Sustainability thought 177: What are environmental pollution production markets, environmental pollution reduction markets, environmental pollution management markets and no environmental pollution production markets? How do they work?

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By

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Abstract

There is an environmental pollution problem separating the environmentally dirty economy from the environmentally clean economy; and this is because the environmentally dirty economy operates through the use of environmental pollution production markets and the environmentally clean economy works through no environmental pollution production markets. The environmental pollution problem between those markets can be addressed through environmental pollution reduction markets and through environmental pollution management markets depending on if you want to fully fix the environmental pollution problem or if you just want to patch it. Hence, there are 4 types of markets related to the environmental pollution issue, environmental pollution production markets, environmental pollution reduction markets, environmental pollution management markets, and no environmental production markets, all of which have different model structure and price structure as well as they all have a different impact on the environmental pollution issue while they work in the search for profits. And this raises important questions such as: What are environmental pollution production markets, environmental pollution reduction markets, environmental pollution management markets, and no environmental pollution markets? How do they work? What are the implications of this? Among the goals of this paper is to provide answers to the questions above.

Key concepts

Traditional market, Green market, Dwarf green market, Dirty markets, Clean markets, Environmental dirty markets, Environmentally clean markets, Environmental pollution problem, Environmental pollution production market, Environmental pollution reduction market, Environmental pollution management market, Environmental pollution-less market, No environmental pollution production markets, Environmentally dirty economy, Environmentally clean economy.

Introduction

a) The problem separating environmentally dirty markets from environmentally clean markets

The thought of the existence of an environmental pollution problem(EPO) separating the environmentally dirty economy(EDM) from the environmentally clean economy(ECLM) has been stressed in the recent past(Muñoz 2022) as indicated in Figure 1 below:

Figure 1 **There is an environmental pollution problem(EPO) that separates the environmentally dirty market(EDM) and the environmentally clean market(ECLM)**

Figure 1 above tells us that there is an environmental pollution problem(EPO) separating the environmentally dirty economy(EDM) from the environmentally clean economy(ECLM); and therefore, to live under an environmentally clean market(ECLM) we need to get rid of the pollution production markets(POPM) like the environmentally dirty market(EDM). In other words, Figure 1 above indicates that we need to eliminate the environmental pollution problem(EPO) generated by the environmentally dirty market(EDM) fully to transform it into the environmentally clean market(ECLM), which means that the most climate change friendly action humanity can take right now is to transition to an environmental pollution free world under environmentally clean markets(ECLM).

b) The two ways of dealing with the environmental pollution(EPO) problem

Therefore, there are two possible ways of addressing the environmental pollution problem(EPO), one is through setting up environmental pollution management markets(EPOMM) if we just want to patch the pollution generation problem and live permanently under them; and the other one is setting up environmental pollution reduction markets(EPORM) if we want to fully fix the pollution problem and transitioning it to the environmentally clean economy(ECLM), which are summarized in Figure 2 below:

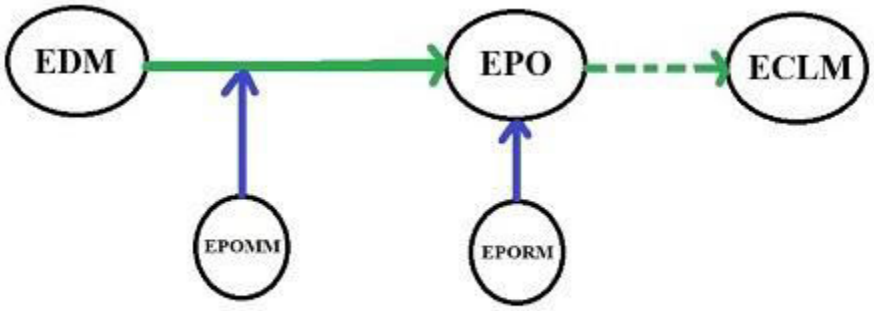

Figure 2 The environmenal pollution management market solution(EPOMM) and the environmental pollution reduction market reduction marke solution(EPORM) to the environmental pollution problem(EPO)

We can see in Figure 2 above that environmental pollution management markets(EPOMM) deal with a portion of the pollution generation problem(EPO) created by the environmentally dirty market(EDM) while environmental pollution reduction markets(EPORM) deal with the whole of the environmental pollution problem(EPO) through problem internalization. In other words, environmental pollution management markets(EPOMM) address the environmental pollution generation problem(EPO) through pollution management theory where, once markets are in place, pollution reduction is not a profitable business incentive as pollution management costs are set externally while environmental pollution reduction markets(EPORM) deal with the environmentally pollution problem through perfect pollution reduction market theory where, once markets are in place, pollution reduction is an excellent business opportunity as it leads to producing at the lowest pollution reduction market price possible.

c) The four markets associated with the environmental pollution problem(EPO)

If we make the environmentally dirty market(EDM) be the environmental pollution production market(EPOPM) and we let the environmentally clean market(ECLM) be the environmental pollution-less market(EPOLM), then there are 4 types of markets related to the environmental pollution problem(EPO) as shown in Figure 3 below:

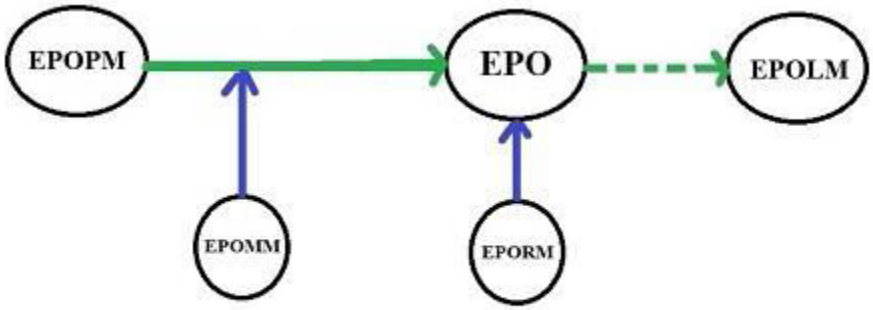

Figure 3 The four markets linked to the environmental pollution problem(EPO): the environmental pollution production market(EPOPM), the environmental pollution management market(EPOMM), the environmental pollution reduction market(EPORM), and the environmental pollution-less market(EPOLM).

Figure 3 above highlights that the four types of markets linked to the environmental production problem are i) the environmental pollution production market(EPOPM); ii) the environmental pollution management market(EPOMM); iii) the environmental pollution reduction market(EPORM), and iv) the environmentally pollution-less market(EPOLM).

d) The need to understand the nature of these markets

Based on the discussion above then, there is an environmental pollution problem separating the environmentally dirty economy from the environmentally clean economy; and this is because the environmentally dirty economy operates through the use of environmental pollution production markets and the environmentally clean economy works through no environmental pollution production markets. The environmental pollution problem between those markets can be addressed through environmental pollution reduction markets and through environmental pollution management markets depending on if you want to fully fix the environmental pollution problem or if you just want to patch it. Hence, there are 4 types of markets related to the environmental pollution issue, environmental pollution production markets, environmental pollution reduction markets, environmental pollution management markets, and no environmental production markets, all of which have different model structure and price structure as well as they all have a different impact on the environmental pollution issue while they work in the search for profits. Notice that in 1987 when the World Commission on Environment and Development(WCED 1987) called for addressing the environmental sustainability problem by internalizing it they meant, albeit through sustainable development thinking, internalizing the environmental pollution problem; and notice that in 2012 the United Nations Commission on Sustainable Development(UNCSD 2012a; UNCSD 2012b) at Rio +20 was supposed to go the way of environmental pollution reduction markets, but instead it went the way of environmental pollution management markets. Notice that neither the World Commission on Environment and Development nor the United Nations Commission on Sustainable Development called for a transition to an environmental pollution-less economy as soon as possible, and even major current climate change based conferences(UNFCCC 2022) do not mention or are not focused on the need to transition from the environmental pollution based economy to the environmental pollution-less economy as soon as possible. If we linked environmental pollution reduction markets to green markets and environmental pollution management markets to dwarf green markets we can see not just that environmental pollution reduction markets work in the opposite as environmental pollution management markets work(Muñoz 2016), but that also to understand their working you need to flip traditional economic thinking(Muñoz 2019). And finally, if we link the environmental pollution production market to the perfect traditional market of Adam Smith(Smith 1776) we can see that just as in traditional markets when environmental pollution production markets expand they generate more environmental pollution as the cost of environmental pollution associated with economic activity is not reflected in the pricing mechanism. And this raises important questions such as: What are environmental pollution production markets, environmental pollution reduction markets,

environmental pollution management markets, and no environmental pollution markets? How do they work? What are the implications of this? Among the goals of this paper is to provide answers to the questions above.

Goals of this paper

a) To highlight the structure and meaning of environmental pollution production markets when in place and when they expand; b) To point out the structure and meaning of environmental pollution management markets when in place and when they expand; c) To stress the structure and meaning of environmental pollution reduction markets when in place and when they expand; d) To indicate the structure and meaning of environmental pollution-less markets when in place and when they expand; and f) to show how the environmental pollution problem can be linked to well-known markets such as the traditional market, the dwarf green market, the green market and the environmental pollution-less market.

Methodology

First the terminology used in this paper is shared. Second, the structure of the environmental pollution production market is described when in place and when it expands. Third, the structure of the environmental pollution management market is pointed out when in place and when it expands. Fourth, the structure of the environmental pollution reduction market is indicated when in place and when it expands. Fifth, the structure of the environmental pollution-less market is presented when in place and when it expands. Sixth, the environmental pollution problem is linked to well-known perfect and imperfect markets such as the traditional market, the dwarf green market, the green market and the environmental pollution-less market. And finally, some food for thoughts and relevant conclusions are listed.

Terminology

TM = The traditional market GM = The green market

EDM = The environmentally dirty market PO = Pollution problem

EPO = Environmental pollution problem E[C] = Environmental cost externalization

I[c] = Environmental cost internalization CLM = The clean market

EPORM = Environmental pollution reduction market DM = The dirty market

ECLM = Environmentally clean market DGM = Dwarf green market

POPM = Pollution production markets EPOPM = Environmental pollution production market

PORM = Pollution reduction markets EPORM = Environmental pollution reduction markets

RPO = Remaining pollution problem REPO = Remaining environmental pollution problem

NEPO = New environmental problem DGMP = Dwarf green market price

GMP = Green market price EM = Environmental margin

TMP = Traditional market price EDMP = Environmentally dirty market price

POLM = Pollution-less markets EPOLM = Environmental pollution-less markets

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Operational concepts, relevant market structures and externalization and internalization rules

A) Operational concepts

1) Science, the *world based on the scientific truth, this world falls if invalidated.*

2) Ideology, *the world based on the non-scientific truth, this world will tend to persist even if invalidated.*

