

CHAPTER IV - VALUING BENEFITS AND COSTS IN SECONDARY MARKETS

1 - INTRODUCTION	2
2 - EFFICIENT SECONDARY MARKETS EFFECTS WITHOUT PRICE CHANGE	3
2.1 - LAKE.....	3
2.2 - DETAILS	5
3 - EFFICIENT SECONDARY MARKETS EFFECTS WITH PRICE CHANGE	7
3.1 - BACK TO THE LAKE.....	7
3.2 - JAPANESE CARS.....	13
4 - VALUING BENEFITS AND COSTS IN DISTORTED SECONDARY MARKETS.....	14
4.1 - AGAIN, BACK TO THE LAKE	14
4.2 - POISON AND TAXES.....	16
5 - CONCLUSION	17

1 – INTRODUCTION

In conducting CBA of government policies, there is a natural tendency to list as many effects of the policies as one's imagination permits.

For example, an improvement in public transportation in a particular city may increase bus usage and reduce car usage.

To assess these effects, one must first determine which occur in **primary markets** and which occur in **secondary markets**.

Primary markets refer to markets that are directly affected by a policy, whereas **secondary markets** are market that are indirectly affected.

We can also call "secondary markets": spill over; "indirect" or "side effects".

Should CBA take account of the change on secondary markets?

If government policies affect the demand for goods in secondary markets, then prices in these secondary markets may or may not change (e.g. Complement versus substitute). (Mohring 1993)¹

¹ Herbert Mohring "Maximizing Measuring and Not Double Counting Transportation Improvement Benefit; a Primer on Closed and Open Economy Cost Benefit Analysis" *Transportation Research*, 27, n° 6, (1993), 413-424

2 – EFFICIENT SECONDARY MARKETS EFFECTS WITHOUT PRICE CHANGE

When can **we ignore** secondary markets effects?

We can and should indeed **should ignore impacts** in **undistorted secondary markets** as long as change in social surplus in the primary markets resulting from a government project are measured and prices in the secondary markets do not change.

The reason for this is that in the **absence of price adjustments** in undistorted secondary markets in response to price change in primary markets, impact are **typically fully measured as surplus changes in primary markets**.

Measuring the same effects in both markets will, therefore, result in **double counting**.

2.1 – Lake

Consider the following example.

Stocking a lake with fish lowers the effective price of access to fishing grounds for the city's residents. They not only fish more often, but they also demand more fishing equipments.

We say that the access to fishing grounds and fishing equipments are **complements** because a **decrease in the price of one will result in an increase in the demand for the other**.

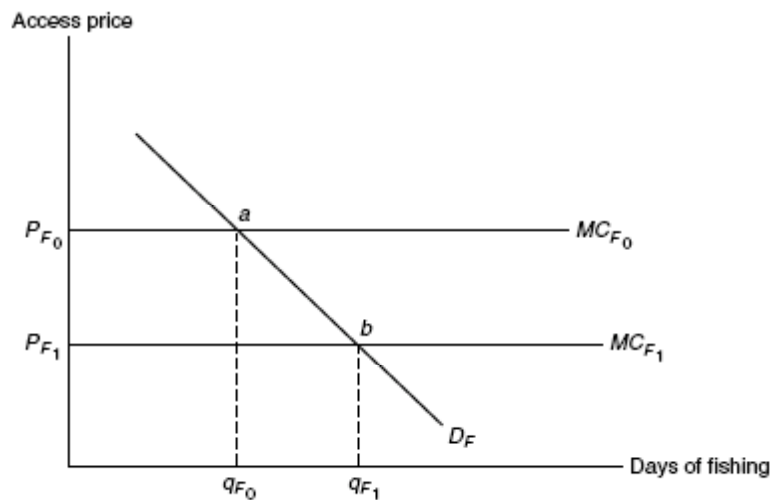
Thus for example, if the price in the fishing equipment market do not change and the market is undistorted, then the increased consumption of fishing equipment is not relevant to the CBA of a project that increase access to fishing grounds.

A closer look to the fishing example should make the **rule clearer**.

