................} (8)\left(\frac{dy}{dt} = 0\right)$$

Hence both phase lines slope downward and which is steeper depends on the values of the parameters. Using (7) and (8) we can plot the two phase lines which we will call L_1 and L_2 where points on L_1 represent combinations of x and y for which $\frac{dx}{dt} = 0$. A similar interpretation applies to L_2.

In Graphs 2, 3 and 4 below the movement of the state variables x and y out of equilibrium can be derived. From equation (2), $\frac{d}{dy(t)}\left(\frac{dx(t)}{dt}\right) = -b$(for any given level of $x(t)$). Hence, above the L_1 line $x(t)$ must be falling. This is shown as the (-) sign above the L_1 line. The (+) sign below the line follows. In the same way, the + and - signs are derived for the movement of $y(t)$ above and below the L_2 line. The movement of the state variables are shown by the arrows in Diagrams (2) – (4) below.

It is easy to show that if the slopes of $L_1$and L_2 are equal then the stable equilibrium solution is a corner solution. This is shown in Graph 2 below.



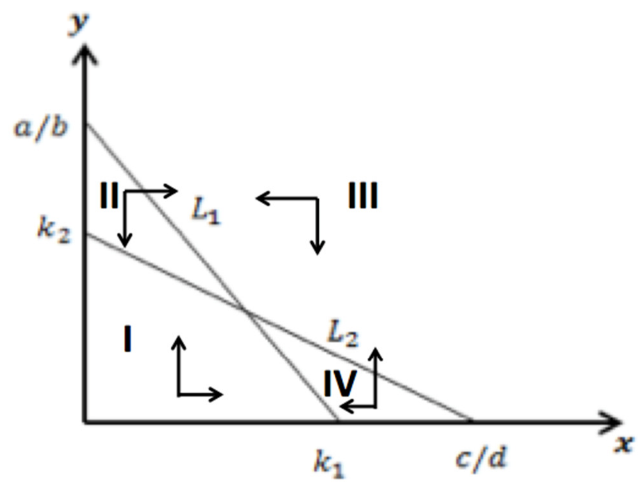
Graph 2

Here $k_1 < c/d$ and $k_2 > a/b$**,** and the two phase lines have equal slope.

Inspection of Graph 2 shows that the stable equilibrium solution is (0**,** k_2) since the solution (0**,** k_1) violates the equilibrium conditions (6). Similarly, if the positions of L_1 and L_2 are reversed then (k_1**,** 0) can be shown to be the stable corner equilibrium. However, in this paper we are concerned mainly with the internal solution (x^*, y^*). For this internal solution, the two possibilities are shown as Cases (a) and (b) in Graphs 3 and 4.

Case (a)

a/b**>**K_2 and c/d**>**K_1 so that the conditions for an internal equilibrium as shown in equation (6) are satisfied. As the arrows show, the equilibrium is stable.

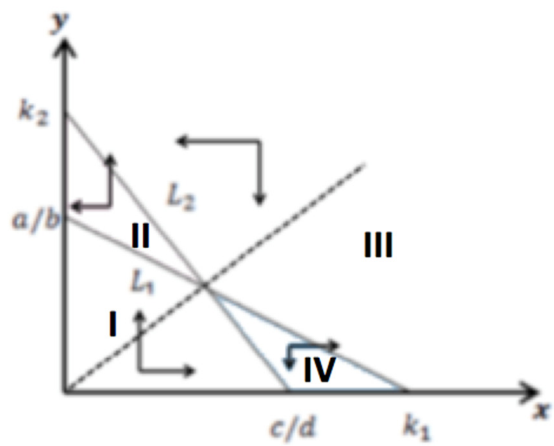


Graph 3

Case (b)

Here a/b**<**K_1 and c/d**<**K_2 so that the conditions for an internal equilibrium as shown in equation (6) are satisfied. However, as the arrows indicate, the equilibrium is unstable and, depending on the initial condition, any displacement of the equilibrium would lead to a corner solution at K_2 or K_1**.** Hence, the movement of x and y out of equilibrium is shown by the arrows in regions I, II, II and IV shown in Graph 3 and Graph 4.

It thus turns out that only in Case (a) is the internal solution, where both the X and Y type of firms coexist, globally stable in the sense that any disturbance of the system will result in systemic changes to maintain the original equilibrium. This is easily demonstrated.



