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Sustainability thoughts 144: Linking sustainability line theory and supply and demand theory to point out the nature of sustainability problems and of unsustainability market zones separating sustainability and unsustainability-based markets

By

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Abstract

Sustainability line theory in terms of markets tells us that market sustainability varies from 0 to 1 or from full unsustainability markets to full sustainability markets and that each market located on the sustainability line has a supply and demand configuration that goes with it. This sustainability line idea in terms of market thinking can be expanded step by step to show the following in terms of supply and demand theory: i) The location of full unsustainability markets and of full sustainability markets; ii) The possible contractions and expansions of sustainability markets; iii) The possible contractions and expansions of unsustainability markets; iv) The nature of the sustainability problem separating full sustainability markets and full unsustainability markets; v) The nature of the unsustainability market zone separating full sustainability markets and full unsustainability markets; and vi) The expected expansion of unsustainability markets and of full sustainability markets once they are in place. The overall goal of this paper is to described how this step-by-step expansion of the sustainability line idea in terms of supply and demand theory works as well as to highlight the relevant implications at each step.

Key concepts

Sustainability markets, Unsustainability markets, Sustainability problem, Unsustainability market zone, Optimal market, non-optimal market, Golden paradigm, Flawed paradigm, Market expansion, Market contraction, Optimization, Maximization

Introduction

a) The boundaries of the sustainability line based on paradigm evolution theory

The boundaries of unsustainability paradigms (UNS) and of sustainability paradigms on the sustainability line have been recently described (Muñoz 2024), as summarized in Figure 1 below:

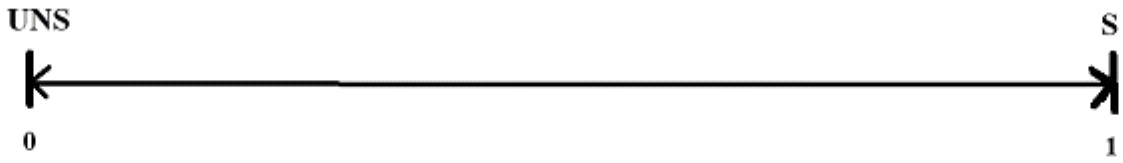

Figure 1 The location of full unsustainability paradigms(UNS) and of full sustainability paradigms(S)

Figure 1 above highlights the boundaries on the sustainability line, to the right we have the location of full sustainability paradigms(S) and to the left we have the location of full unsustainability paradigms (UNS) as sustainability varies from 0 to 1.

b) The boundaries of the sustainability line based on market evolution theory

The boundaries on the sustainability line in terms of market thinking or supply and demand thinking can be established by making the full unsustainability paradigm equal to the full unsustainability market (UNS = UNSM) and transforming the full sustainability paradigm into the full sustainability market (S = SOM), leading to the environment described in Figure 2 below:

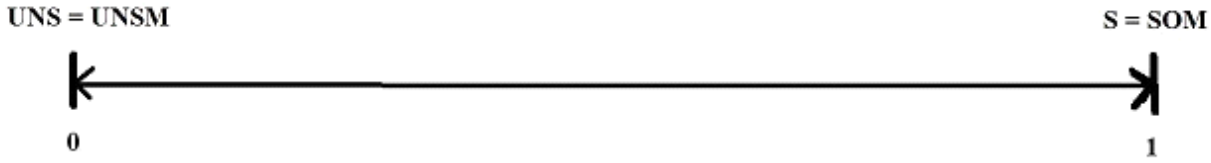

Figure 2 The location of full unsusstainability markets(UNS = UNSM) and of full sustainability markets(S = SOM)

Figure 2 above describes the boundaries on the sustainability line in terms of markets, to the right we have the location of full sustainability markets (S = SOM) and to the left we have the location of full unsustainability markets (UNS = UNSM) as market sustainability varies from 0 to 1.

Looking closely to the Figure 2 above we can highlight the following to expand the link between sustainability line thinking and market evolution thinking. From left to right on Figure 2 above, we have the sustainability market right gram, telling us that sustainability markets (Si = SOMi) vary from zero to one, meaning that there can be full unsustainability markets (Si = SOMi = 0), partial sustainability markets (0 < Si = SOMi <1), and full sustainability markets (Si

= SOMi = 1). From right to left on Figure 2 above, we have the unsustainability market left gram, indicating that unsustainability markets (UNSi = UNSMi) vary from one to zero, meaning that there can be no unsustainability markets at all (UNSi = UNSMi = 1), partial unsustainability markets (0 < UNSi = UNSMi < 1), and full unsustainability markets (UNSi = UNSMi = 0). Hence, either way we look we can appreciate that sustainability markets vary from 0 to 1 as Si = SOMi = 0 = UNSi = UNSMi means no sustainability markets at all and Si = SOMi = 1 = UNSi = UNSMi means full sustainability markets.

c) Linking the sustainability line idea in terms of markets to supply and demand theory

We can appreciate that the interception point where sustainability markets(Si = SOMi) and unsustainability markets(UNSi = UNSMi) are located on the sustainability line are points of supply and demand interceptions where the sustainability line becomes the market demand curve and the vertical line perpendicular to the sustainability line is the supply curve, for example at the full unsustainability market location(UNS = UNSM) is the point where the unsustainability market supply meets the demand(UNSS = UNSMS = D) while the full sustainability market location(S = SOM) is the point where the sustainability market supply meets the demand(SS = SOMS = D). In other words, any sustainability market Si = SOMi and any unsustainability market Si = UNSMi on the sustainability line has a supply and demand configuration unique to it.