3) The theory-practice general consistency principle, *the world where the theory of the model must match the practice.*

4) The different model general inconsistency principle, *the world where the theory and practice of different models are inconsistent with each other.*

5) Academic facts, the *science based truth.*

6) Alternative academic facts, *the non-science based truth.*

7) Academic blindness, *the inability to see academic facts due to the existence of knowledge gaps, paradigm shift based or otherwise.*

8) Willful academic blindness, *the willingness to ignore academic facts and consensus.*

9) Sustainability, *the world where the interplay of sustainability theory and sustainability practice is aimed at fixing or correcting embedded externality problems.*

10) Sustainable development, *the world where the interplay of sustainable development theory and sustainable development practice is aimed at patching or managing embedded externality problems.*

11) Academic integrity, *the duty to respect and defend academic facts and consensus.*

12) Golden paradigm, *one that does not creates abnormalities.*

13) Flawed paradigm, *one that creates abnormalities.*

14) Kuhn's loop, *the science based mechanism that leads to paradigm shift through abnormality correction.*

15) Dirty economy, *a pollution based economy.*

16) Clean economy, *a pollution less based economy.*

17) Red Marxism, *capitalism need to be replaced as it is destroying societies.*

18) Green Marxism, *dwarf green capitalism must be replaced as it is destroying nature.*

19) The red socialism market, *the social justice and equality based market.*

20) The green socialism market, *the environmental justice and equality based market.*

21) Green capitalism, *capitalism supported by green markets.*

22) Dwarf green capitalism, *capitalism supported by dwarf green markets.*

23) Traditional market, *the market cleared by the traditional market price.*

24) Green market, *the market cleared by the green market price.*

25) Red market, *the market cleared by the red market price.*

26) Pollution production market, *a market operating under distorted market pricing.*

27) Environmental pollution production market, *a market operating under environmentally distorted market pricing*

26) Pollution reduction market, *a market operating under a corrected distorted market price.*

27) Environmental pollution reduction market, *a market operating under an environmentally corrected distorted market price.*

28) Pollution management market, *a market operating at a pollution management cost led market price.*

29) Environmental pollution management market, *a market operating at an environmental pollution cost led market price.*

30) Sustainability market, *the one cleared by the sustainability market price.*

31) Dwarf green market, *the market cleared by the dwarf green market price.*

32) Clean market, *the market cleared by the clean market price.*

33) Environmentally clean market*, the market cleared by the environmentally clean market price.*

34) Pollution-less market, *a clean market.*

35) Environmental pollution-less market*, an environmentally clean market.*

B) Relevant market structures

If we have the following: a = social abnormality, c = environmental abnormality, A = dominant society, C = dominant environment, and B = the dominant economy, then the structure of relevant markets can be stated as indicated below:

1) The traditional market as a golden model

i) TM = B

Under externality neutrality assumptions the traditional market TM in section i) above is a golden paradigm, it produces no abnormalities.

2) The traditional market under social abnormalities(a)

ii) TM = aB

Under no social externality neutrality assumptions, the traditional market TM in section ii) above produces social abnormalities "a". It is a flawed paradigm as it has social abnormalities to correct.

3) The traditional market under environmental abnormalities(c)

iii) TM = Bc

Under no environmental externality neutrality assumptions, the traditional market TM in section iii) above produces environmental abnormalities "c". It is a flawed paradigm as it has environmental externalities to correct.

4) The traditional market under socio-environmental abnormalities(ac)

iv) TM = aBc

Under no socio-environmental externality neutrality assumptions, the traditional market TM in section iv) above produces socio-environmental abnormalities "ac". It is a flawed paradigm as it has social and environmental externalities to correct.

5) The red market under environmental abnormalities(c)

v) RM = ABc

Under no environmental externality assumptions, the red market RM in section v) above produces environmental abnormalities. It is a flawed paradigm as it has environmental externalities to correct. Notice that in the red market RM, both society(A) and economy(B) are in dominant form.

6) The green market under social abnormalities(a)

vi) GM = aBC

Under no social externality assumptions, the green market GM in section vi) above produces social abnormalities. It is a flawed paradigm as it has social externalities to correct. Notice that in the green market GM, both the economy(B) and the environment(C) are in dominant form.

7) The sustainability market has no abnormalities

vii) SM = ABC

The sustainability market SM in section vii) above produces no abnormalities as all components are in dominant form since all components are now endogenous to the model. It is a golden paradigm as it has no abnormalities to correct.

C) Abnormality externalization and internalization rules

If y, x, z are three abnormalities and Y, X, Z are the corrected variables and if E[ ] = externalization and I[ ] = internalization, then the following holds true:

a) E[Y] = y **b) E[X] = x** **c) E[Z] = z**

d) I[y] = Y **e) I[x] = X** **f) I[z] = Z**

g) I[E[Y]] = Y **h) E[I[y]] = y** **i) E[YX] = yx**

The environmental pollution production market

The link between the environmental problem(EPO) and the environmental pollution production market(EPOPM) in Figure 3 in the introduction can be indicated graphically as done in Figure 4 below:

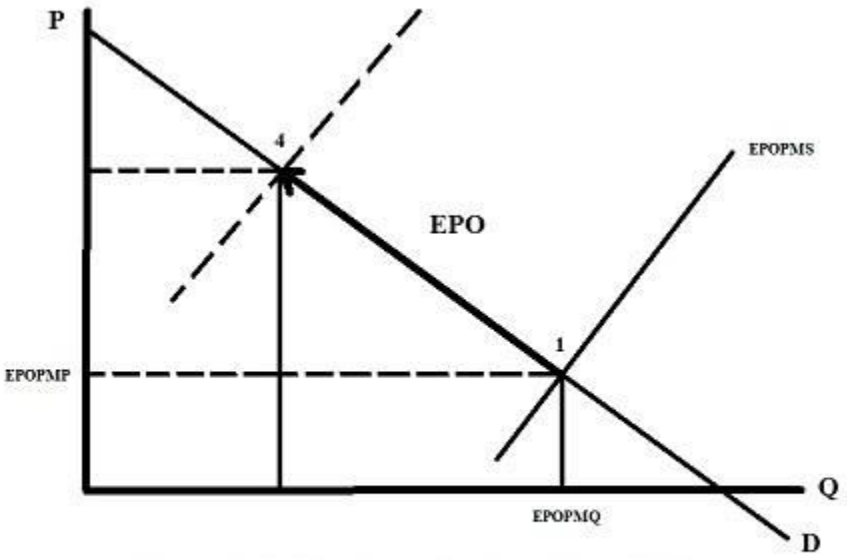

Figure 4 **The environmental pollution production market(EPOPM): It is cleared by the environmental pollution production market price(EPOPMP) at point 1, which determine the environmental pollution production quantity to be produced and consumed(EPOPMQ)**

Figure 4 above can be used to highlight the following: i) that there is a environmental pollution production market(EPOPM) at point 1, where the environmental pollution production market supply(EPOPMS) meets the environmental pollution production market demand D determining the environmental pollution production market quantity(EDMQ) to be produced and consumed at the environmental pollution production market price EPOPMP; ii) that this market generates environmental pollution EPO going from point 1 to point 4; and iii) that as long as this pollution generation problem(EPO) exist there will be no environmental pollution-less markets(EPOLM).

Implication 1:

The environmental pollution production market is the market cleared by the environmental pollution production market price, a market where the environmental cost of production is external to the model.

The expansion of the environmental pollution production market

If the environmental pollution production market(EPOPM) expands from EPOPMS to EPOPMS7 because there is a decrease in the environmental pollution production market price(EPOPMP) from EPOPMP to EPOPMP7, then the environmental pollution production market supply(EPOPMS) will shift from EPOPMS to EPOPMS7 expanding pollution levels as indicated in Figure 5 below:

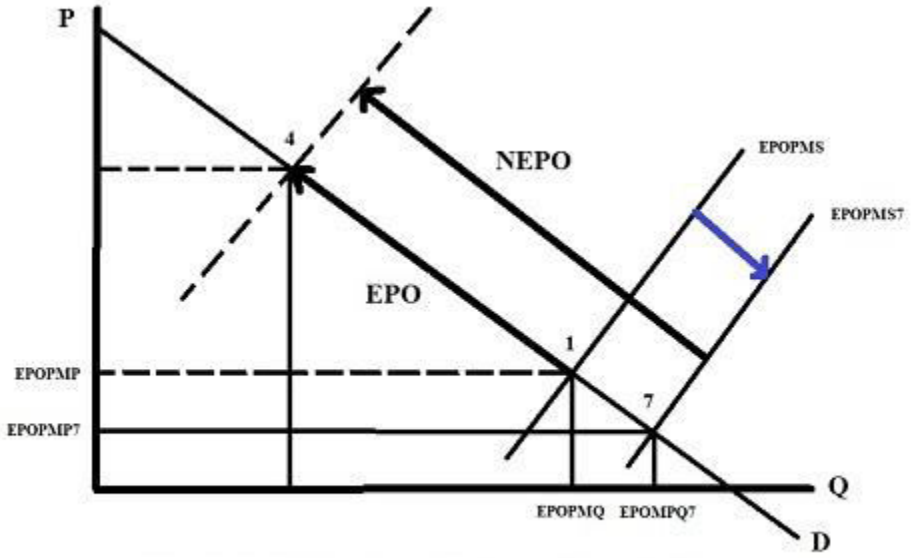

Figure 5 The expansion of the environmental pollution production market(EPOPM) leads to more environmental pollution as the new environmental pollution(NEPO) at point 7 is greater that the environmental pollution problem(EPO) that we have at point 1.

We can appreciate the following based on Figure 5 above: i) when the environmental pollution production market expands from point 1 to point 7 the environmental pollution problem(EPO) expands from point 4 to point 1 to point 4 to point 7 as the new environmental pollution problem(NEPO) is greater than the original environmental pollution problem(EPO) so that NEPO > EPO by the distance from point 1 to point 7 represented by the blue arrow. In other words, as the environmentally pollution production market(EPOPM) expands more environmental pollution(EPO) is generated.

Implication 2:

The expansion of the environmental pollution production market leads to an expansion of the environmental pollution problem as more dirty production and dirty consumption means more environmental pollution. Hence, producers in the environmental pollution production market will tend to produce at the lowest economic cost possible regardless of the environmental pollution levels generated as environmental pollution costs are externalized.