For the simplicity we assume that the price of the fishing equals the marginal social costs of fishing and that the marginal social costs are constant. This in turn implies that there are no producer surplus or externalities in the primary market (e.g highway congestion does not result because of increased travel to

the newly stocked lake). Panel a in figure 1 shows the market for “fishing days”.

Figure 5.1A
Primary Market: Market for Fishing Days



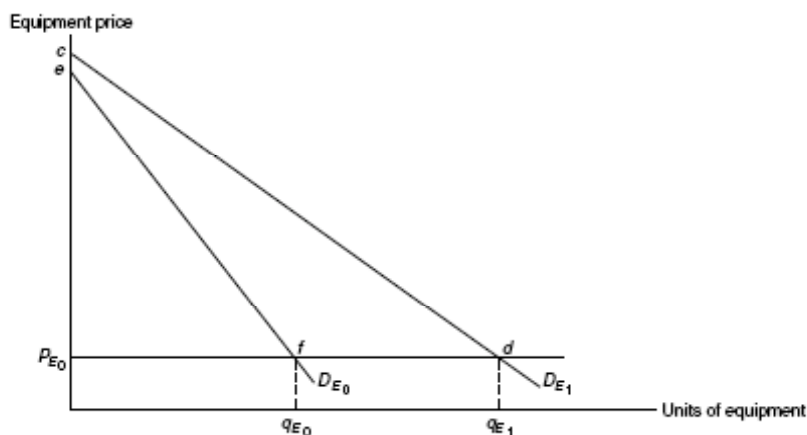
The project causes the effective price of fishing days to decrease. This, in turn, causes the number of fishing days to increase.

The decline in the price of fishing days shifts the demand curve for fishing equipment (a complement) to the right. (Figure 1.b)

Because the local market is only a small portion of regional demand, it does not affect the price of fishing equipment.

Does the shift in demand for fishing equipment represent a change in consumer welfare that could be counted in a CBA ? In other words, should the gap between the old and new demand schedules that is above the price line be counted as an additional increase in consumer surplus ?

Figure 5.1B
Secondary Market: Market for Fishing Equipment (No Price Effect)



It is tempting to treat an increase in consumer surplus from $efPE_0$ to $cdPE_0$ in panel b as an additional increase in social benefits that should be added to $PFOabPF1$ in panel a, but this should not be done.

Any increase in consumer surplus resulting from the increased value that people place on fishing equipment is already reflected in the demand curve in the primary market (i.e., reflected in their WTP for fishing days) and, therefore, a part of the change in social surplus in the primary market.

Secondary markets can only be ignored, however, if the social surplus in the primary market is actually measured.

2.2. Details

To see this, first consider fishers **who already own all the fishing equipment** they need at the time the lake is stocked and, hence presently **contribute no demand to the market of fishing equipment.**

The value that these person place on their existing fishing equipment will tend to increase as a result of stocking the nearby lake?

However because they are not in the market for new fishing equipment, the gap between the old and the new demand schedule for new fishing equipment does not reflect this increase.

Of course these person's willingness to pay for fishing day will presumably be higher than it otherwise would have been as a result of the fact that they will not have to incur further expenditures for fishing equipment. But any additional increase in consumer's surplus that these fishers enjoy as a result of already owning fishing equipment at the time the nearby lake is stocked **will already be reflected in the primary market demand for the fishing day**, which will be further to the right than it otherwise would be. It cannot show up in the secondary market for fishing equipment.

Now consider a person who does not own fishing equipment at the time the lake is stocked but now is induced to make such a purchase.

The gap between the two demand schedules in panel b of figure 1 does accurately reveal the increased value that this person places on fishing equipment. That is, these people are now willing to pay for more fishing equipment and indeed buy more fishing equipment. It is the only way they can fully realize surplus gain from the stocking project?

But this expenditure is not obviously an additional benefit from the stocking project. Just like fishers who already own fishing equipment, the consumer surplus is fully reflected in the primary market demand schedule for fishing days.

This includes a consumer surplus that they receive from their purchase of fishing equipment. Thus counting the gap between the demand schedule in panel b as a benefit, and would result in counting the same benefits twice.

