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# Sustainability thought 164: How to link the general market structure-population dynamics-system stability framework to the concepts of optimal pricing, of distorted market pricing and of the most distorted market price?

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**Abstract:** The general market structure-population dynamics-system stability framework tells us that the nature of the market price determines the nature of the impact on system stability that consumption and production dynamics and population dynamics can have, via no overshoot or via overshoot. As the nature of the market price can be positive or negative in terms of system stability impacts depending on whether or not all cost associated with the business activity are reflected in the pricing mechanism, then positive impacts can be associated with full optimal market pricing where all cost associated with economic activity are accounted for, and negative impacts can be linked to distorted market pricing as not all cost associated with business activity are accounted for as some costs are assumed away or are assumed irrelevant. And hence, the most distorted market price possible would lead to the most distorted consumption, production, and population dynamics affecting system stability negatively at the extreme. In other words, optimal market pricing leads to positive system stability impacts dynamics in terms of consumption and production dynamics and population dynamics while distorted market pricing encourage negative system stability impacts in terms of production and consumption dynamics and population dynamics. And this raises relevant questions like How to link the general market structure-population dynamics-system stability framework to the concepts of optimal pricing, of distorted market pricing and of the most distorted market price? What are the main implications of doing this? Among the goals of this paper is to provide answers to the questions listed above.

**Keywords:** Market structure, market price, production, consumption, population dynamics, overshoot, no overshoot, system stability, climate change, responsible behavior, irresponsible behavior, optimal market price, distorted market price, optimal consumption, distorted consumption, optimal production, distorted production, optimal population, distorted population, optimal system stability impact, distorted system stability impact

## Introduction

### a) The general M-T-R framework

It has been pointed out recently that one way of looking at system stability issues like climate change or environmental problems in general is by means of the general market structure-population dynamics and system stability framework(M-T-R framework)(Muñoz 2022), as shown in Figure 1 below:

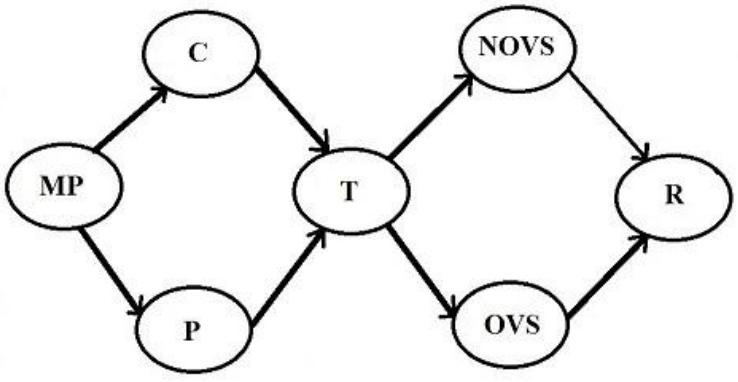


**Figure 1 The general market structure, population dynamics, and system stability framework (M-T-R framework)**

The following aspects can be highlighted based on Figure 1 above about the general system stability framework: i) market pricing(MP) is the root cause of impacts on system stability R, be it they positive or negative; ii) The nature of population dynamics(T) is the consequence of the nature of market price dynamics; iii) overshooting behavior(OVS) is associated only with irresponsible population behavior driven by irresponsible market structure dynamics; and iv) No overshooting behavior(NOVS) is linked to responsible

population behavior led by responsible market structure dynamics. Notice that the structure in Figure 1 above then points out the systematic nature of system stability issues R such as climate change, requiring a systematic policy response whether it is to promote system stability friendly market and population policies or to discourage system stability unfriendly trends.