Sustainability line ideas like the one above have has been applied to advance paradigm evolution ideas in terms of markets (Muñoz 2019) through the use of sustainability inverse gram and sustainability gaps-based thinking; and it has been utilized to provide new ways of looking at pareto optimality ideas (Muñoz 2021) with the help of sustainability right grams and left grams and cost externalization and cost internalization ideas. And the goal of sharing these ideas has been to provide an outside the box view on the nature of sustainability problems linked with Adam Smith's traditional market model(Smith 1776) as for example the socio-environmental sustainability problems the Brundtland Commission identified in 1987(WCED 1987) or the environmental sustainability problems the United Nations Commission on Sustainable Development attempted to solve in 2012 Rio + 20(UNCSD 2012a; UNCSD 2012b); and to link this knowledge to possible outside the box solutions to these sustainability problems using sustainability thinking.

d) Expanding the sustainability line idea in terms of market evolution theory and supply and demand theory

As indicated above sustainability line theory in terms of markets tells us that market sustainability varies from 0 to 1 or from full unsustainability markets to full sustainability markets and that each market located on the sustainability line has a supply and demand configuration that goes with it. This sustainability line idea in terms of market thinking can be expanded step by step to show the following in terms of supply and demand theory: i) The

location of full unsustainability markets and of full sustainability markets; ii) The possible contractions and expansions of sustainability markets; iii) The possible contractions and expansions of unsustainability markets; iv) The nature of the sustainability problem separating full sustainability markets and full unsustainability markets; v) The nature of the unsustainability market zone separating full sustainability markets and full unsustainability markets; and vi) The expected expansion of unsustainability markets and of full sustainability markets once they are in place. The overall goal of this paper is to described how this step-by-step expansion of the sustainability line idea in terms of supply and demand theory works as well as to highlight the relevant implications at each step.

Goals of this paper

a) To use sustainability line theory in terms of markets to place full sustainability markets and full unsustainability markets as its boundaries; b) To use the sustainability line structure in terms of markets above to show how each of those markets can expand or contract; c) To use the sustainability line structure in terms of markets above to point out where the sustainability problems and the unsustainability market zone are located; and d) To use the sustainability line structure in terms of markets above to indicate how full sustainability markets and unsustainability markets are expected to expand once they are in place.

Methodology

First, the terminology and operational concepts relevant to this paper are given. Second, sustainability line theory in terms of market supply and demand theory is used to place full sustainability markets and full unsustainability markets as its boundaries and the main implications of doing this are shared. Third, the sustainability line structure in terms of market supply and demand theory given above is adapted to point out how sustainability markets can expand or contract and the main implications of doing this are highlighted. Fourth, the sustainability line structure in terms of market supply and demand theory given above is used to indicate how unsustainability markets can expand or contract and the main implications of doing this are listed. Fifth, the sustainability line structure in terms of market supply and demand above is utilized to stress where the sustainability problems are located and the main implications of this location are highlighted. Seventh, the sustainability line structure in terms of market supply and demand theory above is used to indicate where the unsustainability market zone is located and the main implications of this location are pointed out. Eight, the sustainability line structure in terms of market supply and demand given above is adapted to stress how full sustainability markets and unsustainability markets are expected to expand once in place and the main implications of the way they expand are exalted. And finally, ninth, some food for thoughts and relevant conclusions are given.

Terminology

S = SOM = Sustainability market Si = SOMi = Sustainability market "i"

P = Price D = Demand

UNS = UNSM = Unsustainability market UNSi = UNSMi = Unsustainability market "i"

SOP = Sustainability problem SOPi = Sustainability problem "i"

UNSMZ = Unsustainability market zone EXP = Expansion

EXPi = Expansion "i" CON= Contraction

CONi = Contraction "i" GOP = Golden paradigm

FLP = Flawed paradigm Ai = Abnormality "i"

Operational concepts

1) Full sustainability market, the one where there is no externality cost externalization.

2) Partial sustainability market, the one where there is partial cost externalization.

3) Full unsustainability market, the one where there is full cost externalization.

4) Sustainability problem, the gap created when unsustainability-based markets are placed below full sustainability markets.

5) Unsustainability market zone, the gap that separate full unsustainability markets from full sustainability markets.

6) Golden market, a full sustainability market.

7) Flawed market, any market placed on any point on the unsustainable market zone.

8) Optimal market, a golden market.

