

SUSTAINABILITY THOUGHTS 156: HOW DOES THE GENERAL IMPERFECT PARADIGM EVOLUTION MODEL IS EXPECTED TO WORK? THE CASES OF EXPANDING IMPERFECT MARKETS, OF SAVING IMPERFECT MARKETS FROM COLLAPSE, AND OF THE FALL OF IMPERFECT MARKETS DUE TO BINDING SUSTAINABILITY GAP PRESSURES

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ABSTRACT

If we transform a general perfect market evolution model under externality neutrality assumptions into a general imperfect market evolution model, we can extract the environment under which a dominant component imperfect market operates, which allows for the possibility of forever growth and no collapse. However, if we place this imperfect market under a framework of no externality neutrality assumption, then the model shows limits to growth and the possibility of collapse. And if the risk of collapse is real, the dominant component imperfect market model can either be saved or it can collapse if it cannot be saved. The saving mechanism allows for either a full fix or just a patch, but it all depends on whether or not there are paradigm shift knowledge gaps together with political will and academic will. If the imperfect market cannot be saved, it will flip perfectly or imperfectly to opposite or inverse opposite forms, and if possible, it will flip towards a market form that still allow it to keep the same legal and political loyalty structure it had before the flip. The above holds true for any dominant component based imperfect market, which makes the following question relevant: How does the general imperfect paradigm evolution model is expected to work? The cases of expanding imperfect markets, of saving imperfect markets from collapse, and of the fall of imperfect markets due to binding sustainability gap pressures. Among the goals of this paper is to provide a detailed answer, both analytically and graphically, to this question.

Key Words: Perfect markets, imperfect markets, externality neutrality assumption, binding sustainability gaps, paradigm evolution, dominant paradigm, market expansion, market collapse, fully fixing markets, partially fixing markets, paradigm shift, paradigm flip, perfect paradigm shift, perfect paradigm flip, imperfect paradigm shift, imperfect paradigm flip.

1. INTRODUCTION

a) The general perfect market evolutions model

If we have a dominant component based perfect market of the form $M = X_y$, where X is the dominant component driving the market; and “y” is the passive component, then all possible evolutions routes if under externality pressures available to this market M can be summarized as previously indicated(Muñoz 2021) as it is done in Figure 1 below:

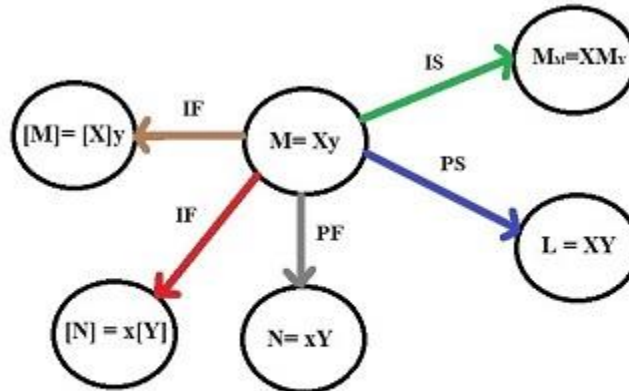


Figure 1 Paradigm M under all types of pressures provides the structure of the general paradigm evolution model under sustainability gap pressures

We can appreciate the following based on Figure 1 above about the perfect model $M = Xy$:
 i) Model M is the dominant component X perfect market; ii) Model L is a two dominant component based market; iii) Model M_M is the externality “y” based externality management market; iv) Model N is the perfect inverse opposite market to M, a dominant component Y perfect market; v) Model [N] is a dominant component Y based dictatorship market, and the imperfect inverse opposite model to M; and vi) Model [M] is a dominant component X based dictatorship market and the opposite model to M.