**b) The general M-T-R framework and the full optimal market pricing and distorted market pricing idea**

The general market structure-population dynamics-system stability framework in Figure 1 above tells us that the nature of the market price determines the nature of the impact on system stability that consumption and production dynamics and population dynamics can have, via no overshoot or via overshoot. As the nature of the market price can be positive or negative in terms of system stability impacts depending on whether or not all cost associated with the business activity are reflected in the pricing mechanism, then positive impacts can be associated with full optimal market pricing where all cost associated with economic activity are accounted for, and negative impacts can be linked to distorted market pricing as not all cost associated with business activity are accounted for as some costs are assumed away or assumed irrelevant. In other words, optimal market pricing leads to positive system stability impacts dynamics in terms of consumption and production dynamics and population dynamics while distorted market pricing encourage negative system stability impacts in terms of production and consumption dynamics and population dynamics. Hence, we should expect that the most distorted market pricing framework would lead in the long haul to over consumption and over production and over population; and hence it would lead to extreme negative impacts of system stability through extreme overshoot. The idea to move towards more socially and environmentally friendly markets stressed by the Brundtland Commission in 1987(WCED 1987) and the idea of focusing only on environmentally friendly markets implemented by the United Nations Commission on Sustainable Development in 2012 Rio +20(UNCSD 2012a; UNCSD 2012b) are consistent with the idea of the need of market prices of positive nature like the optimal market pricing. It has been indicated that accounting for all costs associated to economic activity leads to responsible market activity as there is no cost externalization(Muñoz 2020) and that not accounting for some costs by assuming them away through externality cost neutrality assumptions like Adam Smith's traditional market did/does(Smith 1776) leads to distorted market prices(Muñoz 2010) and backward economic thinking(Muñoz 2012).

**c) The need to link the general system stability framework with optimal market pricing and distorted market pricing thinking**

Hence, the discussion above raises relevant questions like How to link the general market structure-population dynamics-system stability framework to the concepts of optimal pricing, of distorted market pricing and of the most distorted market price? What are the implications of doing this? Among the goals of this paper is to provide answers to the questions listed above.

**Goals of this paper**

a) To highlight the structure of the optimal market structure-optimal population dynamics-optimal system stability framework; b) to stress the structure of the distorted market structure-distorted population dynamics-distorted system stability framework; and c) to point out the structure of the most distorted market price framework possible and its implications.

## Methodology

First, the terminology, some operational concepts and merging rules are shared. Second, the optimal market structure, the optimal population dynamics, and the optimal system stability framework is extracted from the general market structure-population dynamics and system stability framework. Third, The distorted market structure, the distorted population dynamics, and the distorted system stability framework is derived from the general market structure-population dynamics and system stability framework. Fourth, The distorted market structure, the distorted population dynamics, and the distorted system stability framework is linked to the most distorted system stability framework. Fifth, the most distorted system stability framework is linked to the overpopulation and system stability framework a la ecological overshoot. And finally, some food for thoughts and relevant conclusions are provided.

**Terminology**

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|---|---|
| M = Market structure dynamics | T = Population dynamics |
| R = System stability | MP = Market price |
| C = Consumption | P = Production |

| | |
|---|---|
| OVS = Overshoot | NOVS = No overshoot |
| A = Dominant / active component | a = Dominated / passive component |
| M-R framework | T-R framework |
| M-T-R framework | TM = Traditional market price |
| OMP = Optimal market price | DMP = Distorted market price |
| MDMP = Worse distorted market price | OC = Optimal consumption |
| MDC = Most distorted consumption | OP = Optimal production |
| DP = Distorted production | MDP = Most distorted production |
| OT = Optimal population dynamics | DT = Distorted population dynamics |
| MDT = Most distorted population dynamics | OR = Optimal system stability |
| DR = Distorted system stability | MDR = most distorted system stability |
| EP = Environmental problems | OVC = Overconsumption |
| OVP = Over production | OVT = Over population |
| OM-OT-OR framework | DM-DT-DR framework |
| DC = Distorted consumption | MDM-MDT-MDR framework |

OVT-R = Overpopulation and system stability a la ecological overshoot framework

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**Operational concepts and merging rules**