The environmental pollution management market

The link between the environmental problem(EPO) and the environmental pollution management market(EPOMM) in Figure 3 in the introduction can be stated graphically as done in Figure 6 below:

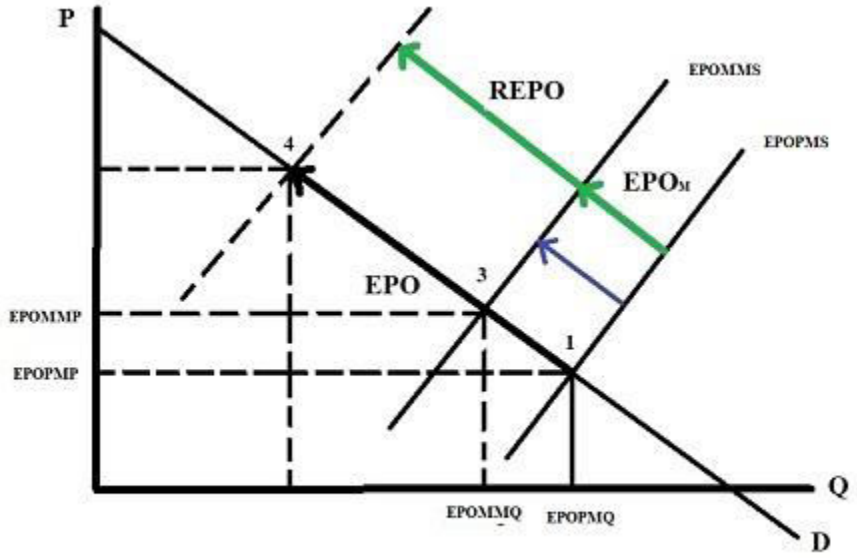

Figure 6 The working of the environmental pollution management market(EPOMM): It is cleared by the environmental pollution manamenet market price(EPOMMP), which determines the environmental pollution management market quantity(EPOMMQ) to be produced and consumed.

We can see based on Figure 6 above that when the environmental pollution problem(EPO) becomes an issue and decision makers decide to manage the environmental pollution generation problem then the environmental pollution production market(EPOPM) found at point 1 shift to the environmental pollution management market found at point 3 as now some of the environmental pollution problem is under management making the environmental pollution management market price greater than the environmental pollution production market price(EPOMMP > EPOPMP), which leads to lower pollution levels as production and consumption decrease(EPOMMQ < EPOPMQ). We can also highlight based on Figure 6 above that when environmental pollution management markets are in place such as the one in point 3 their sustainability is affected by a remaining environmental pollution problem(REPO) as indicated by the green arrow from point 3 to point 4 as only a portion of the environmental pollution problem is under management(EPO_M) as shown by the green arrow from point 1 to point 3.

Implication 3:

The environmental pollution management market is the market cleared by the environmental pollution management market price, a market where only a portion of the

environmental cost of production, which is decided by the environmental pollution manager are passed to consumers or accounted for, the rest of the environmental costs are still externalized.

The expansion of the environmental pollution management market

If the environmental pollution manager decides to expand the size of the environmental problem under management(EPO_M) it will increase the environmental externality cost to be passed by producer to consumers to further decrease production and consumption and hence, decrease environmental pollution, a situation summarized in Figure 7 below:

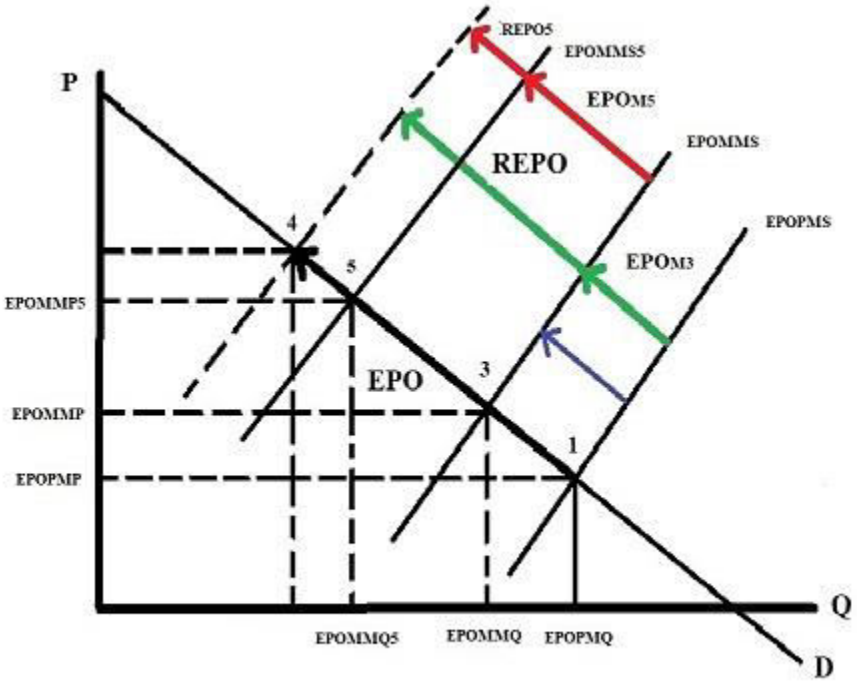

Figure 7 The expansion of environmental pollution management markets(EPOMM) is still affected by a remaining environmental pollution problem(REPO)

We can see in Figure 7 above that when we expand the size of the environmental pollution to be managed such as from point 3 to point 5, by increasing the environmental pollution management cost then production and consumption fall as EPOMMQ5 < EPOMMQ and therefore environmental pollution(EPO) also falls, however there is still a remaining environmental pollution problem($REPO_5$) as indicated by the red arrow from point 5 to point 4.