Person who does not own fishing equipment, at the time the lake is stocked would be even better off, like the current owners of fishing equipment, they did not have to buy new equipment in order to take advantage of the newly stocked lake. Thus everything being equal, willingness to pay for fishing day is presumably greater among those who already own fishing equipment than among those who purchase it.

The increase in surplus consumer that result from the stocking project for both groups even in different from one another , will be fully reflected in the primary market demand schedule for fishing day.

It is important to stress that secondary market effects can only be ignored if social surplus in the primary market is measured directly.

3 – EFFICIENT SECONDARY MARKETS EFFECTS WITH PRICE CHANGE

The situation is more **complex when the price in the secondary market changes because the supply curve is positively sloping.**

3.1 – Back to the lake

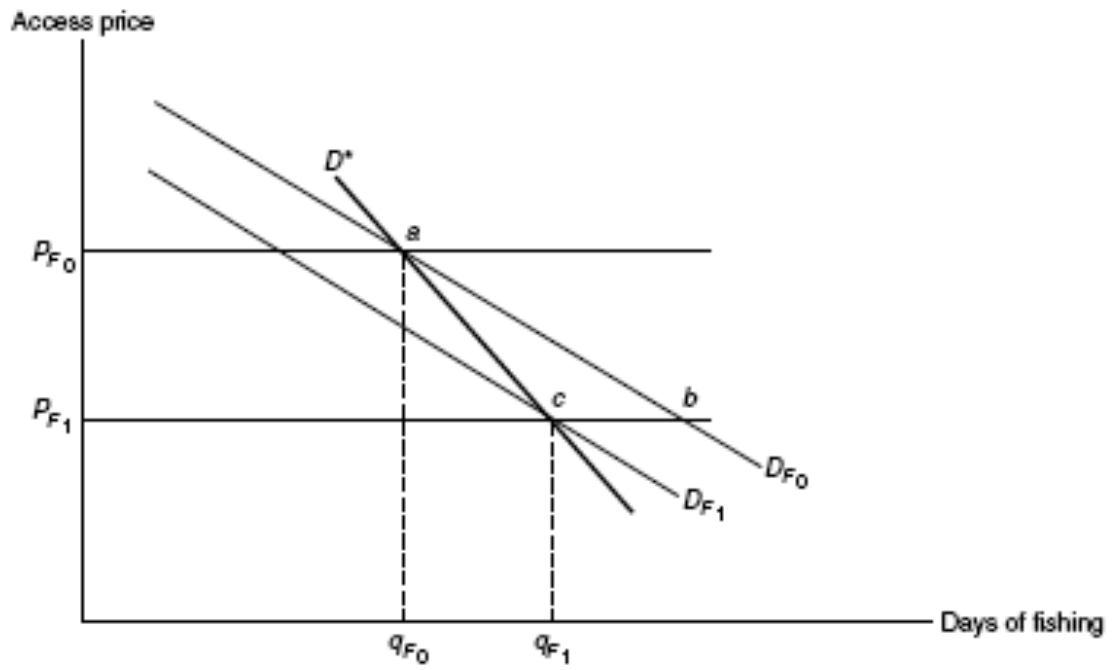
This can be seen by returning to the fishing example and considering the secondary market for golf (a substitute).

A reduction in the price of fishing days from PF0 to PF1 would cause the demand for golfing to fall. This the demand schedule for golfing in panel 2b would shift to the left from DG0 to DG1.

As previously emphasized by itself this shift does not represent a change in consumer surplus that is not already fully accounted for in measuring the change in consumer surplus in the primary market.

Golfers are obviously not made worse of by the stocking the lake, although some may now place a lower valuation on golf.

Instead, by itself, the shift in demand merely indicates that in the absence of golf, the consumer surplus gains from stocking of the demand schedule for fishing days, which is further to the left than it would have been if golf were not available as a substitute for fishing.



