General Equilibrium comes to Applied Welfare Economics

Arnold Harberger

UCLA

International Institute of Public Finance

Paphos, Cyprus, August 2003

A walk through the garden to look at a few flowers

1. Tax incidence

2. Economic Opportunity Costs

3. The "Mother of all triangle problems"

4. General Equilibrium analysis of social security

1. **Tax Incidence**: general equilibrium leads to different
    conclusions

    a. From partial equilibrium

    b. From standard allocations of tax burdens

2. **Economic Opportunity Cost of Foreign Exchange:**

    a. Standard practice led to one opportunity cost

    b. General Equilibrium leads to two; EOCFX and
        SPNTO. One for spending on tradables and the
   other for spending on non-tradables

3. **The "mother of all triangle problems"**: showing how general equilibrium can be dealt with using supply and demand diagrams in a quite sophisticated, yet simple way.

4. **General equilibrium analysis of social security differs at almost every step from the points most often heard in the debate.**

1. General Equilibrium Comes to Incidence Analysis

- Empirical studies of incidence "allocate" specific taxes to specific groups. This misses a major point. Some groups can easily **more than fully bear** the burden of a tax.

- Tariff (see diagram)

- Corporation Income Tax – Closed Economy Case (see diagram)

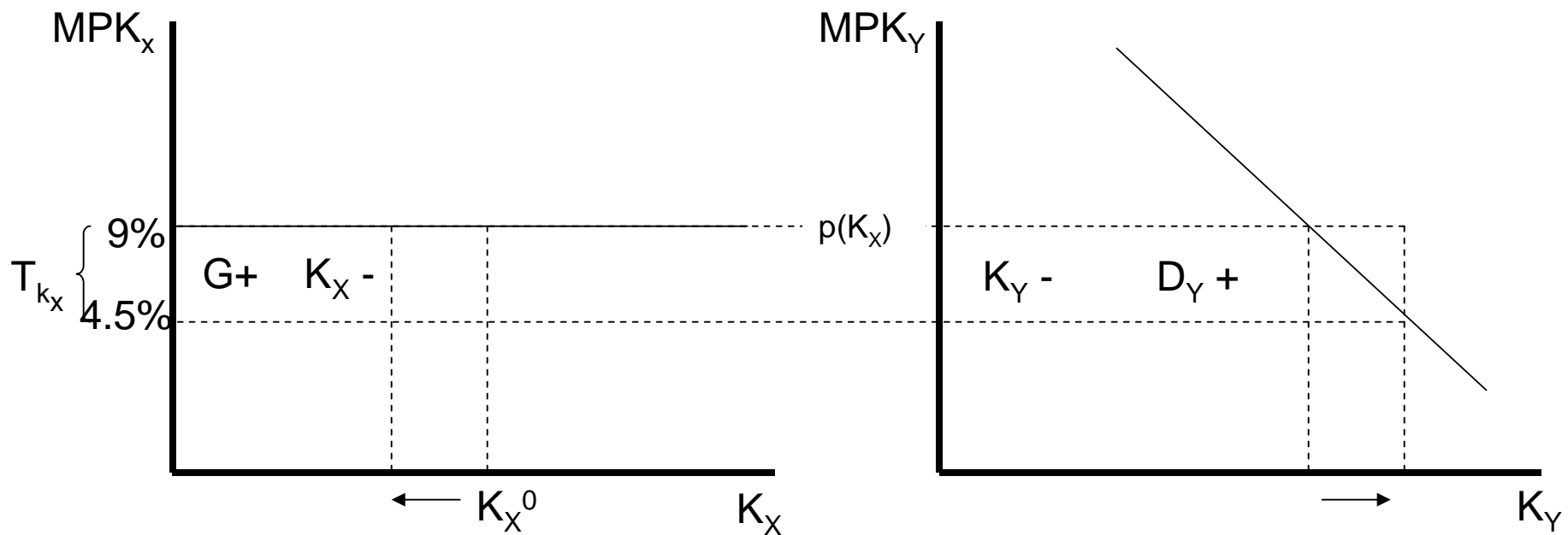- Corporation Income Tax – Open Economy Case (see diagram)