Implication 4:

The expansion of the environmental pollution management market by expanding the environmental pollution cost under management leads to an increase in the environmental pollution management market price, which leads to a further decrease in production and consumption and a further decrease in pollution generation. However, producers in the

environmental pollution management market have no incentive to produce at the lowest environmental cost possible as they will be content with making money by simply passing the environmental management cost assigned by the environmental pollution manager to consumers.

The environmental pollution reduction market

The link between the environmental problem(EPO) and the environmental pollution reduction market(EPORM) in Figure 3 in the introduction can be presented graphically as indicated in Figure 8 below:

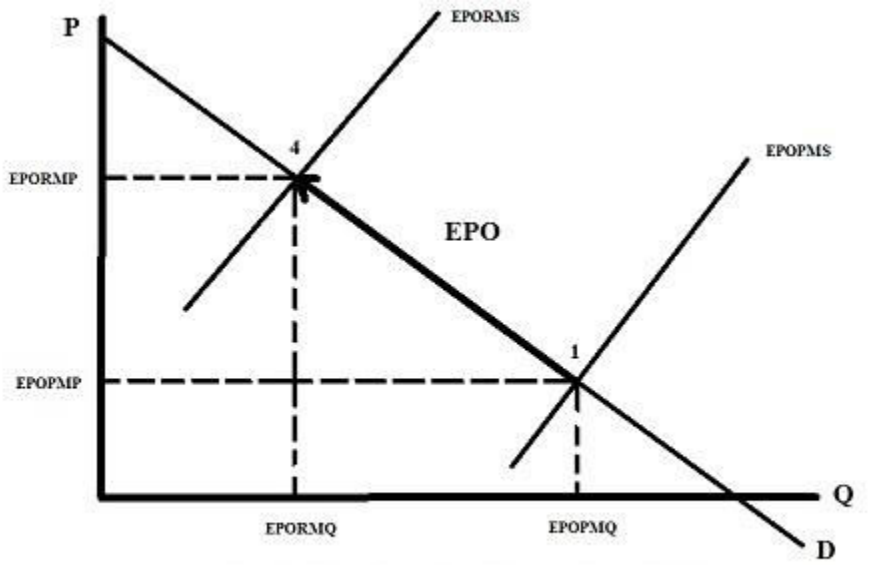

Figure 8 The working of the environmental pollution reduction market(EPORM): It is cleared by the environmental pollution reduction market price(EPORMP), which determines the environmental pollution reduction market quantity to be produced and consumed(EPORMQ)

If we internalized the environmental pollution problem(EPO) then the environmental pollution production market(EPOPM) at point 1 shifts to the environmental pollution reduction market at point 4, where the quantity to be produced and consumed is EPORM < EPOPMQ, which means no more environmental pollution cost externalization as the environmental pollution reduction market price(EPORMP) accounts for all environmental costs associated with economic activity. Therefore, at point 1 we have the environmental pollution production market(EPOPM) and at point 4 we have the environmental pollution reduction marke(EPORM) and in between we have the full environmental problem(EPO) that separates these two perfect markets.

Implication 5:

The environmental pollution reduction market is the market cleared by the environmental pollution reduction market price, a market where all the environmental cost of production are accounted for as environmental costs here are internalized.

The expansion of the environmental pollution reduction market

When the environmental pollution cost associated with production decreases, then the environmental pollution reduction price will decrease shifting the market production structure to the right as cleaner good and services are produced and consume at lower prices, a situation indicted in Figure 9 below:

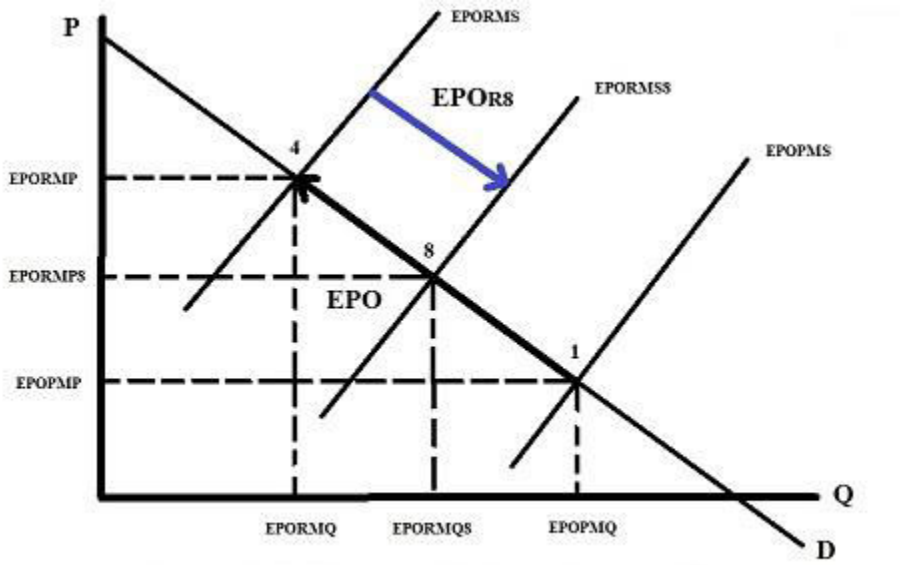

Figure 9 The expansion of environmental pollution reduction markets(EPORM) leads to an expansion of environmetal pollution reduction(EPOR) while making money

We can appreciate based on Figure 9 above that the reduction in the environmental cost of production shift the environmental pollution reduction market(EPORM) from point 4 to point 8 as now we have lower prices EPORMP8 < EPORMP, which leads to a reduction of environmental pollution(EPO_{R8}) from point 4 to point 8. In other words, at point 8 we are producing cleaner goods and services at a lower environmental pollution reduction market price as there is a lower environmental cost of production associated with the economic activity taking place at this point. Hence we can see based on Figure 9 above that while environmental pollution production markets will tend to produce at the lowest economic cost possible and shift from left to right environmental pollution reduction markets will tend to produce at the lowest environmental pollution cost possible and they shift from left to right too.