Therefore, Figure 1 above summarizes all possible paradigm evolution routes for all possible dominant component based perfect markets. In other words, the paradigm evolution routes for perfect market M in Figure 1 above hold for any dominant component based perfect market such as the perfect social market or the perfect economic market or the perfect green market or the perfect red market, and so on. It is well-known that the traditional market model given to the world by Adam Smith(Smith 1776) has a dominant economy structure consistent with the perfect structure in Figure 1 above under equality neutrality assumptions.

b) Transforming the general perfect market evolution model into a general imperfect market evolution model

If we place the imperfect or dictatorship version of market $[M] = [X]y$ at the centre of Figure 1 we get to the different paradigm evolution routes available to an imperfect dominant component based market as indicated in Figure 2 below:

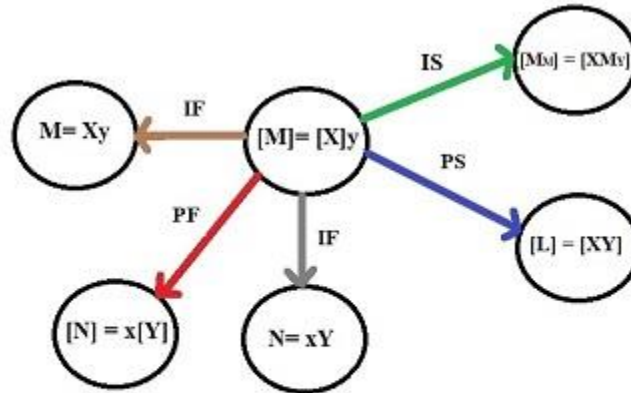


Figure 2 Imperfect paradigm M under all types of pressures provides the structure of the general paradigm evolution model under sustainability gap pressures

We can say the following based on Figure 2 above about the imperfect model $[M] = [X]y$:
 i) Model $[M]$ is the dominant component $[X]$ imperfect market or dictatorship based market; ii) Model $[L]$ is a two dominant component based imperfect market or dictatorship based market; iii) Model $[M_M]$ is the externality “y” based externality management imperfect market or dictatorship based market; iv) Model N is the imperfect inverse opposite market to $[M]$, a dominant component Y perfect market; v) Model $[N]$ is a dominant component $[Y]$ based dictatorship market and the perfect inverse opposite model to $[M]$; and vi) Model M is a dominant component X based perfect market and the opposite model to $[M]$.

Hence, Figure 2 above summarizes all possible paradigm evolution routes for all possible dominant component based imperfect markets. In other words, the paradigm evolution routes available to imperfect market $[M]$ in Figure 2 above hold for any dominant component based imperfect market such as the imperfect social market/social dictatorship market/red socialism market or the imperfect economic market/economic dictatorship market or the imperfect green market/green market under dictatorship or the imperfect red market/red market under dictatorship, and so on. It is well-known that the red socialism model given to the world by Karl Marx (Marx and Engels 1848) has a society dominant component without freedom based structure consistent with the imperfect structure in Figure 2 above as it assumes freedom neutrality.

c) The need to understand how the general imperfect market evolution model is expected to work when under externality neutrality assumptions and when under binding externality assumptions

As shown above, if we transform a general perfect market evolution model under externality neutrality assumptions in Figure 1 into a general imperfect market evolution model as in Figure 2, we can extract the environment under which a dominant component imperfect market operate, which allows for the possibility of forever growth and no collapse. However, if we place this imperfect market under a framework of no externality neutrality assumption, then the model shows limits to growth and the possibility of collapse. And if the risk of collapse is real, the

dominant component imperfect market model can either be saved or it can collapse if it cannot be saved. The saving mechanism allows for either a full fix or just a patch, but it all depends on whether or not there are paradigm shift knowledge gaps together with political will and academic will. The key role that paradigm shift knowledge gaps have in either supporting efforts to save the paradigm from collapse or in leading to its collapse have been recently pointed out(Muñoz 2020). If the imperfect market cannot be saved, it will flip perfectly or imperfectly to opposite or inverse opposite forms, and if possible it will flip towards a market form that still allow it to keep the same legal and political loyalty structure it had before the flip. The above holds true for any dominant component based imperfect market with the structure as in Figure 2 above, which makes the following question relevant: How the general imperfect paradigm evolution model is expected to work? The cases of expanding imperfect markets, of saving imperfect markets from collapse, and of the fall of imperfect markets due to binding sustainability gap pressures. Among the goals of this paper is to provide a detailed answer, both analytically and graphically, to this question.