Tariff
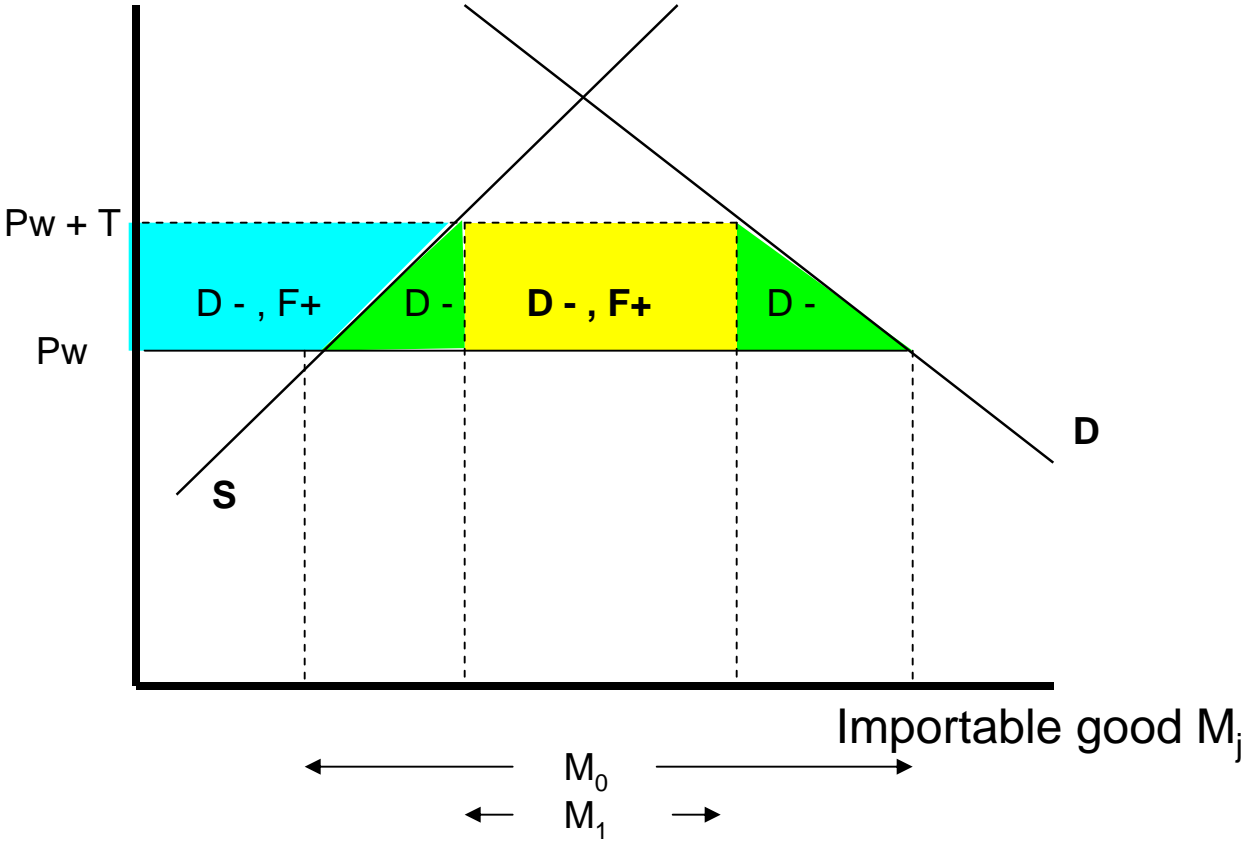
Incidence of Corporation Income Tax
(standard case – closed economy)