Implication 6:

The expansion of the environmental pollution reduction market by decreasing the environmental pollution cost of production leads to an increase in cleaner production and consumption and to a reduction in environmental pollution as when the environmental pollution reduction market price decreases the environmental pollution reduction supply will shift to the right. Therefore, under environmental pollution reduction markets there is an incentive for

producers to produce at the lowest environmental cost possible to maximize profits while there is an incentive for consumers to consume cleaner and cleaner goods and services at lower prices.

The environmental pollution-less market

The link between the environmental problem(EPO) and the environmental pollution-less market(EPOLM) in Figure 3 in the introduction can be summarized graphically as shown in Figure 10 below:

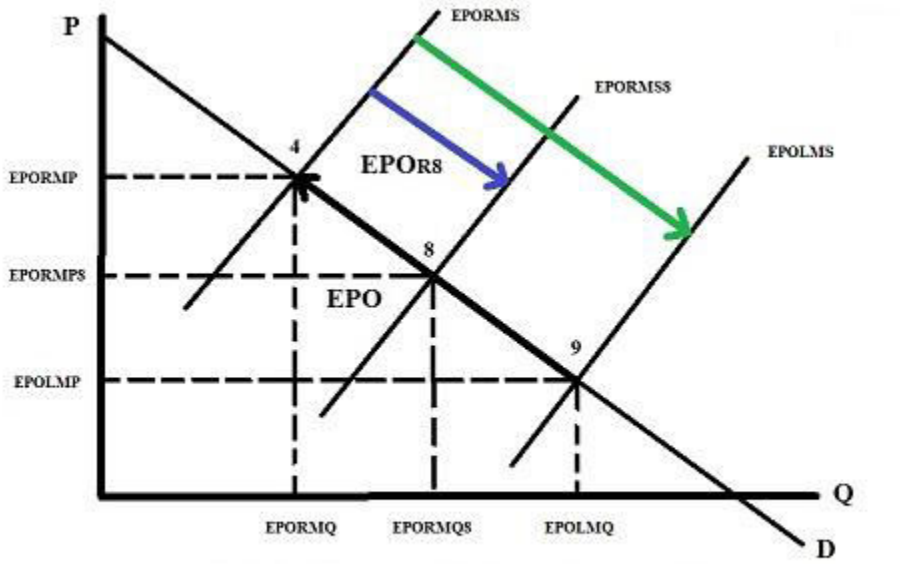

Figure 10 The working of environmental pollution-less markets(EPOLM), they are cleared by the environmental pollution-less market pric(EPOLMP), which determines the environmental pollution-less market quantity(EPOLMQ) to be produced and consumed.

We can highlight based on Figure 10 above that when the environmental cost of production in the environmental pollution reduction market(EPORM) becomes zero(EM = 0), then the environmental pollution reduction market becomes the environmental pollution-less market(EPOLM) found at point 9 as indicated by the green arrow from point 4 to point 9. Therefore, at point 9 the environmental pollution reduction market(EPORM) is now an environmental pollution-less market(EPOLM) as the environmental pollution cost there is zero, which means that EPOLMP < EPORMP8 < EPORMP and that EPOLMQ > EPORMQ8 > EPORMQ.

Implication 7:

The environmental pollution-less market is the market cleared by the environmental pollution-less market price, a market where the environmental cost of production associated with economic activity is zero as this is a market where there is no environmental pollution production problem.

The expansion of the environmental pollution-less market

An environmental pollution-less market should be expected to tend to producing at the lowest environmental pollution-less market price(EPOLMP) possible as then producer will make money by producing and supplying clean good and services at the lowest price possible as shown in Figure 11 below:

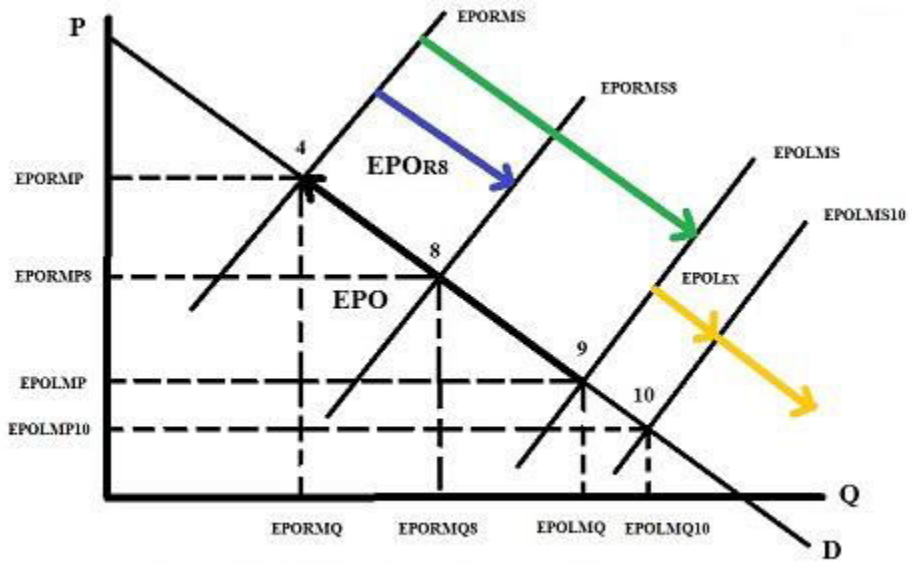

Figure 11 The expansion of environmental pollution-less markets(EPOLM) leads to an expansion of environmental pollution-less good and services while making money

