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Handwritten Notes for Minsky's PhD Thesis titled The Nature of Equilibrium in Economic Literature

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The Nature of Equilibrium in Economic Literature.

The General Nature of Equilibrium of a System.

Equilibrium as a 'solution' of ~~simultaneous~~ 'determinants'. The stability of equilibrium depends upon a process such that ~~regardless of any~~ from any 'initial' position the solution is approached 'asymptotically' as the time axis goes out to ∞. The uniqueness of equilibrium would hold if the asymptotic solution is independent of the initial position; if the asymptotic position depends upon the initial position if you can then have a number of equilibrium positions each stable for a set of 'initial' positions and therefore for a set of displacements from 'equilibrium'. That a system has a solution which is 'stable' does not therefore mean that the system will not display 'cyclical' patterns of behavior if the system is 'continuously being subject to 'random' shocks.

A system then which possesses multiple stable equilibria, if these 'stable equilibria could be characterized by a progression from one 'stable set' to another could then have an 'invariant' pattern of progression from stable equilibria to stable equilibria such a system would display regularity of a 'higher' order than the simple 'composite stable equilibria' systems.

If a system with a set of stable equilibria subject to random shocks; the 'equilibria' to be reached after X, would depend on the set of 'possible positions' achieved from X as a result of 'achievable displacement' depending upon the characteristics of the original position and the nature of the 'allowable shocks'. The set of achievable positions S_1 is made up of 'elements' each of which implies a particular equilibrium ~~set~~ $X_1, X_2 - - - X_n$. If we assume an 'initial position' X_1, then to X_1 there is related a set of achievable positions S_{1j} each $S_1 \supset s_1, s_2 \ldots s_k$. Each $s_i \supset$ an equilibrium set of values X_i. Therefore for each X_j there corresponds a set S_i

this replaces above ¶.

Equilibrium values: X_i.

Set S_i of achievable positions, (depending upon X_i and nature of shocks.)

$S_i \supset s_{1i}, s_{2i} \ldots s_{ki}$; each $s_{ix} \supset X_j$ an equilibrium position. Therefore the $P(X_j)$ given X_i

$$P_{X_i}(X_j) = \text{relative frequency of } \frac{s_{ix} \supset X_j}{S_i};$$

If X_i is a unique equilibrium position then

$$j \neq i \quad P_{X_i}(X_j) = 0.$$

$$j = i \quad P_{X_i}(X_j) = 1$$

Necessary 1. to investigate the properties of an 'equilibrating system' so that

$$\underline{P_{X_i}(X_j) = 0 \quad j \neq i}.$$

and $P_{X_i}(X_j) = 1 \quad i = j$

before you can go on.

$P_{x_i}(x_j) = 0 \quad j \neq i$ implies that all

$s_{ik} \supset \cdot X_i$ are a set of measure zero. This means that the only achievable positions due to a 'random shock' are on 'paths' to X_i

This means either that $\underline{s_{ik} \supset \cdot X}$ is the entire space. or that: given X_i then the random shock operator T on X_i achieves only values of S_i such that $S_{ik} \supset \cdot X_i$ e.g.

$$T(X_i) \supset S_i \cdot \supset \cdot s_{ik} \in S_i \cdot \supset \cdot$$

$$T(X_i) = S_i \ni s_{ik} \in S_i \supset \cdot X_i$$

where $\mathrm{Prob}: \frac{s_{ik}}{S_i} = 1.$

So it is necessary to construct systems such that either $S_i \supset \cdot X_i$ is the space, or

if $S_i = S$ then

$P(T(X_i) \supset \cdot S_i = 1$. E.g. the set of all T's which do not imply S_i for X_i is a set of measure zero.

Therefore you have to investigate the properties of 1) The Transformation space

2) the space of 'achievable positions'.

3) the space of 'equilibrium' values.