Graph 4

In Case (b), Graph 4, the plane is divided into two regions by the dotted line. If the initial condition lies in the upper region containing $(0,K_2)$ (excluding the equlibrium point) then the system will converge on the point $(0,K_2)$ so that the X-type stores are eliminated. In the other region convergence to the point $(K_1,0)$ takes place and the Y-type stores are eliminated. This can be shown as follows. There are four possible cases. If the initial condition is in region I , the solution tends to K_1 and similarly in region IV the solution tends to K_2. If, the initial condition lies above the dotted line in regions I and III, the equilibrium will converge to K_2 while if it lies below the dotted line in regions I or III, the equilibrium tends to K_1. Hence, the equilibrium shown in Graph 4 is globally unstable.

Consider again the stable equilibrium of Case (a), Graph 3. We have seen that the equilibrium condition requires that $a/b > K_2$ and $c/d > K_1$. In general both a/b and c/d would be greater than 1 as both a and c represent the unconstrained growth rates of the X and Y sectors, respectively and b and d the factors by which these growth rates are limited by competition. In our model, both K_1 and K_2 are market determined as they represent the maximum number of unorganised (small scale) and organised sector firms that can be sustained in the absence of any competition from each other. In general organised sectors can be expected to have higher fixed costs imposed by the need to satisfy the conditions of establishment. In addition, organised firms have to incur higher costs of initial research on the state of the market so that exiting also has its own administrative fixed cost. We have also noted earlier that in developing countries regulatory stipulations would imply that the organised sector is unionised so that labour cannot be easily removed due to fluctuating market conditions. This would also imply that this sector faces higher variable costs in the form of wage costs given the applicability of minimum wage guidelines which are not applicable to the *X* type of firms. Organised firms therefore face higher fixed and variable costs due to the cost of compliance with the regulatory norms.

In general we expect (given a common market area) that $K_1 > K_2$. Consider the case of retail trade (which is the focus of this paper). Here the organised sector stores are presumed to provide higher quality and service than the *X* type of stores. They would then charge slightly higher prices which is necessary to sustain them (since their operating costs and set up costs are higher). However, they cater to a wider market of higher income individuals. Again, these *Y* types of stores tend to cluster in one location so that travel costs of consumers are minimised. On the other hand, prior to the existence of *Y* types of stores, consumers buy goods from the *X* types but the nature and quality of these goods does not justify the inconvenience of incurring transport and other costs of purchasing. Hence, the *X* types of firms would be in the nature of "neighbourhood" or “convenience" stores whose market is limited by income and distance from the consumer. This therefore implies that, in any geographical area the number of *X* type stores that can be sustained is greater than the number of *Y* types. In other words, for any one *Y* type store in a givengeographical area there would be a number of smaller *X* type stores that can be sustained.

From the above it is clear that for both the *X* and *Y* kind of firms to exist in a stable equilibrium we must have $a/b > K_2$ and $c/d > K_1$. Violation of either or both these conditions would imply that one or the other kind of firm would disappear over time.

Theorem 1.

Competing organised and unorganised firms would end up in a stable internal solution if $a/b > K_2$ *and* $c/d > K_1$*. In all other cases one or the other set of firms would disappear in* *equilibrium.*

The condition of Theorem 1 lends itself to some intuitive interpretation. The condition of Theorem 1 would be satisfied if one type of firm has little impact on the growth rates of the other, that is, both b and d are small. This can often be done by physical separation of the two types of firms, for example, by restricting the areas of operation of the two types. This is precisely what was attempted in the Indian context when certain products (and hence markets) were reserved for the unorganised sectors between 1950 and 2000 or so. While not necessarily efficiency promoting, it was certainly a good political decision given the importance of the unorganised manufacturing sector which accounts for about 90 percent of employment in the manufacturing sector. The phasing out of this reservation was an equally sensible decision from an efficiency point of view. The zoning restrictions on retail trade in many countries is probably driven by the same consideration.