**i) Operational concepts**

**1) Responsible market price,** a *price that reflects all the cost of production*
**2) Irresponsible market price,** *a price that does not reflect all the cost of production*
**3) Responsible population behavior,** *one that lives under the carrying capacity of the system so it does not overshoot*
**4) Irresponsible population behavior,** *one that goes over the carrying capacity of the system so it overshoots.*
**5) Responsible production,** *the one driven by a responsible market price*
**6) Irresponsible production,** *the one led by an irresponsible market price*
**7) Responsible consumption,** *the one driven by a responsible market price*
**8) Irresponsible consumption,** *the one led by an irresponsible market price*
**9) Right market price,** *a responsible market price*
**10) Distorted market price,** *an irresponsible market price*
**11) Wrong market price,** *a distorted market price*
**12) Right production,** *a responsible production level*
**13) Wrong productio**n*, an irresponsible production level*
**14) Right consumption,** *a responsible consumption level*
**15) Wrong consumption,** *an irresponsible consumption level*
**16) Right population,** *a responsible population*
**17) Wrong population,** *an irresponsible population*
**18) Right system stability impact,** *a responsible stability impact*
**19) Wrong system stability impact,** *an irresponsible stability impact*
**20) Optimal price,** *a right market price*
**21) Non-optimal market price,** *a wrong market price*
**22)Best market price,** *an optimal market price*
**23)Worse market price,** *the worse wrong market price*
**24) Most distorted market price,** *the most irresponsible market price*
**25) Optimal consumption,** *the right consumption level*
**26) Distorted consumption,** *the wrong consumption level*
**27) Most distorted consumption,** *the worse consumption level*
**28) Optimal production,** *the right production level*
**29) Distorted production,** *the wrong production level*
**30) Most distorted production,** *the worse production level*
**31) Optimal population,** *the right population level*
**32) Distorted population,** *the wrong population level*
**33) Most distorted population,** *the worse population level*
**34) Optimal system stability impact,** *the most responsible system stability impact*
**35) Distorted system stability impact,** *an irresponsible system stability impact*
**36) Most distorted system stability,** *the most irresponsible system stability impact*

**ii) Merging rules**

***a) The case of frameworks***

Let's assume we have a stability system with 4 components A, B. C and D and 4 different frameworks: F1 = A-D, F2 = B-D, F3 = C-D, and F4 = A-B-D, where D is the stability issue and the other components are the root causes and/or consequences, then the following merging rules hold:

**1) F1-F2 = (A-D)(B-D) = A-B-D as DD = D**
**2) F1-F3 = (A-D)(C-D) = A-C-D as DD = D**
**3) F2-F3 = (B-D)(C-D) = B-C-D as DD = D**
**4) F1.F4 = (A-D)(A-B-D) = A-B-D as AA = A and DD = D**
**5) F2-F4 = (B-D)(A-B-D) = A-B-D as BB = B and DD = D**
**6) F3.F4 = (C-D)(A-B-D) = A-B-C-D since DD = D**

***b) The case of dominant component based systems***

Let's assume we have a development model with 3 components A, B. and C; and we have 4 possible dominant component based models: M1 = A, M2 = B, M3 = C, and M4 = BC, then the following merging rules hold:

**1) M1.M2 = (A)(B) = AB**
**2) M1.M3 = (A)(C) = AC**
**3) M1.M4 = (A)(BC) = ABC**
**4) M2.M3 = (B)(C) = BC**
**5) M2.M4 = (B)(BC) = BC**

***c) The case of dominant and dominated component based systems***

Let's assume we have a development model with 3 components A, B. and C; and we have 4 possible dominant and dominated components based models: M1 = Abc, M2 = aBc, M3 = abC, and M4 = aBC, then the following merging rules hold:

**1) M1.M2 = (Abc)(aBc) = ABc**
**2) M1.M3 = (Abc)(abC) = AbC**
**3) M1.M4 = (Abc)(aBC) = ABC**
**4) M2.M3 = (aBc)(abC) = aBC**
**5) M2.M4 = (aBb)(aBC) = aBC**

**The optimal market structure, the optimal population dynamics, and the optimal system stability framework**

If the nature of the market price MP in Figure 1 of the introduction is that of the full optimal market price OMP, a price that accounts for all costs associated with the business activity, then the general framework in Figure 1 above becomes the optimal market structure, optimal population dynamics, and optimal system stability framework (OM-OT-OR framework) since there is no overshoot(NOVS) as indicated in Figure 2 below:

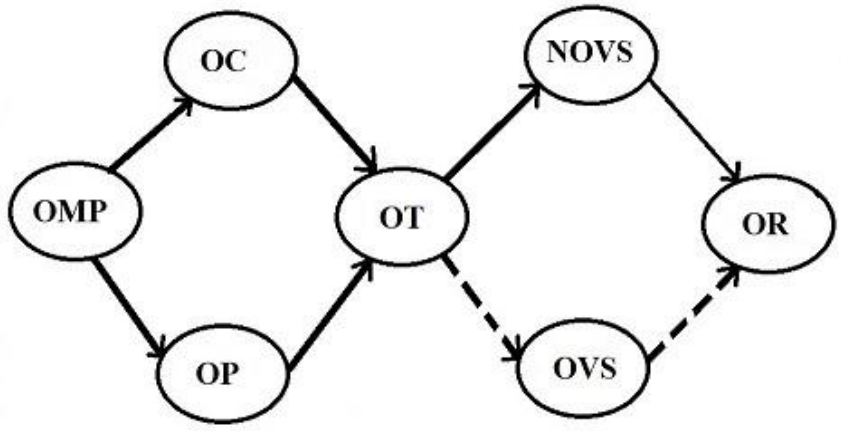


Figure 2 The optimal market structure, the optimal population dynamics, and the optimal system stability framework(OM-OT-OR framework)

Noticed in Figure 2 above that the optimal market price OMP has a positive system stability impact on consumption, production, and population dynamics, which leads to no overshooting behavior(NOVS); and

therefore, to optimal system stability(OR) as indicated by the continuous arrow from NOVS to OR. You can see that in the optimal system stability framework the root cause of positive system stability impacts OR is the optimal market price OMP while optimal consumption OC, optimal production OP, and optimal population dynamics OT are consequences of the positive stability impact exerted by the optimal market price OMP. Moreover, you can see based on Figure 2 above that the optimal nature of the market structure(OMP, OC, OP) shapes the optimal nature of population dynamics(OT). Hence, the framework in Figure 2 above is the optimal market structure, optimal population dynamics, and optimal system stability framework(OM-OT-OR framework).

**Expectation 1:**

***If there is full optimal market pricing there will be optimal system stability conditions as there will be no overshooting behavior*.**

**The distorted market structure, the distorted population dynamics, and the distorted system stability framework**

If the nature of the market price MP in Figure 1 of the introduction is that of a distorted market price DMP, a price that does not account for all costs associated with the business activity, then the general framework in Figure 1 above becomes the distorted market structure, distorted population dynamics, and distorted system stability framework (DM-DT-DR framework) since now there is overshoot(OVS) as summarized in Figure 3 below:

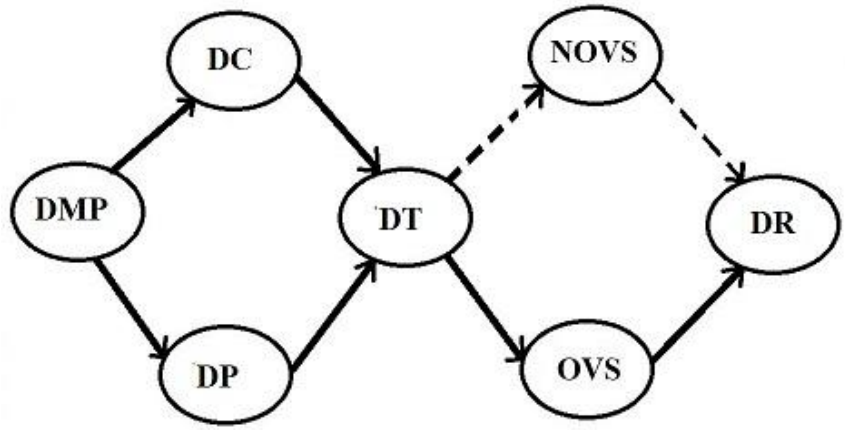


**Figure 3 The distorted market structure-distorted population dynamics-distorted system stability framework(DM-DT-DR framework)**