Second

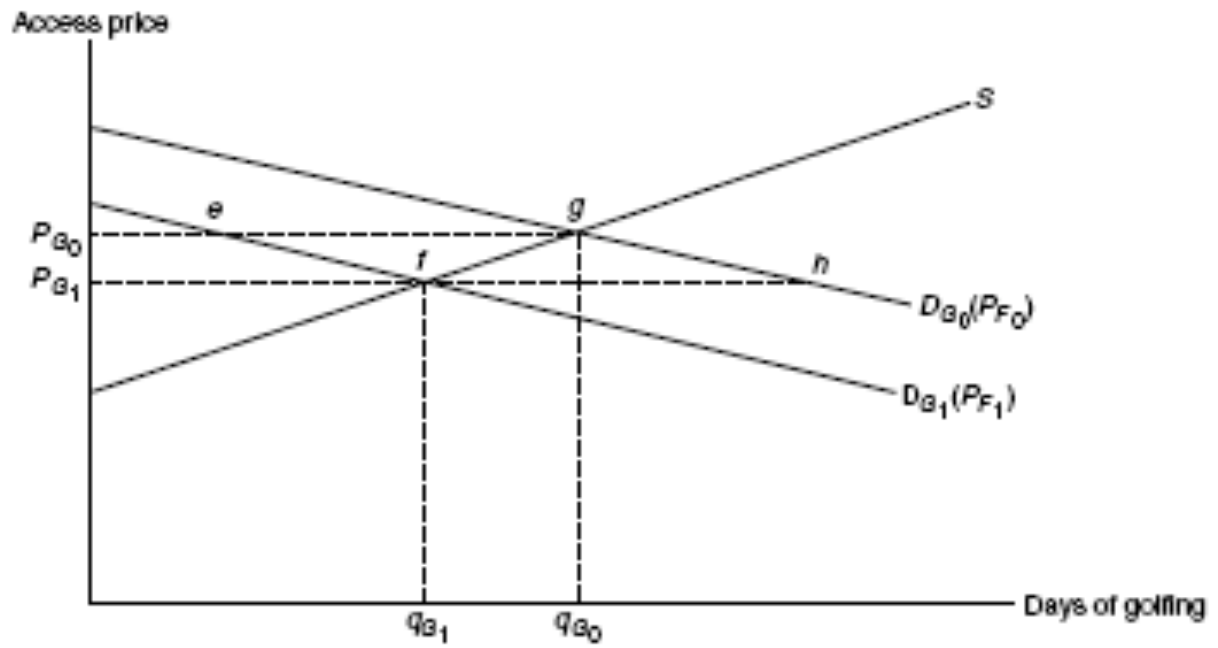


Figure 5.2A
 Primary Market: Market for Fishing Days

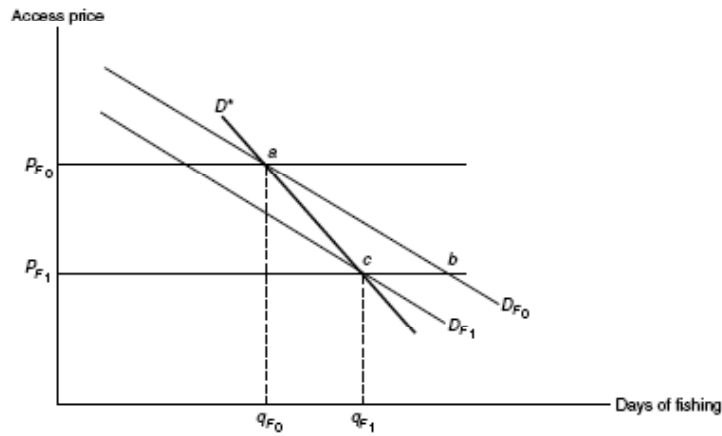
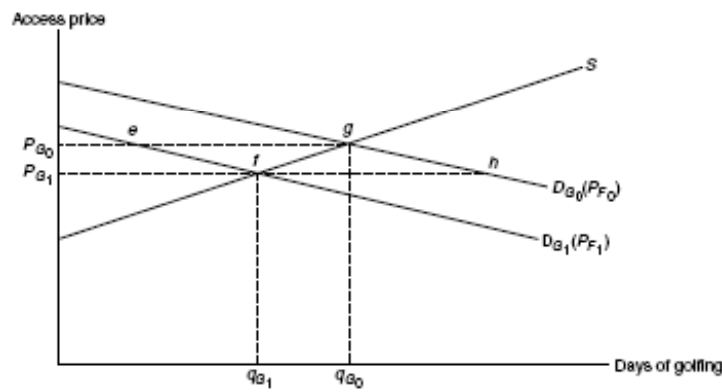