Consider the retail trade sector. Also consider some low income and sparsely populated area where we would expect both K_2 and K_1 are small. In this case it is likely that the condition of stable internal equilibrium would be satisfied. The opposite would be true in urban areas where both K_1 and K_2 can be expected to be large. In other words, the co-existence of organised and traditional retail stores is only sustainable if zoning restrictions do not permit organised retail in the larger urban markets. However, the current policy in India of restricting foreign owned retail stores to the metros has little meaning and may hasten the disappearance of the unorganised retail stores.

In another interpretation of the condition of Theorem 1, note that a/b and c/d represent in one sense the net growth rates of the unorganised and organised segments. We have also noted that, in general, $K_1>K_2$. We have the following proposition.

Proposition 1.

The organised and unorganised sectors can coexist if and only if the net growth rate of the organised sector is significantly higher than that of the unorganised sector.

Consider the retail trade sector in India. In a recent survey of a consumers and retailers in the city of Bangalore, India it was found that the minimum cost of setting up an unorganised retail store is about Rs. 100,000 and organised store 350,000 (see, CIC, 2015). Given the existing market size this would imply that $K_1 = 3.5\ K_2$. This implies that the net growth rate in the organised sector must be at least 3.5 times that of the organised sector. If the difference is any less then (as discussed in Graph 1) the organised stores would disappear. The intuition is obvious. Since organised stores have a higher fixed cost of operations, they need a much higher growth rate to survive.

Since organised stores made their debut way back in the 1990s, one can assume that reported growth rates of the organised stores are their net growth rates. Some estimates in recent years place the growth rate around 20 percent (see, Images, op.cit.). This implies that if the unorganised segment grows at anything above 6 percent per annum, then the organised stores are likely to disappear over time. Similarly, if the unorganised segment grows at less than around 6 percent, overtime the organised sector will disappear. While these are rough numbers, what is stressed here is the knife edge problem: there is a certain critical gap in the growth rate of the two sectors which will allow them to co-exist and that this coexistence is neither natural or expected.

Inspection of Theorem 1 also yields additional insights. Given K_1 and K_2 , and the natural growth rates of market demand (a and b), coexistence is possible if the impact of one sector on the demand for the other is minimised. There is some presumption that d is likely to be small (the organised sector caters to a set of demands and products not supplied by the unorganised sector). As the organised sector starts producing products which are close substitutes of those produced in the unorganised sector, the coefficient b rises so that we have $\frac{a}{b} < K_2$ and the unorganised sector would disappear over time. In other words, unless product market are well segmented coexistence is not possible.

Proposition 2.

Unless there is clear product segmentation or markets are segmented, it is unlikely that the organised and unorganised sectors can coexist.

The policy in India of reserving some products for the small scale manufacturing sector since the Industrial Policy of 1948, while not necessarily efficiency promoting, was probably a good idea in terms of the political economy of protection given that the unorganised sector accounts for over 90 percent of employment in the manufacturing sector. This was also the logic for only phased de-reservation between 1991 and 2000 or so. However, in the retail (services) sector no such protection exists today and phasing out of the unorganised sectors would probably require segmentation by methods like zoning restrictions. It is also not surprising that in products where product differentiation is not likely (for example, foodgrains) the organised sector is unlikely to survive.

IV. Conclusion

Debates around protection are usually couched in terms of protection of the manufacturing from imports and is centred around the usual "infant industry" argument. However, since the advent of the WTO such protection can only be tariff based and subject to phasing out over time. For many developing countries the political arguments are now centring around the fast growing services sector where the application of WTO principles are not so clear cut. In India, for example, protection of the unorganised sectors seems to be confused with the issue of whether foreign direct investment (FDI) should or should not be allowed. Here, even if FDI is not allowed, coexistence of the organised and unorganised sectors is not guaranteed. The real issue seems to be temporary protection of the unorganised retail sector from the organised sector to allow for structural adjustment over time. Yet, despite the politically charged nature of the debate there exist no analytical models to motivate the debate.

In this paper we have tried to model a scenario where organised and unorganised sectors compete and where the organised sector is only restricted by statutory rules of setting up business. The model indicates that coexistence of the two sectors is a knife-edge problem and generally unlikely. It is seen that while low growth rates of demand would eliminate the organised sectors, high growth rates and product competition will eliminate the unorganised sector. The political need to ensure coexistence for some time would require some market segmentation via regulatory restriction like zoning restrictions.