2. GOALS OF THIS PAPER

a) To highlight how the imperfect market model [M] is expected to work under externality neutrality assumptions; b) To stressed how the imperfect market model [M] under binding externality assumptions can be saved from collapse by a full fix or by a patch; and c) To indicate how the imperfect market model [M] under binding externality assumptions will evolve if it cannot be saved and collapses.

3. METHODOLOGY

First, the terminology used in this paper is introduced. Second, the operational concepts and typology of paradigms and paradigm evolution rules are shared. Third, the structure of the imperfect market model [M] when under unlimited growth is highlighted, analytically and graphically. Fourth, the structure of the imperfect market model [M] when under full fix and under partial fix or saving options is shared analytically and graphically. Fifth, the structure of the imperfect market model [M] when it collapses as it cannot be fixed is shared analytically and graphically to point out available evolution routes. And finally sixth, some food for thoughts and relevant conclusions are provided.

Terminology

- M1 = Perfect market M1 [M1] = Imperfect market M1
[M1] = Authoritarian market M1 M1M = M1 under externality management
PS = Perfect shift IS = Imperfect shift
PF = Perfect paradigm flip IF = Imperfect paradigm flip
M = Perfect lower level market M N = Perfect lower level market N
L = Perfect higher level market L [] = Authoritarianism

[L] = Imperfect higher level model L [M1_M] = Imperfect market under externality management

[M] = Market M under authoritarianism [N] = Market N under authoritarianism

Operational concepts, types of market structures and model evolution rules

a) Operational concepts

1) **Perfect market**, *a market where there is dominant component equality and freedom*

2) **Imperfect market**, *a market where there is component equality, but not freedom*

3) **Perfect paradigm shift**, *a shift from a perfect market to a higher level perfect market*

4) **Paradigm management**, *the handling of cost externalization through externality management*

5) **Paradigm flip**, *a flip to the opposite paradigm or a flip to the inverse opposite paradigm*

6) **Perfect paradigm flip**, *a flip to the perfect inverse opposite paradigm or a flip to the imperfect inverse opposite paradigm*

7) **Imperfect paradigm flip**, *a flip to the imperfect inverse opposite paradigm or a flip to the perfect inverse opposite paradigm*

8) **Authoritarian market**, *an imperfect market*

9) **Sustainability market**, *the perfect market where there is full co-component equality and freedom*

10) **Externality management market**, *the market where there is partial co-component equality, but no freedom.*

b) Type of market structures

Given the dummy market models $M_1 = Xy$ and $M_2 = xY$, the following can be said about different market structures:

1) Perfect markets

There is dominant component equality and freedom

$M_1 = Xy = \mathbf{A\ dominant\ component\ X\ perfect\ market}$

$M_2 = xY = \mathbf{A\ dominant\ component\ Y\ perfect\ market}$

2) Imperfect markets

There is dominant component equality, but no freedom, they are dictatorship based markets

$[M_1] = [X]y = A$ dominant component X imperfect market

$[M_2] = x[Y] = A$ dominant component Y imperfect market

3) Externality management market

They are ongoing government intervention based markets

$M_{M1} = XY_M = A$ dominant component X externality Y management market

$M_{M2} = X_MY = A$ dominant component Y externality X management market

4) The sustainability market

The perfect market where there is full co-component equality and freedom

$S = M_1.M_2 = (Xy)(xY) = XY$

Details about paradigm merging rules and paradigm shift rules can be found in the publication about paradigm evolution and sustainability thinking(Muñoz 2019a).

c) Model evolution rules

i) Perfect paradigm shift

The externality gap affecting the market, y or x, is fully closed and internalized, in perfect markets and imperfect markets