Figure 5.2B
 Secondary Market: Market for Golfing Days (Price Effects)



The **shift of demand from DGO to DG1, however causes the fees for golf course use to fall from PG0 to PG1.**

This, in turn, results in an **increase in consumer surplus**, one represented by the area PG0 et PG1, **which has not previously been taken into account.**

In addition, the fall in golfing **fees also causes a reduction in producer's surplus equal to PG0gfPG1**, which has not previously been taken in account.

As the reduction in producer surplus exceeds the increase in consumer surplus, **a net loss in social surplus equal to the area of triangle efg results.**

Should this loss in social surplus in the golfing market **be subtracted from the social surplus gain** in the fishing market in measuring net gains from the project?

It is frequently **unnecessary** to do so.

The **reason** is that **increase in consumer surplus gain in the fishing market is often likely, in practice, to be measured as the area PF0acPF1 rather than as the area PF0abPF1.**

If measured in this way, the **increase in consumer surplus** in the fishing market would **be understand by the triangular area abc, but this triangle typically closely approximates triangle efg, the net loss in social surplus in the golfing market.**

To see why the consumer surplus gain in the fishing market may, **in practice, be measured as the area PF0acPF1 rather than as the area PF0abPF1**, one must recognize does not end with the demand schedule in the secondary market.

If **golf and fishing are substitutes** the reduction in golf course fees will cause people **to switch from fishing to golf and the demand for fishing day will fall.**

This is shown in panel a as a leftward shift in the demand schedule for fishing days from DF0 to DF1.

By itself this shift does not cause any further changes in social surplus, because we have assumed that the supply of fishing

day is perfectly elastic, prices in the market for fishing days are unaffected.

Note, however that by drawing a line between the original and the final equilibrium point on panel a that is between a and c – one can derive a special type of demand schedule, D^* .

This demand schedule which is sometime "**called an observed or equilibrium demand schedule**"² indicates what the demand for fishing days **will be once prices in other market including the market for golfing days have fully adjusted** to the change in prices in the market for fishing day.

Thus **day D^* differs from the demand schedule DF_0 and DF_1** , which as mentioned earlier indicates the number of fishing days demanded at each price for fishing days, holding the prices of all other good constant.

As it is **frequently difficult statistically to hold the price constant** while measuring the relation between price and demand on primary market empirically estimated demand schedules-the ones actually observed and available for use in CBA-often more closely resemble "**equilibrium demand schedules**" such as D^* instead of the "**textbook style**" demand schedule such as DF_0 and DF_1 .³

Thus the **equilibrium demand schedule D^*** is the one that **may be used in practice** to obtain a measure of the increase of social surplus resulting from the reduction in price of fishing

³ See Richard E Just , Darrel L. Huet hand Andrew Schimdt « Applied Welfare Economics and Public Policy » Prentice, 1982.

days. **However the resulting measure ΔPF by the triangular area abc .**

But as previously **suggested area abc provides a good approximation of area efg in panel b**, the area that should be subtracted from area ΔPF to obtain an accurate measure of the overall net gain from stocking the lake.