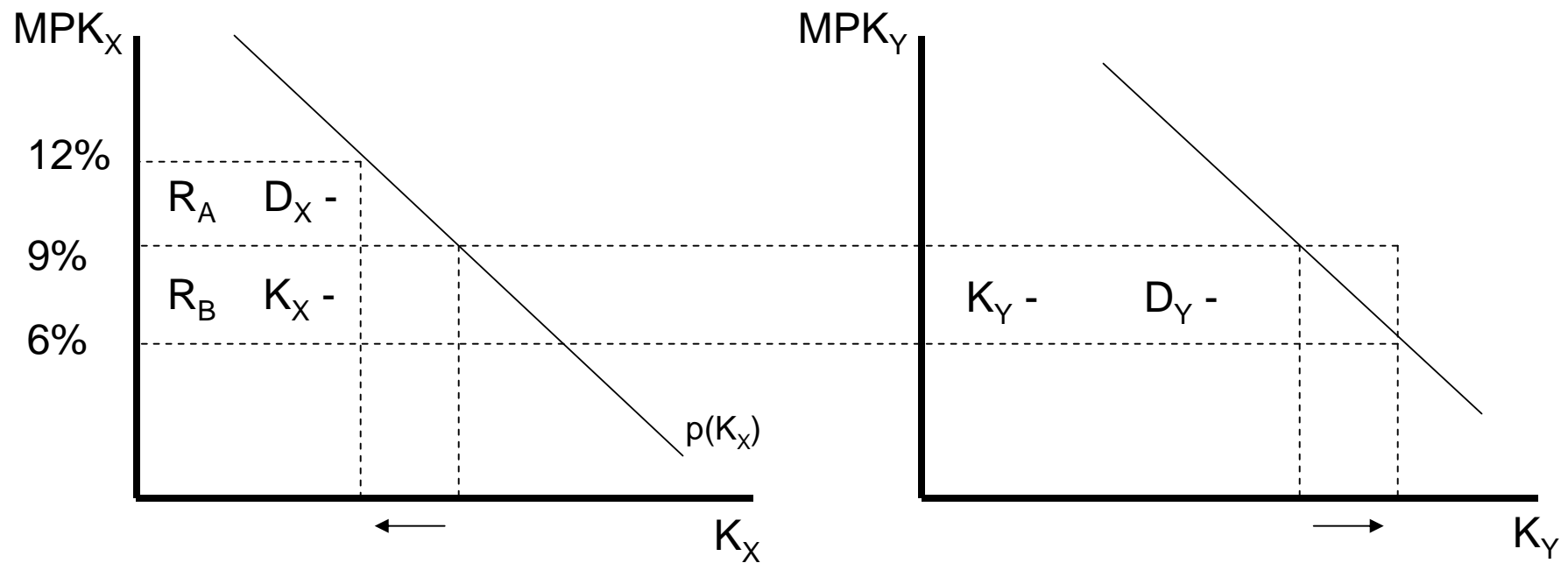
Incidence of Corporation Income Tax
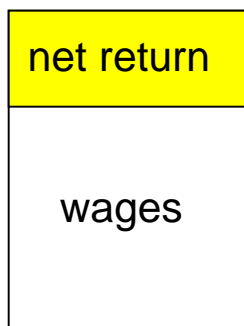## (limiting case – closed economy)