Notice that at point 9 and point 10 in Figure 11 above production and consumption is taking place without generating environmental pollution, the reason why the environmental pollution cost is zero. We can stressed based on Figure 11 above the following: i) A reduction in the environmental pollution-less market price from point 9 to point 10 leads to increased production and consumption since EPOLMQ10 > EPOLMQ without producing environmental pollution, and hence, environmental pollution-less markets will expand from left to right as the environmental pollution-less market price decreases.

Implication 8:

The expansion of the environmental pollution-less market by producing at the lowest environmental pollution-less market price possible leads to an increase in production and consumption and profits without producing environmental pollution; and therefore, when the environmental pollution-less market price decreases the environmental pollution-less market supply will shift to the right. Therefore, under environmental pollution-less markets there is an incentive for producers to produce at the lowest environmental pollution-less cost possible to maximize profits while there is also an incentive for consumers to consume clean goods and

services at lower prices without producing environmental pollution. In other words, as the environmental pollution-less market is a no environmental pollution production based market its expansion is environmental pollution-less too.

Linking the environmental pollution problem to known perfect and imperfect markets

We can link the environmental problem(EPO) in Figure 3 in the introduction to well-known perfect and imperfect markets by making the environmental pollution production market(EPOPM) equal to the traditional market of Adam Smith(TM) so that TM = EPOPM, by making the environmental pollution management market(EPOMM) equal to the dwarf green market(DGM) so that DGM = EPOMM, by making the environmental pollution reduction market(EPORM) equal to the green market(GM) so that GM = EPORM, and by making the environmental pollution-less market(EPOLM) be the environmentally clean market(ECLM) so that ECLM = EPOLM as highlighted in Figure 12 below:

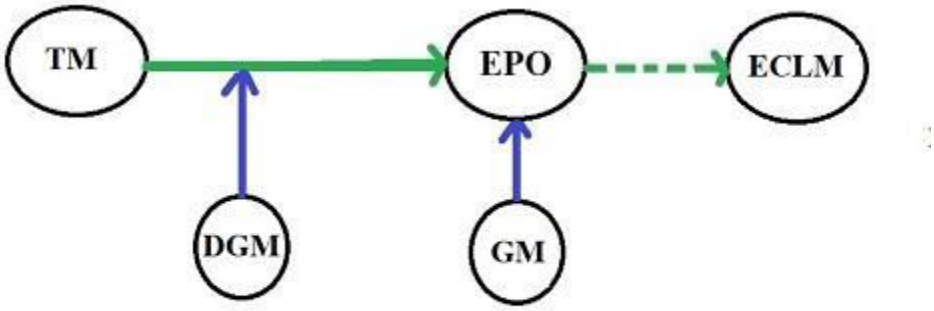

Figure 12 Linking the environmental pollution problem(EPO) to the perfect traditional market(TM), to the dwarf green market(DGM), to the perfect green market(GM) and to the perfect environmentally clean market(ECLM)

Figure 12 above can be used to say that the environmental pollution problem(EPO) can be seen from the point of view of four markets, the traditional perfect market(TM) that generates environmental pollution, the dwarf green market(DGM) that manage environmental pollution while still polluting(REPO), the perfect green market(GM) that internalizes the environmental problem, which can then be transitioned to an environmental pollution-less, and the perfect environmentally clean market, a market that does not produce environmental pollution.

Food for thoughts

a) Can environmental externality management markets exist without a remaining environmental pollution problem? I think No, what do you think?; b) Can the coming of environmentally clean markets be seen as the day when the environmental cost of production driving green market expansions becomes zero? I think Yes, what do you think?; and c) Can we

transition from environmental externality management markets to environmental pollution-less markets? I think No, what do you think?

Conclusions

First, it was highlighted that environmental pollution production markets generate the environmental pollution problem, and their expansion following the principle of producing at the lowest economic cost possible generates even more environmental pollution. Second, it was stressed that environmental pollution management markets work under a remaining environmental problem while managing environmental pollution, and their expansion by expanding the level of pollution to be managed reduces production and consumption and environmental pollution while still under a remaining environmental problem. Third, it was mentioned that environmental pollution reduction markets internalize the environmental problem and their expansions lead to more production and consumption of cleaner and cleaner goods and services produce at the lowest environmental cost possible, and therefore, producing at the lowest environmental pollution reduction market price possible. Fourth, it was indicated that when the environmental pollution cost becomes zero the green market becomes an environmental pollution-less market, and that the expansion of environmental pollution-less markets leads to more production and consumption as the environmental pollution-less market price decreases without producing environmental pollution. And fifth, it was shown that the environmental pollution problem can be linked to the perfect traditional market, the imperfect dwarf green market, the perfect green market, and the perfect clean market.

Overall, it was pointed out that the environmental pollution problem is linked in general to environmental pollution production markets, environmental pollution management markets, environmental pollution reduction markets, and environmental pollution-less markets; and in particular it is linked to the traditional market, the dwarf green market, the green market and environmentally clean market.

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