In other words, **area abc represents part of the benefits from the fish stocking project and area efg an approximately offsetting cost of the project.**

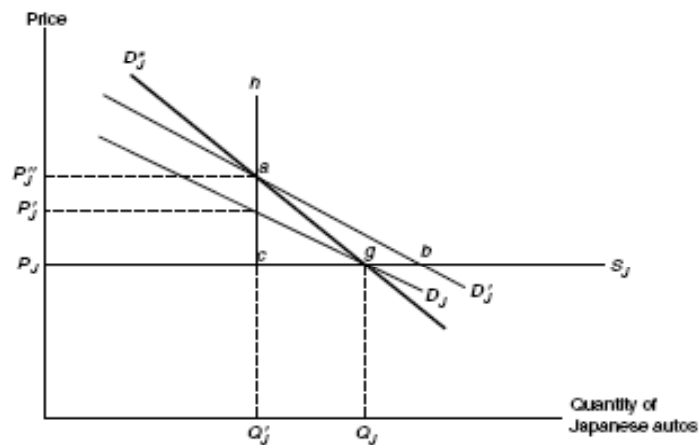
Hence **by using the equilibrium demand to measure the change in social surplus, we incorporate social surplus change that occur in the market for golfing days, as well as those that occur in the market for fishing days. We do not need to obtain separate measures of the surplus changes that occur in secondary markets.**⁴

This significant because it illustrates an important point.

By using an **equilibrium demand schedule for the primary market** –the type of demand schedule that is **oftenly empirically** estimated–once **capture the effect** of policy intervention both in the primary market where the policy change have been initiated and also in the secondary market.

⁴ Indeed under certain assumption abc and efg are exactly equal. Small price changes and no income effects. $\Delta PF \approx \Delta q_f = \Delta q_g \approx \Delta P_g$ Given that, $\frac{\Delta q_f}{\Delta P_g} = \frac{\Delta q_g}{\Delta PF}$. Hence areas are equal.

Figure A
Japanese Automobiles (Primary Market)



We should ignore effect in undistorted secondary markets, regardless of whether or not there are price changes, if we are measuring benefit in the primary markets using empirically measured demand schedule that do not hold prices in secondary market constant.

3.2. – Japanese cars

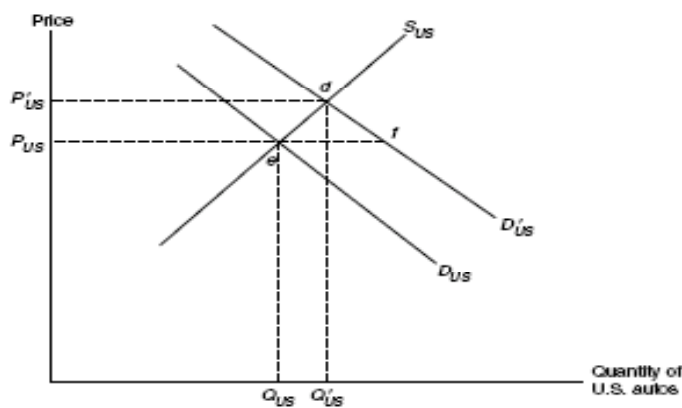
In 1981, Japan and the US agreed to cut imports of Japanese cars with the Voluntary Restraint Agreement (VRA).

The idea was that Japanese cars are substitutes for U.S. cars, so limiting the imports would improve U.S. sales.

The limit on imports did, in fact, raise the price of Japanese cars and, thereby, increase the demand for U.S. cars. This shift in demand increased the price and quantity sold of U.S. cars, which, in turn, caused the demand for Japanese cars to increase (shift to the right), increasing Japanese car prices even more.

The effects of the policy included an increase in producer surplus for U.S. car manufacturers, an increase in producer surplus for Japanese car manufacturers, a deadweight loss, and a large decrease in consumer surplus. The net effect was a loss in social surplus within the U.S.

Figure B
U.S. Automobiles (Secondary Market)



4 – VALUING BENEFITS AND COSTS IN DISTORTED SECONDARY MARKETS

Unfortunately, use of equilibrium demand schedule in primary markets misses part of the effect that **occur in distorted secondary market-that is secondary markets in which price do not equal social marginal costs.**

4.1 – Again, back to the lake

To see why, examine next figure, a slightly altered version of panel b of previous figure. This new figure is based on the assumption that because of **negative externalities** the market