Capital (K_X + K_Y) loses **much** more than government gains (G+)
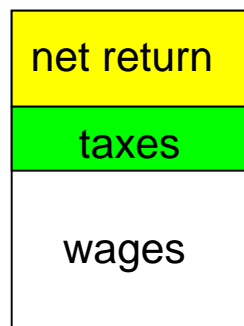
Corporation Income Tax Incidence
Price formation in four sectors – before and after Tax
(Small Open Developing Country)
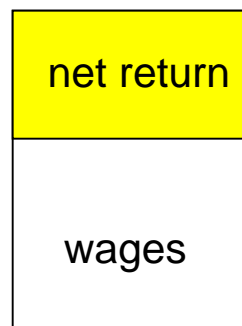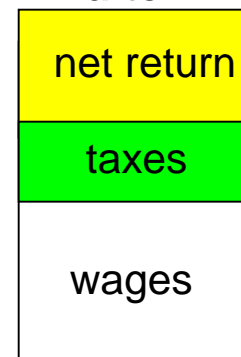
Corporate Tradable sector

before

net return

wages

after

net return

taxes

wages

Worker lose, government gains

Corporate Nontradable sector

before
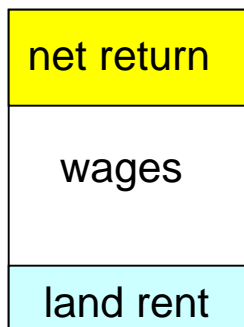
net return

wages

after

net return

taxes

wages

Worker and demanders lose, government gains

Noncorporate Tradable sector

before

net return

wages

land rent

after

net return

wages

land rent
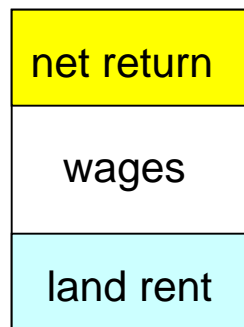
Worker lose, landowners gain

Noncorporate Notradable sector

before

net return

wages

after

net return

wages
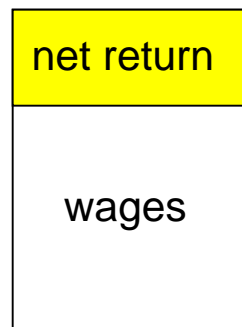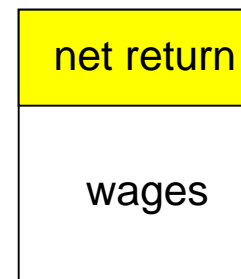
Worker lose, demanders gain

2. General Equilibrium and Project Evaluation

- The birth of SPNTO.

- We always took EOCFX to be

$$EOCFX = E_M \left[\sum_i f_i(1+\tau_i) + \sum_j f_j(1+\xi_j) \right]$$

$\tau_i = \text{tariff on imports of } i$

$\xi_j = \text{subsidy to exports of } j$

$$\sum_i f_i + \sum_j f_j \equiv 1$$

- This follows the general process that the foreign exchange we get must come either from displaced imports or newly stimulated exports. This is true.

- But following this process leads to a contradiction. We demand more foreign exchange raising its price and stimulating the production of tradables.

- But higher price of tradables causes a shift of demand toward nontradables, also stimulating their production

- This cannot be, with fully employed resources.

- The mistake in the above exercise is not taking direct account of where we got the money to spend on foreign exchange.

- Standard assumption is that we got it from capital market. To implement thus assumption we must take into account that when we go to capital market for 1000, we displace other demand by that amount; e.g.

$$\Delta \text{ importables demand } = -400$$

$$\Delta \text{ exportables demand } = -100$$

$$\Delta \text{ notradables demand } = -500$$

- Now, if we spend 1000 on importables, we have an excess demand for them of 600, and for tradables of 500. (Note: tradable excess supply = 100)

- Also an excess supply of nontradables of 500.

- Thus, there must be a real exchange adjustment to close these gaps.

- The EOCFX must build in the distortions involved, both in raising the money in the capital market and in closing the gaps in tradable / nontradable supply and demand.