PS

$M_1 = Xy \text{-----} \rightarrow M_3 = XY$

PS

$M_2 = xY \text{-----} \rightarrow M_3 = XY$

PS

$[M_2] = x[Y] \text{-----} \rightarrow [M_3] = [XY]$

ii) Imperfect paradigm shift

The externality gap affecting the market, y or x, is patched and managed as an externality problem, in perfect markets and imperfect markets

IS

$M_1 = Xy \text{-----} \rightarrow M_4 = XM_Y$

IS

$$M_2 = xY \text{-----} \rightarrow M_5 = M_X Y$$

IS

$$[M_2] = x[Y] \text{-----} \rightarrow [M_5] = [M_X Y]$$

iii) Perfect paradigm flip

Paradigms flip to the perfect inverse opposite model, in perfect markets and in imperfect markets

PF

$$M_1 = Xy \text{-----} \rightarrow M_2 = Xy$$

PF

$$M_2 = xY \text{-----} \rightarrow M_1 = Xy$$

PF

$$[M_2] = x[Y] \text{-----} \rightarrow [M_1] = [X]y$$

iv) Imperfect paradigm flip

Paradigms flip to the imperfect inverse opposite model, in perfect markets and in imperfect markets

IF

$$M_1 = Xy \text{-----} \rightarrow M_6 = x[Y]$$

IF

$$M_2 = xY \text{-----} \rightarrow M_7 = [X]y$$

IF

$$M_7 = [X]y \text{-----} \rightarrow M_2 = xY$$

The imperfect dominant component based market [M] under externality neutrality assumptions

If the imperfect model $[M] = [X]y$ in Figure 2 above operates under externality neutrality assumptions, then the pressures from externality “y” it generates when expanding are irrelevant as indicated by all the broken arrows; and therefore, there is no need to evolve as by assumption it is not under sustainability threats from externality ‘y’, a situation that can be summarized as in Figure 3 below:

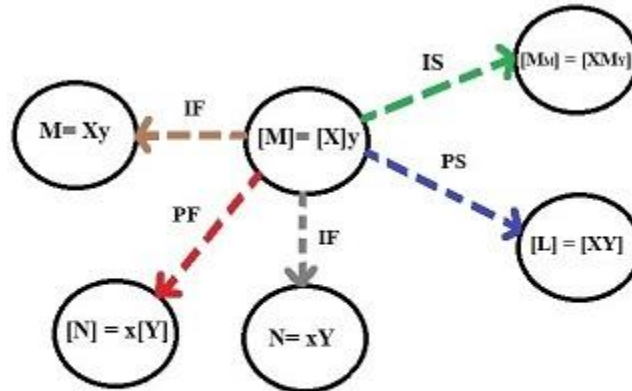


Figure 3 Imperfect paradigm M under no externality "y" pressures provides the structure of a market without limits to growth and not fear of collapse

The broken arrows in Figure 3 above indicate the idea that under externality neutrality assumptions there is no need to fix the paradigm nor there is a need to flip to other paradigm forms as the paradigm cannot collapse as growth is unlimited.

In other words, under externality neutrality assumptions imperfect model [M] can expand for ever without generating externalities such as 'y', which allow it to operate outside the pressures of sustainability gaps(SG_Y) from passive component "y" as indicated in Figure 4 below:

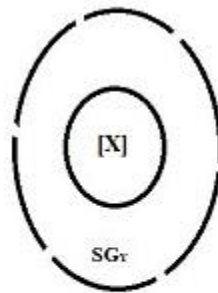


Figure 4 Imperfect model M under no limits to growth as the externality driven sustainability gap SG_Y is non-binding

We can see based on Figure 4 above that without sustainability gap pressures $SG_Y = 0$ by assumption, imperfect model [M] driven by dominant component [X] displays unlimited growth as it could expand for ever without sustainability gap's restraints. In other words an authoritarian system like market [M] can expand for ever under externality neutrality assumptions.