We can appreciate based on Figure 3 above that the distorted market price DMP has a negative system stability impact on consumption, production, and population dynamics, which leads to overshooting behavior; and hence, to distorted system stability conditions as indicated by the continuous arrow from OVS to DR. You can see that in the distorted system stability framework the root cause of negative system stability impacts DR is the distorted market price DMP while distorted consumption DC, distorted production DP, and distorted population dynamics DT are consequences of the negative stability impact exerted by the distorted market price DMP. Moreover, you can appreciate based on Figure 3 above that the distorted nature of the market structure(DMP, DC, DP) shapes the distorted nature of population dynamics(DT). Therefore, the framework in Figure 3 above is the distorted market structure, distorted population dynamics, and distorted system stability framework(DM-DT-DR framework).

**Expectation 2:**

***If there is distorted market pricing there will be distorted system stability conditions as there will be overshooting behavior driven by distorted population behavior*.**

**The most distorted market structure-most distorted population dynamics-most distorted system stability framework**

If the nature of the distorted market price DMP in Figure 3 above is that of the most distorted market price MDMP, the distorted price that maximizes cost externalization, then the framework in Figure 3 above becomes the most distorted market structure, the most distorted population dynamics, and the most distorted

system stability framework(MDM-MDT-MDR framework) as overshooting now is extreme(EOVS) as stated in Figure 4 below:

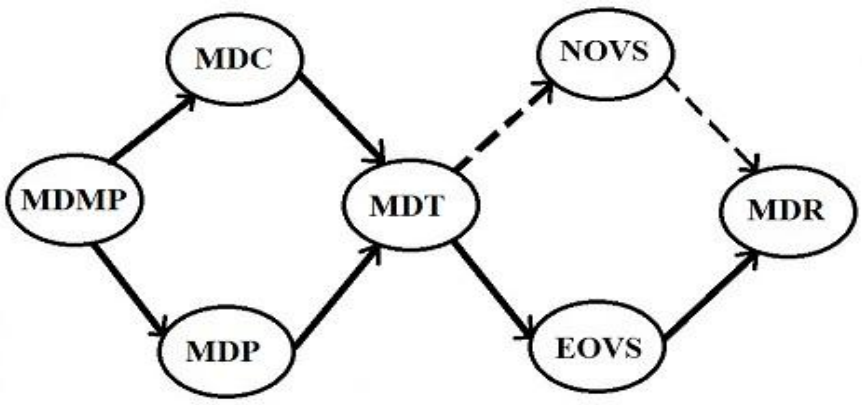


**Figure 4 The most distorted market structure-the most distorted population dynamics and the most distorted system stability framework(MDM-MDT-MDR framework)**

We can notice based on Figure 4 above that the most distorted market price MDMP has the most distorted system stability impact on consumption, production, and population dynamics, which leads to extreme overshooting behavior(EOVS); and hence, to the most distorted system stability conditions MDR as indicated by the continuous arrow from EOVS to MDR. You can appreciate now that in the most distorted system stability framework the root cause of the most distorted system stability impacts MDR is the most distorted market price MDMP while the most distorted consumption MDC, the most distorted production MDP, and the most distorted population dynamics MDT are consequences of the most distorted stability impact exerted by the most distorted market price MDMP. Moreover, you can also notice based on Figure 4 above that the most distorted nature of the market structure(MDMP, MDC, MDP) shapes the most distorted nature of population dynamics(MDT).