APPENDIX A

The system of equations (2 – 3) that govern the model is a nonlinear autonomous system of first order differential equations that may be written as

$x'(t) = F(x, y)$ (A1)

$y'(t) = G(x, y)$ (A2)

with (x^*, y^*) as the equilibrium point. We linearise the system by using the first approximation of Taylor series expansion of $F(x, y)$ and $G(x, y)$ about the equilibrium point (x^*, y^*).

$$F(x,y) = F(x^*,y^*) + \frac{\partial F(x^*,y^*)}{\partial x}(x - x^*) + \frac{\partial F(x^*,y^*)}{\partial y}(y - y^*)$$

$$G(x,y) = G(x^*,y^*) + \frac{\partial G(x^*,y^*)}{\partial x}(x - x^*) + \frac{\partial G(x^*,y^*)}{\partial y}(y - y^*)$$

Since, (x^*, y^*) is the equilibrium point, $F(x^*, y^*) = G(x^*, y^*) = 0$. Thus, the system of equations (A1 – A2) may be written as

$$\begin{bmatrix} x'(t) \\ y'(t) \end{bmatrix} = \begin{bmatrix} \dfrac{\partial F(x^*,y^*)}{\partial x} & \dfrac{\partial F(x^*,y^*)}{\partial y} \\ \dfrac{\partial G(x^*,y^*)}{\partial x} & \dfrac{\partial G(x^*,y^*)}{\partial y} \end{bmatrix} \begin{bmatrix} (x - x^*) \\ (y - y^*) \end{bmatrix}$$

The coefficient matrix $J = \begin{bmatrix} \dfrac{\partial F(x^*,y^*)}{\partial x} & \dfrac{\partial F(x^*,y^*)}{\partial y} \\ \dfrac{\partial G(x^*,y^*)}{\partial x} & \dfrac{\partial G(x^*,y^*)}{\partial y} \end{bmatrix}$ is the Jacobian matrix of the system at the equilibrium point (x^*, y^*). For the model under study,

$$J = \begin{bmatrix} a - \dfrac{2ax^*}{k_1} - by^* & -bx^* \\ -dy^* & c - \dfrac{2cy^*}{k_2} - dx^* \end{bmatrix} = \begin{bmatrix} \alpha & \beta \\ \gamma & \delta \end{bmatrix}$$

The eigen values of the Jacobin matrix J satisfy the quadratic equation

$$\begin{aligned} &\lambda^2 - (\alpha+\delta)\lambda + (\alpha\delta - \beta\gamma) = 0 \\ &\Rightarrow \lambda^2 - tr(J)\lambda + \det(J) = 0 \end{aligned} \qquad \text{(A3)}$$

Since, we are mainly interested in the stability of the internal equilibrium point we shall focus on the eigen values of the Jacobian matrix derived for the internal solutions (5). The equation (A3) for the internal equilibrium point is

$$\lambda^2 - \frac{ac}{ac - bdk_1k_2}\left((bk_2 - a) + (dk_1 - c)\right)\lambda + \frac{ac}{ac - bdk_1k_2}(bk_2 - a)(dk_1 - c) = 0$$

$$\lambda^2 - p\lambda + q = 0$$

In case (a) $\left(\frac{a}{b} > k_2, \frac{c}{d} > k_1\right) q > 0$ and $p < 0$ but for case (b) $\left(\frac{a}{b} < k_2, \frac{c}{d} < k_1\right)$, $q < 0$ and

$p > 0$. Hence, the eigen values of the jacobian matrix in case (a) are negative real whereas in case (b) they are of opposite sign. Therefore from the *Poincare-Lyapunov Theorem*[2] the equilibrium point in case (a) is a stable node whereas in case (b) it is an unstable saddle point.

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[2]*Poincare-Lyapunov Theorem*: If the eigenvalues of the Jacobian matrix evaluated at the equilibrium point are not equal zero or are not pure imaginary numbers, then the trajectories of the system around the equilibrium point behave the same way as the trajectories of the associated linear system.

1. If the eigenvalues are negative or complex with negative real part, then the euilibrium point is stable

2. If the eigenvalues are positive or complex with positive real part, then the equilibrium point is a unstable

3. If the eigenvalues are real number with different sign (one positive and one negative), then the equilibrium point is a saddle point.

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