Imperfect dominant component model [M] under binding externality assumptions

When there is no externality neutrality assumptions there are sustainability gap pressures($SG_Y = y$) so that when externalities become binding($BSG_Y = y$), they place limits to the growth of imperfect market [M] as shown in Figure 5 below:

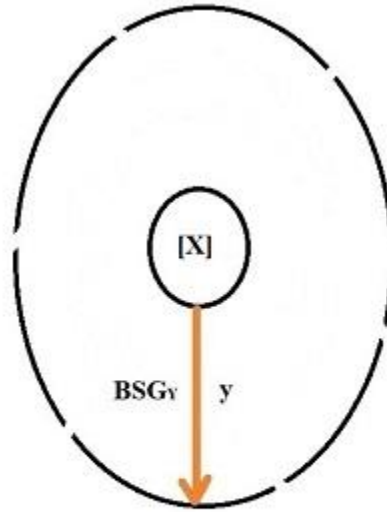


Figure 5 Imperfect market M under binding sustainability gap pressures $BSG_y = y$ so $[M] = [X]y$

Figure 5 above points out that externality “y” can become a binding externality BSG_y capable of even forcing the collapse of imperfect model [M] if no action is taken to save it. In other words, when the externally “y” becomes a binding externality (BSG_y) it forces stakeholders to fix it, fully or partially, to save it to maintain the core values of imperfect market [M] or it forces them to accept that the imperfect market [M] as it known will collapse and flip to take the form of other paradigms with different core values. Hence, we should expect that stakeholders who support imperfect market [M] will first try to take actions to save it; and only and only when they cannot save the imperfect paradigm they will accept the collapse and flip options.

i) The options available to save the imperfect model [M] from collapse under binding sustainability gap pressures

To avoid the collapse of imperfect market [M] under binding sustainability gap pressures (BSG_y) from externality “y”, we have two options: a full fix by shifting it to imperfect model [L] where there are no longer pressures from externality ‘y’ or partial fix by placing imperfect model [M] under externality “y” management frameworks $[M_M]$, as it can be appreciated in Figure 6 below:

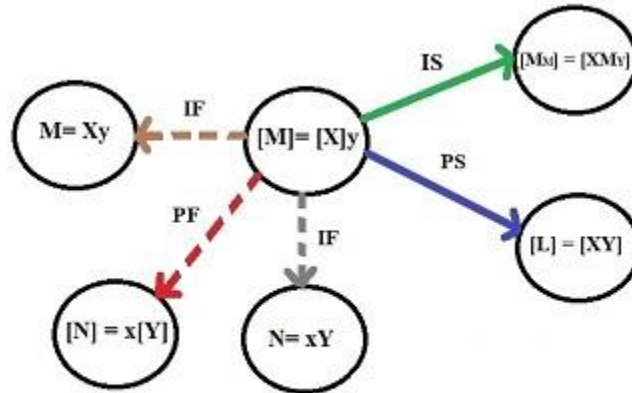


Figure 6 Imperfect market M under binding externality pressures and the ways to avoid collapse provides the structure of a full fix and of a partial fix

The continuous arrows in Figure 6 above indicate the two options available to save market M from collapse; and the broken arrows indicate that if the paradigm can be saved there will be no collapse; and therefore, there will be no paradigm flips to opposing views paradigms. The blue arrow in Figure 6 above shows the perfect shift(PS) from imperfect model [M] to a higher level imperfect model [L]; and the green arrow indicates the imperfect shift(IS) from model [M] to externality management model [M_M], which is addressed analytically below.

1) The perfect fix option

The blue arrow in Figure 6 above shows the full fix option, the perfect shift(PS) from imperfect market [M] = [X]y to imperfect market [L] = [XY], which is achieved by internalizing the externality cost of “y” in the pricing mechanism of imperfect market [M] so it perfectly shifts, a situation that can be expressed analytically as follows:

PS

$$[M] = [X]y \text{-----} \rightarrow [L] = [XY]$$

The expression above tells us that if “y-----→Y”, then imperfect model [M] will perfectly shift(PS) to imperfect model [L] as there are no longer externality gaps associated with the cost of externality “y”.