**Expectation 3:**

***If the most distorted market price among the distorted market prices possible is in place the most distorted system stability conditions will come to exist as there will be extreme overshooting behavior driven by the most distorted population behavior.***

**Linking the most distorted market price possible framework to the overpopulation and system stability framework a la ecological overshoot**

Since the ecological overshoot idea(EOVS) is based on overpopulation(OVT) as the driver of environmental problems(EP)(Rees 2022); and we know that the most distorted consumption(MDC) and most distorted production(MDP) patterns are overconsumption(OVC) and over production(OVP), which means that the most distorted market price possible MDMP will encourage in the long term over consumption(OVC) and over production(OVP). So if we make MDC = OVC, MDP = OVP, MDT = OVT, EOVS = EOVS, and MDR = EP in Figure 4 above, we arrived at the framework in Figure 5 below:

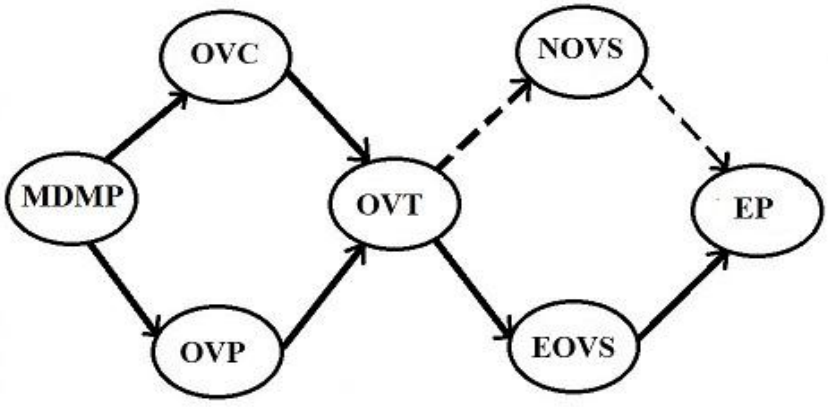


**Figure 5 Linking the most distorted market price structure(MDMP) to over population dynamics(OVT) and environmental problem(EP) a la ecological overshoot**

Figure 5 above shows a link between market structure dynamics and the ecological overshoot idea, where the right side from OVT to EP is the overpopulation and environmental problems a la ecological overshoot idea; and the left part from MDMP to OVT is the most distorted market structure idea that leads to the most distorted population dynamics a la overpopulation. Notice that in the most distorted system stability framework as in Figure 5 above, the root cause of environmental problems EP is the most distorted market price MDMP as the most distorted market structure possible(MDMP, OVC, OVP) leads population dynamics towards overpopulation(OVT) and to extreme overshoot(EOVS). Now if we assume that market structures, optimal or distorted, do not matter, then the ecological overshoot idea works, where the root cause of environmental problems would be then overpopulation dynamics.

**Expectation 4:**

***If the most distorted market price among the distorted market prices possible is in place the most distorted system stability conditions will come to exist as in the long term overpopulation dynamics will materialize as the most distorted population dynamics possible, which will lead to environmental problems through extreme overshooting behavior.***

**Food for thoughts**

a) Should we expect overshooting under distorted market pricing? I think yes, what do you think?;
b) Should we expect no overshooting behavior under optimal market pricing? I think Yes, what do you think?; and
c) Can a system stability issue be solved without fixing distorted market prices? I think No, what do you think?

## Conclusions

First, it was indicated that if there is optimal market pricing, then the general M-T-R framework becomes the optimal system stability framework(OM-OT-OR), where the root cause of optimal system stability conditions is the optimal market price. Second, it was highlighted that if there is distorted market pricing, then the general M-T-R framework becomes the distorted system stability framework(DM-DT-DR), where the root cause of distorted system stability conditions is the distorted market price. Third, it was pointed out that if the is the distorted market pricing was the most distorted market price possible idea, then the distorted DM-DT-DR framework becomes the most distorted system stability framework (MDM-MDT-MDR), where the root cause of the most distorted system stability conditions is the most distorted market price. Fourth, it was mentioned that we can link the most distorted system stability framework with the ecological overshoot idea if we link the most distorted consumption to overconsumption, most distorted production to over production, most distorted population dynamics to over population dynamics, overshoot to extreme overshoot and the most distorted system stability to environmental problems. And fifth, it was stated that if market structure matters, then the nature of the population dynamics is shaped by the nature of the market price structure, but if markets do not matter then the ecological overshoot idea works as then overpopulation dynamics are the root cause of environmental problems.

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