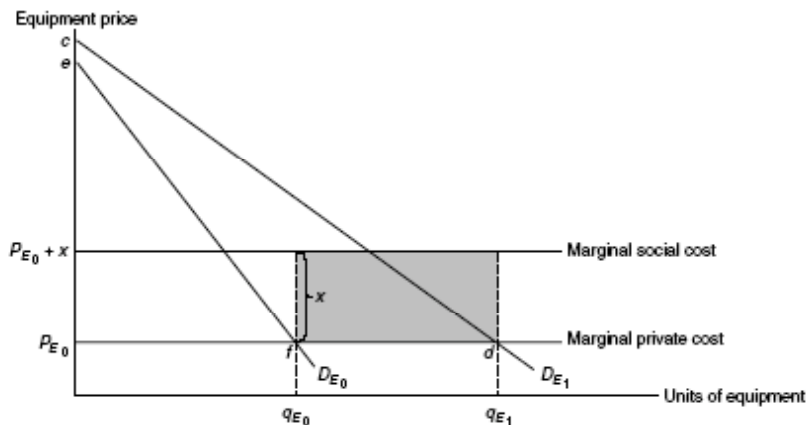
price of fishing equipments, PE_0 underestimates the marginal social cost by x cents.

Thinking the equipments as lead sinkers some of which eventually end up in the lake, where they poison ducks and other wildlife. The x cents would then represent the value of the **expected loss of wildlife** from the sale of another sinker.

In this case, the **expansion of consumption involves a social surplus loss equal** to x times $(q_{E1} - q_{E0})$, which is represented by shaded rectangle.

This **loss which is not reflected at all by markets demand or supply in the fishing market should be subtracted from the benefit occurring in that market in order to obtain an accurate measure of net gain from the program.**

Figure 5.3
Distorted Secondary Market: Market for Fishing Equipment (No Price Effect)



Distorted markets are those in which price doesn't equal social marginal costs.

4.2 – Poison and taxes

Two examples are markets in which there are negative externalities and taxes.

For an illustration negative externality, consider the possibility that lead sinkers, which are part of fishing equipment, can poison some of the wildlife.

The social cost (say X cents per sinker) of this loss of wildlife is not included in the price of the sinkers.

Therefore, an increase in consumption of lead sinkers imposes a cost of X times the increase in quantity that should be included in a CBA.

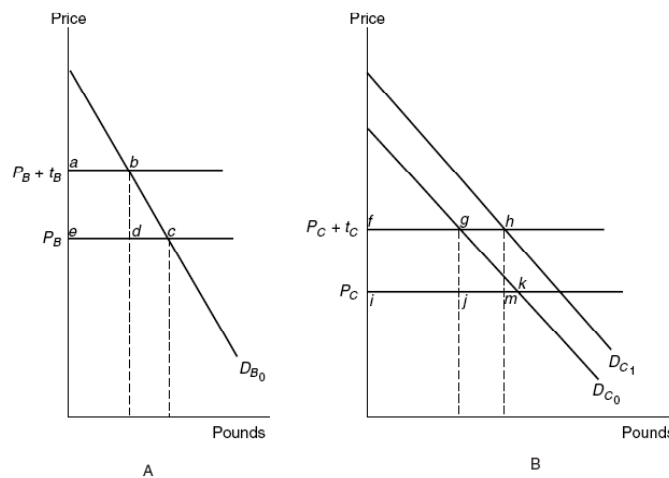
The second example is taxes.

Consider two substitute goods: Good A, which is not initially taxed, and good B, which is taxed. Now imagine that a tax is imposed on good A.

The tax on good A raises its price, increasing government revenue, decreasing consumer surplus, and creating deadweight loss. The demand for the substitute (good B), however, shifts to the right (due to the increase in the price of good A), resulting

in more revenue for the government (from the already existing tax on good B).

Figure 5.4A Market for Beef
Figure 5.4B Market for Chicken



This may offset the deadweight loss created in market A.

5 – CONCLUSION

When there are **distortions in secondary markets**, benefits and costs **can't be measured solely by observing effects that occur in primary markets**.

Effects in distorted secondary markets must be **valued separately**.

These effects, however, **are very difficult to measure** in the real world.

Fortunately, they are usually small. Unless the good in question has strong substitutes or complements, large price changes would be needed to produce noticeable demand changes in secondary markets. Therefore, effects in distorted secondary markets can usually be ignored.