2) The partial fix option

The green arrow in Figure 6 above indicates the partial fix option, the imperfect shift(IS) from imperfect market [M] = [X]y to imperfect market [M_M] = [X M_Y], which is achieved by managing the externality cost of ‘y’ as “M_y” so that BSG_Y = y > M_Y, which sets externally the new pricing mechanism of the imperfect market [M] so it imperfectly shifts, a situation that can be expressed analytically as follows:

IS

$$[M] = [X]y \text{-----} \rightarrow [M_M] = [XM_Y]$$

The expression above tells us that if “ $y \text{-----} \rightarrow M_Y$ ”, then imperfect model [M] will imperfectly shift(IS) to imperfect model $[M_M]$, a market where still there is a remaining externality gap associated with externality “y” since $BSG_Y = y > M_Y$.

3) The role of paradigm shift knowledge gaps in terms of best saving option to implement

If there are no paradigm shift knowledge gaps, then whether to implement a full fix or a partial fix to save the paradigm may depend on politics and academic will, not on science. If there are no paradigm knowledge gaps then the best solution to save the dominant imperfect paradigm is the science based solution, which is the implementation of the full market fix through full externality cost internalization to induce a perfect shift. However, the science based solution may not be politically feasible so implementing a partial fix through externality management frameworks may be the politically feasible option as market prices can then be kept lower. But implementing a non-science based solution because it is more politically feasible requires the existence of willful academic blindness as when there are no paradigm shift knowledge gaps science leads to a full fix, not to a partial fix. For example, in 2012 the world was moving fast towards a world of green markets, green growth and green economies as that is the science based approach to address the environmental crisis as highlighted by the UNCSD 2012 conference(UNCSD 2012a; UNCSD 2012b), but soon after they decided to go instead the way of dwarf green markets, dwarf green growth and dwarf green economies as a non-science based approach was then more politically viable(Muñoz 2019b).

ii) The option of imperfect model [M] collapse when it cannot be saved from binding externality pressures

If an imperfect market is under binding externality pressures(BSG_Y) and there are paradigm shift knowledge gaps, the imperfect market cannot be saved, and this imperfect market will collapse. And hence, if the imperfect market cannot be saved, it will flip perfectly or imperfectly to opposite or inverse opposite forms, and if possible they will flip towards a market form that still allow them to keep the same legal and political loyalty they had before the flip. For example after the fall of red socialism in 1991 all former red socialism countries flipped back to capitalism(Muñoz 2019c); and in the case of China, it flipped towards controlled capitalism(an imperfect economy market) in order to maintain political power and keep the same legal and political loyalty structure it had before the fall as it took steps before 1991 and soon after to allow capitalism in through a controlled approach(Muñoz 2010). When the imperfect market model like model [M] cannot be saved it will flip as shown in Figure 7 below:

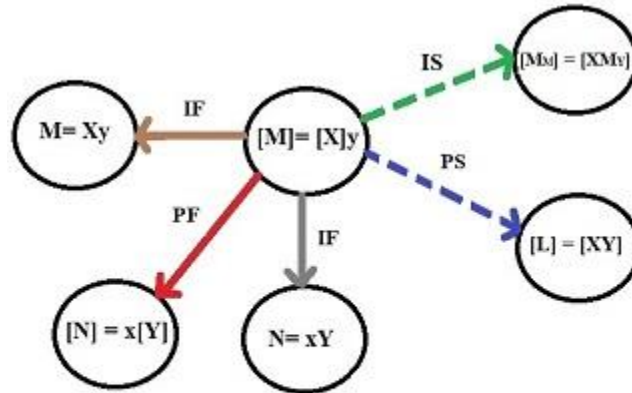


Figure 7 Imperfect paradigm M under binding externality pressures when it can not be saved and collapses provides the structure of all possible paradigm flip routes