9) Non-optimal market, a flawed market.

10) Optimal market expansion trend, the tendency that full sustainability markets have to produce at the lowest optimal market price possible to maximize sustainability market-based profits.

11) Non-optimal market expansion trend, the tendency that unsustainability markets have to produce at the lowest non-optimal market price possible to maximize unsustainability market-based profits.

The location of full unsustainability markets and of full sustainability markets in terms of supply and demand theory

If we place the market boundaries on the sustainability line given in Figure 2 of the introduction in terms of supply and demand theory, we reach the situation shared in Figure 3 below:

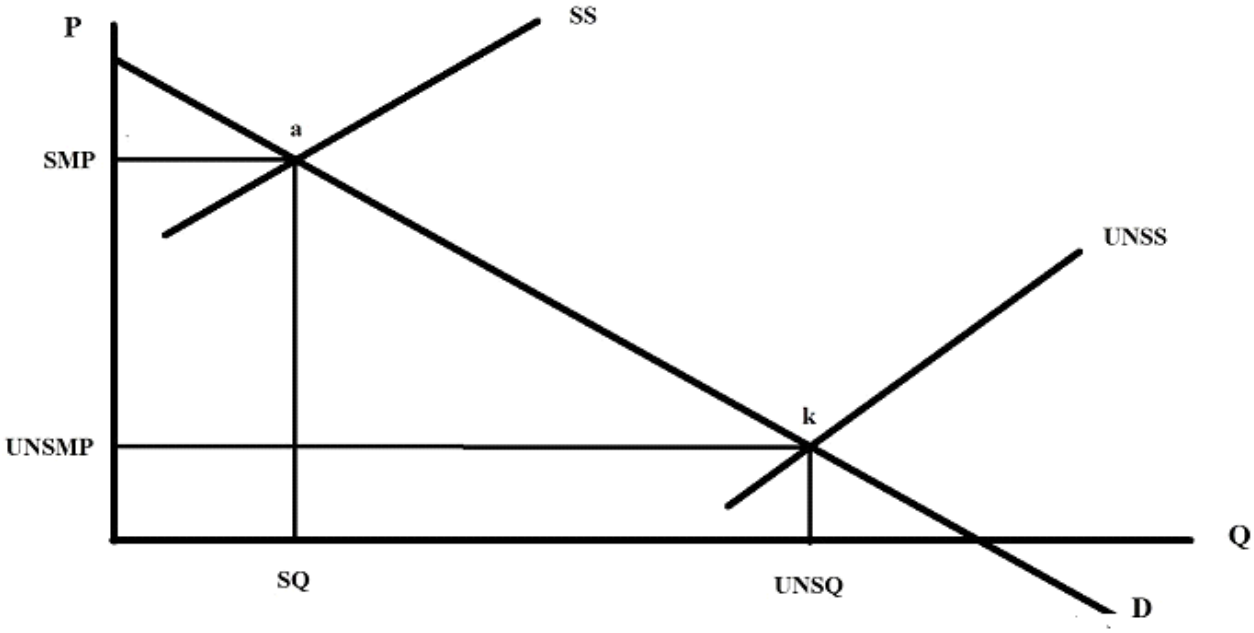

Figure 3 The full sustainability market(S = SOM) and the full unsustainability market(UNS = UNSM) in terms of supply and demand theory

Figure 3 above simply gives the boundaries on the sustainability line in terms of market supply and demand theory. At point "a" there is a full sustainability market where sustainability supply and demand meet (SS = D), with price SMP; and quantity consumed SQ; and at point "k" there is a full unsustainability market where unsustainability supply and demand meet (UNSS =D) with price UNSMP and quantity consumed UNSQ. Notice that supply and demand theory, if you compare the information in Figure 2 above with that of Figure 3 above, works in reverse as general sustainability line theory does; and the interceptions of supply and demand in Figure 3 above are given by the location of full sustainability markets and full unsustainability markets on the general sustainability line in Figure 2.

Implications:

The boundaries on the sustainability line in terms of market supply and demand theory are full sustainability markets (S = SOM) and full unsustainability markets (UNS = UNSM). Hence, a move away from full unsustainability markets is a move closer to full sustainability markets; and any move away from full sustainability markets is a move closer to full unsustainability markets. In other words, the level of sustainability a market has depends on whether it is closer to full unsustainability markets or closer to full sustainability markets. Notice, based on Figure 3 above, the full unsustainability market point(UNS = UNSM) indicates limits to unsustainability market growth.

The possible contractions and expansions of full sustainability markets in terms of supply and demand theory

Full sustainability markets (S = SOM) are optimal markets so they can expand (EXP) or contract (CON) as needed in an optimal market fashion as indicated in Figure 4 below:

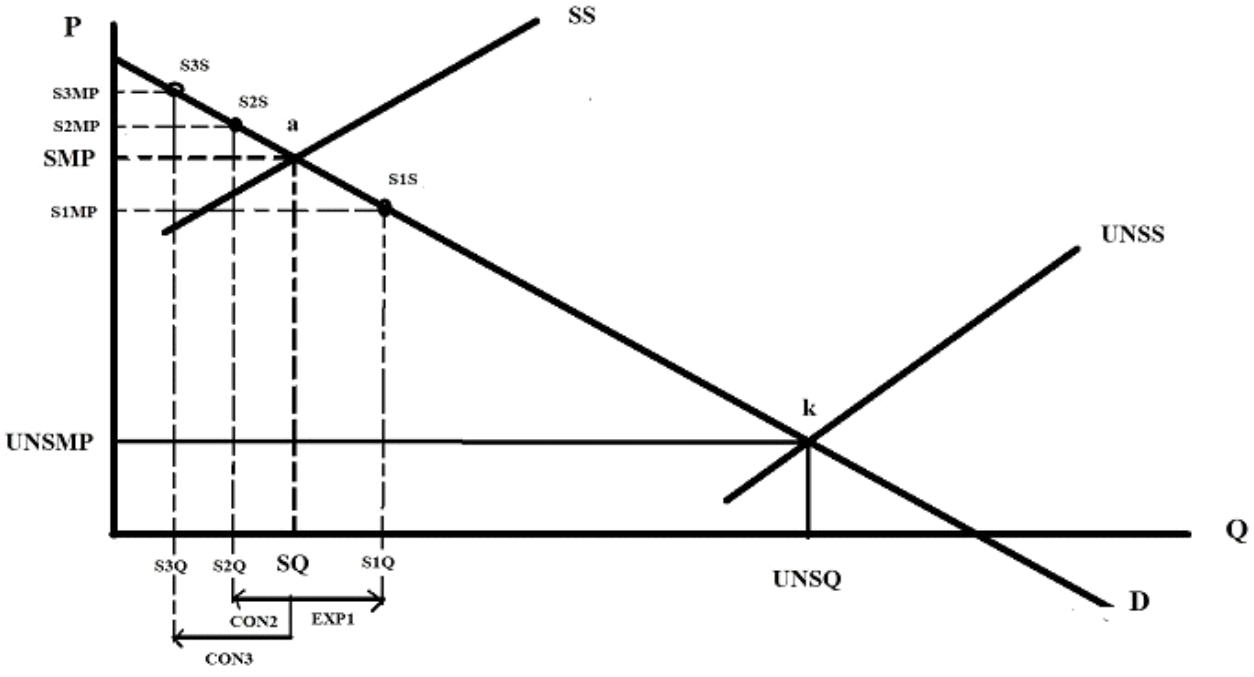

Figure 4 Expansions and contractions in full sustainanility markets(S = SOM)

Figure 4 above tells us i) how full sustainability markets(S = SOM) can contract optimally as needed as the contraction from S = SOM to S2 = SOM2 (CON2) and contraction from S = SOM to S3 = SOM3 (CON3) indicate; and ii) how full sustainability markets(S = SOM) can expand optimally as needed as the move from S = SOM to S1 = SOM1 (EXP1)

indicates, as in all cases market optimality maintains full sustainability intact as represented by the 1 below S1 = SOM1, S = SOM, S2 = SOM2, and S3 = SOM3.

Implications:

Full market sustainability is maintained when optimal contractions and optimal expansions take place, and therefore, full sustainability markets can expand or contract optimally as needed.

The possible contractions and expansions of unsustainability markets in terms of supply and demand theory

Unsustainability markets (UNSi = UNSMi) are non-optimal markets so they cannot expand (EXP) forever as there is a limit to growth at point "k" at full unsustainability, but they can contract, and the more they contract the closer they are to full sustainability markets (S = SOM) a situation described in Figure 5 below:

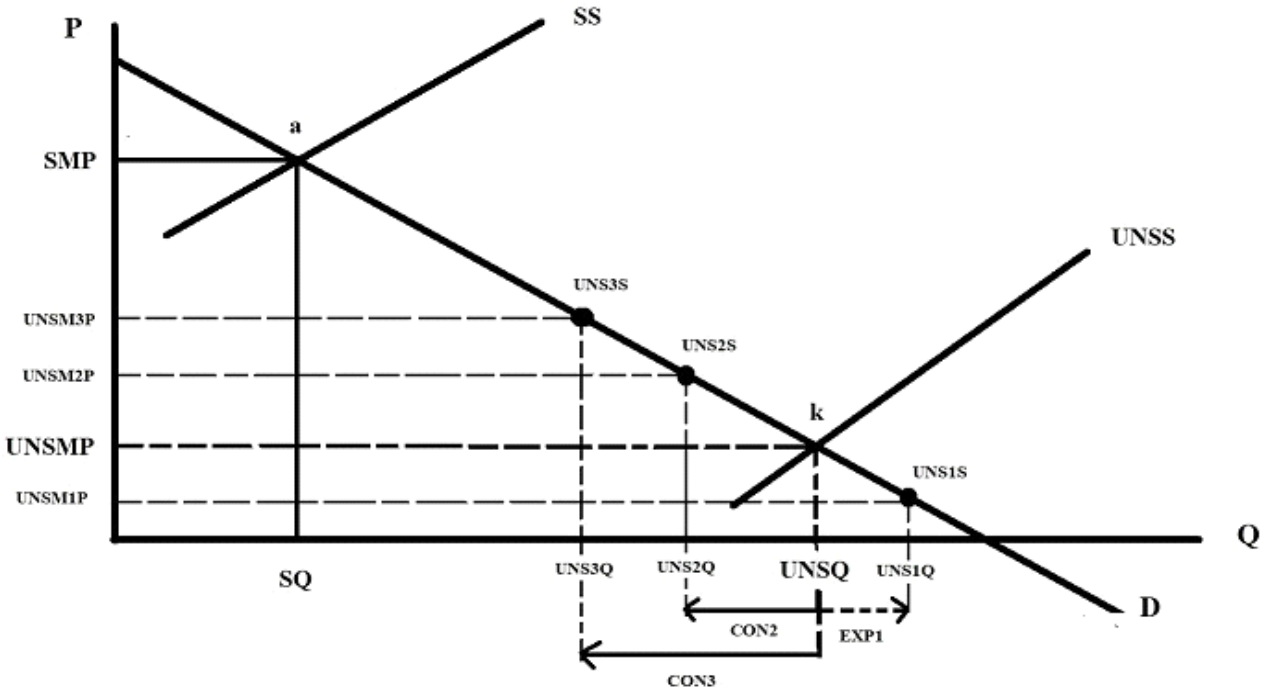

Figure 5 Expansions and contractions of full unsustainability markets(UNS = UNSM)

We can observe the following aspects based on Figure 5 above: i) Unsustainability markets cannot expand beyond full unsustainability markets(UNS = UNSM) at point "k" as the broken arrow indicating the expansion EXP1 from UNS = UNSM to UNS1 = UNSM1 tells us; ii) Unsustainability market can be contracted as needed as the contraction CON1 from UNS = UNSM to UNS2 = UNSM2 and the contraction CON2 from UNS = UNSM to UNS3 = UNSM3

demonstrate; iii) The contraction UNS3 = UNSM3 is more sustainable than the contraction UNS2 = UNSM2 as it is closer to full sustainability markets(S = SOM); and iv) The contraction UNS2 = UNSM2 is more unsustainable than contraction UNS3 = UNSM3 as it is closer to full unsustainability markets.

Implications:

Unsustainability markets cannot expand beyond full unsustainability markets; and the larger the contraction that unsustainability markets have the closer to full sustainability markets they are.

The nature of the sustainability problem separating full sustainability markets and full unsustainability markets in terms of supply and demand

The gap between unsustainability markets and full sustainability markets (S = SOM) represents the sustainability problem (SOP) associated with the working of unsustainability markets (UNSi = UNSMi), a situation indicated by the blue arrows moving from right to left in Figure 6 below:

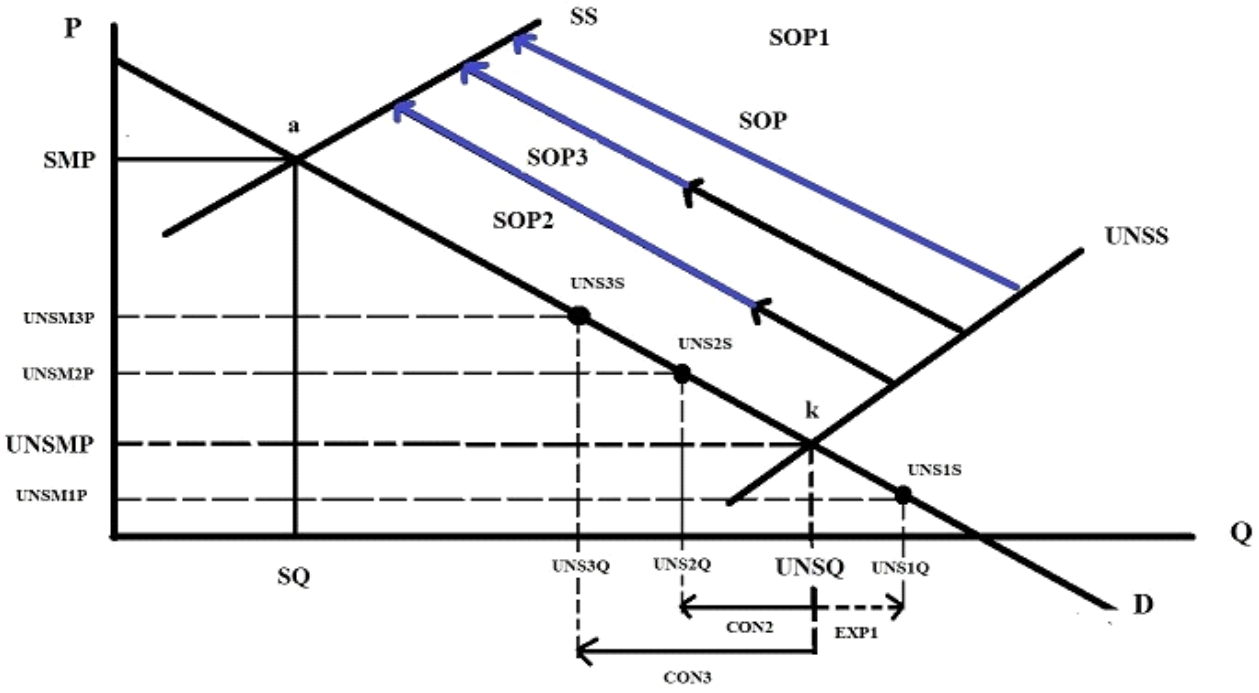

Figure 6 The sustainability problem(SOP) separating unsustainability markets(UNS = UNSM) from sustainability markets(S = SOM)

We can extract the following relevant information based on Figure 6 above: i) There is a sustainability problem(SOP) separating full unsustainability markets(UNS = UNSM) from full sustainability markets(S = SOM) as shown by the blue arrow from right to left from UNS =

UNSM to S = SOM; ii) There is a sustainability problem(SOP2) separating partial unsustainability market 2(UNS2 = UNSM2) from full sustainability market(S = SOM) as indicated by the blue arrow from right to left from UNS2 = UNSM2 to S = SOM; iii) There is a sustainability problem(SOP3) separating partial unsustainability market 3(UNS3 = UNSM3) from full sustainability market(S = SOM) as represented by the blue arrow from right to left from UNS3 = UNSM3 to S = SOM; and iv) The bigger the contraction of unsustainability markets the smaller the sustainability problem separating them from full sustainability markets(S = SOM) as in the case of UNS2 = UNSM2 and UNS3 = UNSM2 we can see that unsustainability market UNS2 = UNSM2 has a larger sustainability problem than unsustainability market UNS3 = UNSM3 does since SOP3 < SOP2 as indicated by the lengths of their respective blue arrows.

Implications:

There is a sustainability problem separating unsustainability-based markets from full sustainability markets; and the sustainability problem associated with full unsustainability markets is bigger than the sustainability problem associated with any of its contractions since the closer the contractions are to full sustainability markets the less unsustainable they are.

The nature of the unsustainability market zone separating full sustainability and full unsustainability markets

The unsustainability market zone (UNSMZ) captures non-optimal markets that can be found below full sustainability markets (S = SOM) as indicated by the brown arrow from left to right going from S = SOM to UNS = UNSM, as highlighted in Figure 7 below:

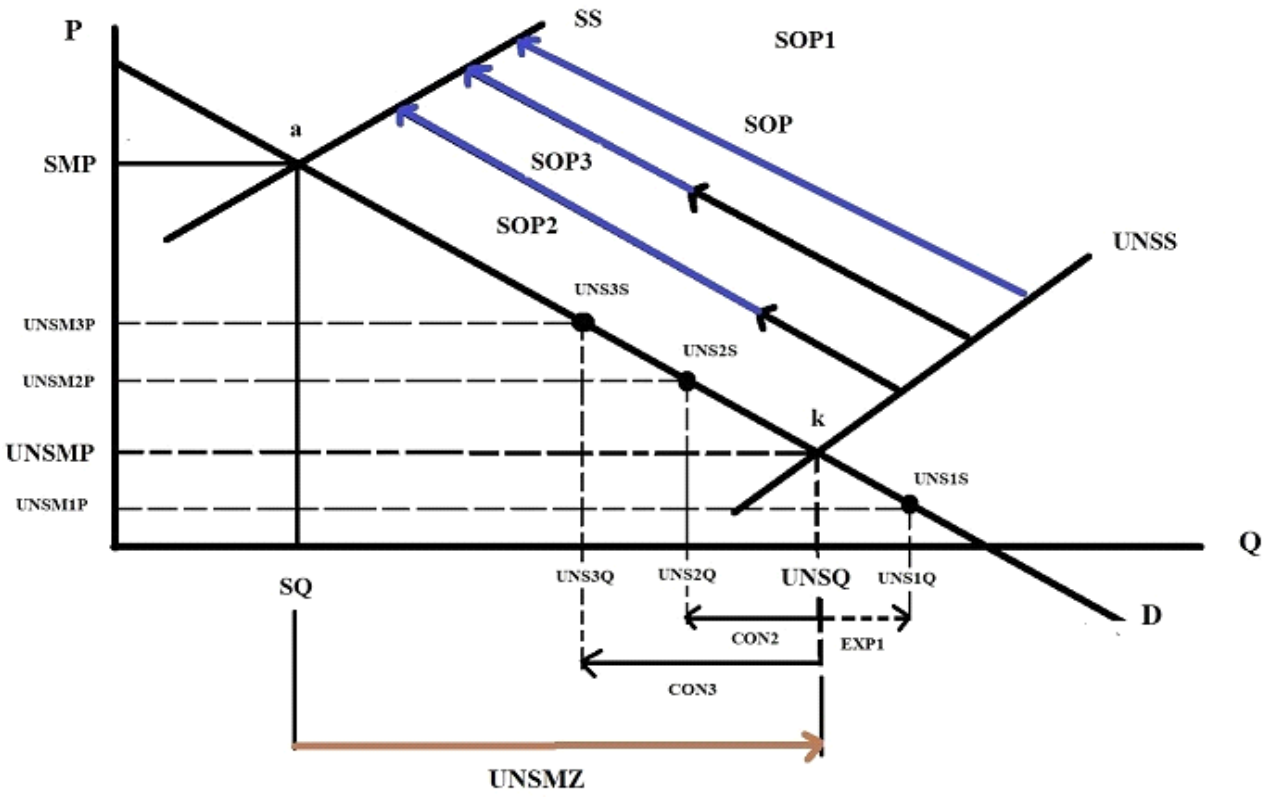

Figure 7 The unsustainability market zone(UNSMZ) separating full unsustainability markets(UNS = UNSM) from full sustainability markets(S = SOM)

Hence, based on Figure 7 above the unsustainability market zone (UNSMZ) goes from point "a" to point "k". We can also appreciate directly from Figure 7 above that markets UNS = UNSM, UNS2 = UNSM2, and UNS3 = UNSM3 are within the unsustainability market zone (UNSMZ); and hence, they are non-optimal markets that in terms of unsustainability markets can be ranked as UNS = UNSM > UNS2 = UNSM2 > UNS3 = UNSM3. We can also observe based on Figure 7 above that when an unsustainability market is placed in the unsustainability market zone (UNSMZ) as we can see with UNS2 = UNSM2 and UNS3 = UNSM3 we also allocate the sustainability problem (SOP) associated with each of them as for example, placing the unsustainability market UNS3 = UNSM3 on the unsustainability market zone (UNSMZ) above makes it a non-optimal market with the associated sustainability problem SOP3.

Implications:

Any paradigm found or placed in the unsustainability market zone is a non-optimal market, which has a specific sustainability problem associated with it. In other words, any non-optimal market is below full sustainability markets, and it has a sustainability problem embedded in it.

The expected expansion of unsustainability markets and of full sustainability markets once they are in place.

Once markets are in place, they will tend to expand at the lowest market price possible, in the case of optimal markets like full sustainability markets they expand at the lowest optimal market price possible; and in the case of unsustainability markets, they will tend to expand at the lowest non-optimal market price possible, a view summarized in Figure 8 below:

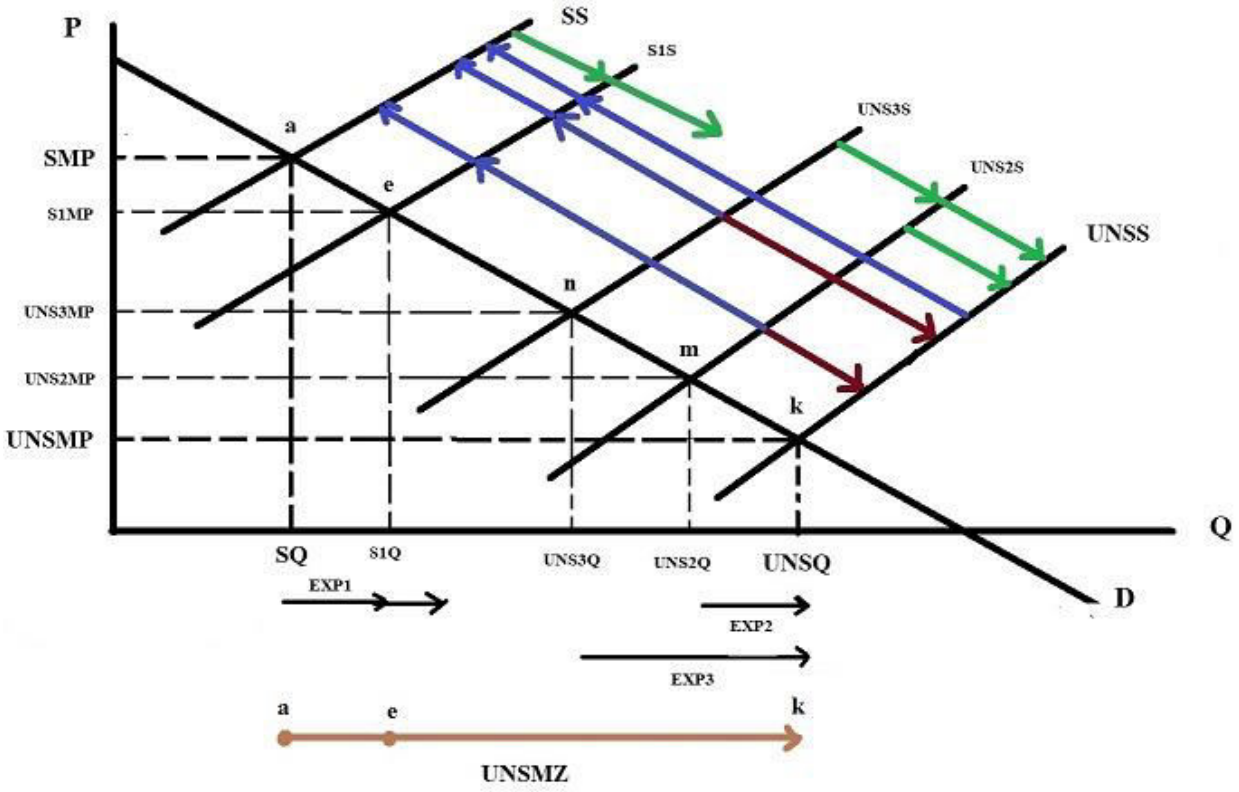

Figure 8 The expected tendency of unsustainability markets(UNS = UNSM) and of sustainability markets(S = SOM) to expand once in place

On the left side of Figure 8 above from point "a" to point "e" and beyond we have the optimal expansion of full sustainability markets (S = SOM), which can expand as needed as the expansion EXP1 from S = SOM to S1 = SOM1 and beyond as represented by the green arrow going from left to right from point "a". This is because as the optimal market price decreases sustainability markets expand and as the optimal market price continues to decrease beyond S1 = SOM1 they expand even more. On the right side of Figure 8 above we have the non-optimal expansion of unsustainability markets such as market UNS2 = UNSM2 and market UNS3 = UNSM3, which will tend to expand towards full unsustainability markets (UNS = UNSM) as the expansions EXP4 from UNS2 = UNSM2 towards UNS = UNSM and the expansion EXP3 from UNS3 = UNSM3 to UNS2 = UNSM2 and beyond as represented by the green arrows going from left to right from point "m" and point "n". This is because as the non-optimal market price of those unsustainability markets decreases unsustainability markets expand, and as their non-optimal market prices continue to decrease the markets UNS2 = UNSM2 and UNS3 = UNSM3

will expand towards full unsustainability (UNS), as that is the unsustainability growth limit. Notice that Figure 8 summarizes sustainability line thinking in terms of market supply and demand theory as i) it shows the limits of sustainability for sustainability markets and unsustainability markets; ii) it indicates the sustainability problems within those market limits; iii) it tells us about where the unsustainability market zone is; iv) it indicates the sustainability problems associated with any unsustainability market found on the unsustainability market zone; and v) it highlights how sustainability markets and unsustainability markets are expected to expand once they are in place. We can see also based on Figure 8 above the following: i) If full sustainability markets are set at point "a" the full sustainability problem(SOP) goes from point "k" to point "a" and the full unsustainability market zone(UNSMZ) goes from point "a" to point "k"; ii) If full sustainability markets are set at point "e" the full sustainability problem(SOP) goes from point "k" to point "e" and the full unsustainability market zone(UNSMZ) goes from point "e" to point "k"; iii) this means that the expansion of sustainability markets(Si = SOMi) leads to a contraction of sustainability problems(SOP) and a contraction of the unsustainability market zone(UNSMZ); and iv) this raises the possibility that if a full sustainability market(S = SOM) expands to produce at the same market price as an unsustainability market like at point "n|" so that sustainability supply S3S = unsustainability supply UNS3S and the sustainability market price S3MP = UNS3MP, then the unsustainability market UNS3 = UNSM3 would collapse in an open system, a situation recently explored(Muñoz 2023) with the use of perfect green markets as golden paradigm and the use of dwarf green markets as unsustainability markets to show how they would behave under perfect market competition as closed and open systems, and which model would collapse under open systems.

Implications:

Sustainability paradigms, once in place, should be expected to expand as the optimal paradigm price decreases; and unsustainability paradigms, once in place, should be expected to expand as the non-optimal paradigm price decreases, if left unattended, unsustainability paradigms will expand towards full unsustainability and collapse. In other words, Figure 8 shows that there are no limits to optimal growth, but they are limits to non-optimal growth, which is full unsustainability.

Food for thoughts

i) Are unsustainability markets consistent with maximization principles? I think Yes, what do you think?; ii) Are sustainability markets consistent with optimization principles? I think Yes, what do you think?; and iii) Can you promote an unsustainability market as a sustainability market without alternative academic facts? I think No, what do you think?

Conclusions

In general, it was highlighted that the sustainability line idea in terms of market supply and demand theory can be used to stress important issues that help us understand the world of sustainability markets and unsustainability markets and how these markets are expected to work and the problems associated with how they work. Specifically, it was pointed out step by step the following: the limits of sustainability in terms of market supply and demand thinking, the possible expansion and contractions of unsustainability and sustainability markets, the sustainability problems associated with each unsustainability market, the unsustainability market zone where all unsustainability markets are found, and the expected way sustainability markets and unsustainability markets will expand once in place.

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