The broken arrows in Figure 7 above tell us that imperfect paradigm [M] cannot be saved and that for this reason it has 3 paradigm evolution options: i) a perfect flip(PF) from imperfect market [M] to the inverse opposite imperfect market [N] as indicated by the red arrow; ii) an imperfect flip(IF) from imperfect market [M] to the inverse opposite perfect market N as indicated by the gray arrow; and iii) an imperfect flip(IF) from imperfect market [M] to perfect market M as indicated by the brown arrow. These paradigm flips are described in detailed below:

1) The imperfect flip to perfect market M

The flip from imperfect market [M] to perfect market M as indicated by the brown arrow can be stated as follows:

IF

$$[M] = [X]y \text{-----} \rightarrow M = Xy$$

Notice that when imperfect dominant component [X] goes perfectly to component X so that [X]---->X, then the imperfect model [M] flips to the perfect market M. It is a flip from an imperfect market or dictatorship market to the opposite perfect market.

2) The imperfect flip to perfect inverse opposite

The flip from imperfect market [M] to perfect inverse opposite market N can be written as follows:

IF

$$[M] = [X]y \text{-----} \rightarrow N = xY$$

Notice that when imperfect dominant component [X] goes to x so that $[X] \rightarrow x$ and when $y \rightarrow Y$, then imperfect model [M] flips to perfect market N. It is a flip from an imperfect market or a dictatorship based market to a perfect inverse opposite dominant component market.

3) The perfect flip from an imperfect market to the imperfect inverse opposite market

The flip from imperfect market [M] to imperfect inverse opposite market [N] can be indicated as follows:

PF

$$[M] = [X]y \rightarrow [N] = x[Y]$$

Notice that when imperfect dominant component [X] goes imperfectly to ‘x’ so that $[X] \rightarrow x$ and passive component ‘y’ goes to imperfectly dominant component [Y] so that $y \rightarrow [Y]$, then imperfect model [M] flips to imperfect market [N]. It is a flip from dictatorship based market to the inverse opposite dictatorship based market.

4) Political and legal loyalty structures and paradigm flips after collapse

After paradigm collapse, the political and legal loyalty under which imperfect market [M] operated flips to the political and legal loyalty structure under which the new paradigms operate. If stakeholders, take steps long before or just before the collapse to transition towards a preferred flip structure as indicated above in the case of China, they can flip to that paradigm structure. If they do not take transition steps, they will probably flip towards the perfect inverse opposite after paradigm collapse as former soviet bloc countries did when flipping back to capitalism since 1991.

4. FOOD FOR THOUGHTS

a) Is the red socialism market model of Karl Marx the imperfect inverse opposite of Adam Smith’s traditional market model? I think yes, what do you think?; b) Is the economic dictatorship model in China of today the perfect inverse opposite of Karl Marx’s red socialism model? I think yes, what do you think?; c) Is the economic dictatorship based market the opposite model of Adam Smith’s perfect market? I think yes, what do you think?

5. CONCLUSIONS

1) It was shown that under externality neutrality assumptions the imperfect market model has no limits for growth; 2) It was pointed out that the imperfect paradigm can be saved from collapse when under binding externality pressures, both through a full fix or a partial fix; 3) It was indicated that if there are no paradigm shift knowledge gaps, then the full fix is the science based solution, but it may be the less politically feasible option; 4) It was highlighted that implementing the non-science based solution or partial fix to save the imperfect paradigm because it is a more politically amenable option it requires the existence of willful academic blindness; 5) It was stressed that if the imperfect paradigm cannot be saved because of the existence of paradigm shift knowledge gaps it will collapse and flip to either the opposite model or to the perfect inverse opposite model or to the imperfect inverse opposite model; and 6) It was said that if actions are taken to transition to a preferred paradigm flip when approaching paradigm collapse in order to

maintain the same political and legal structure than before the flip this is possible as the case of China flipping from social authoritarianism to economic authoritarianism since 1991 shows.

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