- It should be obvious that exactly the same type of situation is created when our money is spent on nontradables rather than tradables. Only here of course, the excess demand and supply go in the opposite direction

- How did we go for so long without SPNTO? I think it was because we thought we had solved the capital – sourcing problem with

$$EOCK = f_1\rho + f_2 r$$

ρ = marginal productivity of displaced investment

r = after – all – taxes rate of return to savers (marginal rate of time preference)
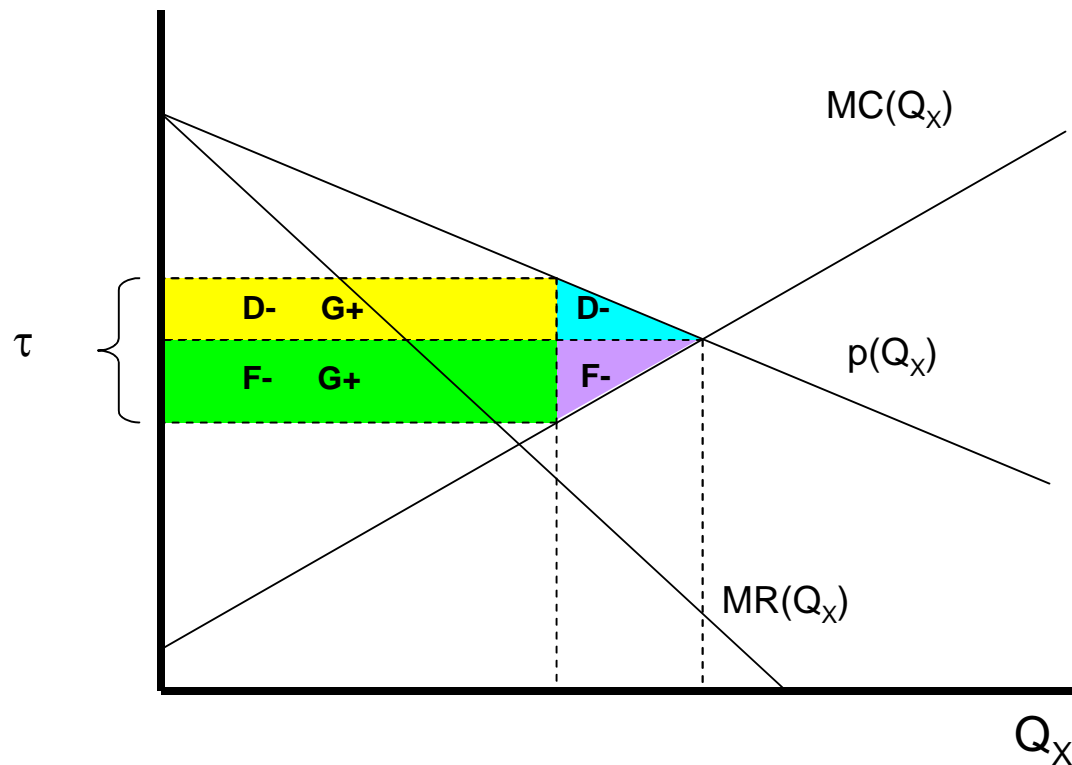
- Or in more general form

$$EOCK = E_M\left[\sum_i f_i\rho_i + \sum_j f_j r_j\right]$$

- The problem here is that this (more – or – less standard) framework takes into account the **intertemporal** distortions associated with sourcing in the capital market, but not the **contemporaneous** distortions that stem from the fact that somebody is **now** releasing the purchasing power that we are **now** extracting from the capital market.

- Glenn Jenkins and I stumbled on this problem while working on the so – called "national parameters" for Argentina and Uruguay, in connection with a project to build a bridge across the Rio de la Plata. (The project was abandoned in the wake of the Asian, Russian and then Argentine and Uruguayan crises).

3. The "Mother of all Triangle Problems"

- Tax on Export with no ER Effect (see diagram)

- Tax on Export with ER Effect (see diagram)

Tax on Export with no ER Effect

Tax on Export with ER Effect

$(1+\delta)p^*(Q_X)$

$MC(Q_X)$

$\delta(\tau)$

τ

1

$P^*(Q_X)$

$MR^*(Q_X)$

**Marginal Revenue
from Coffee Exports
(in $)**

**Foreign Demand Price
for Coffee Exports
(in $)**

**Supply of all
importables**

**Demand for all
importables**

$1+\delta(\tau)$

1

M_0

M_1

Foreign Exchange
(in $)
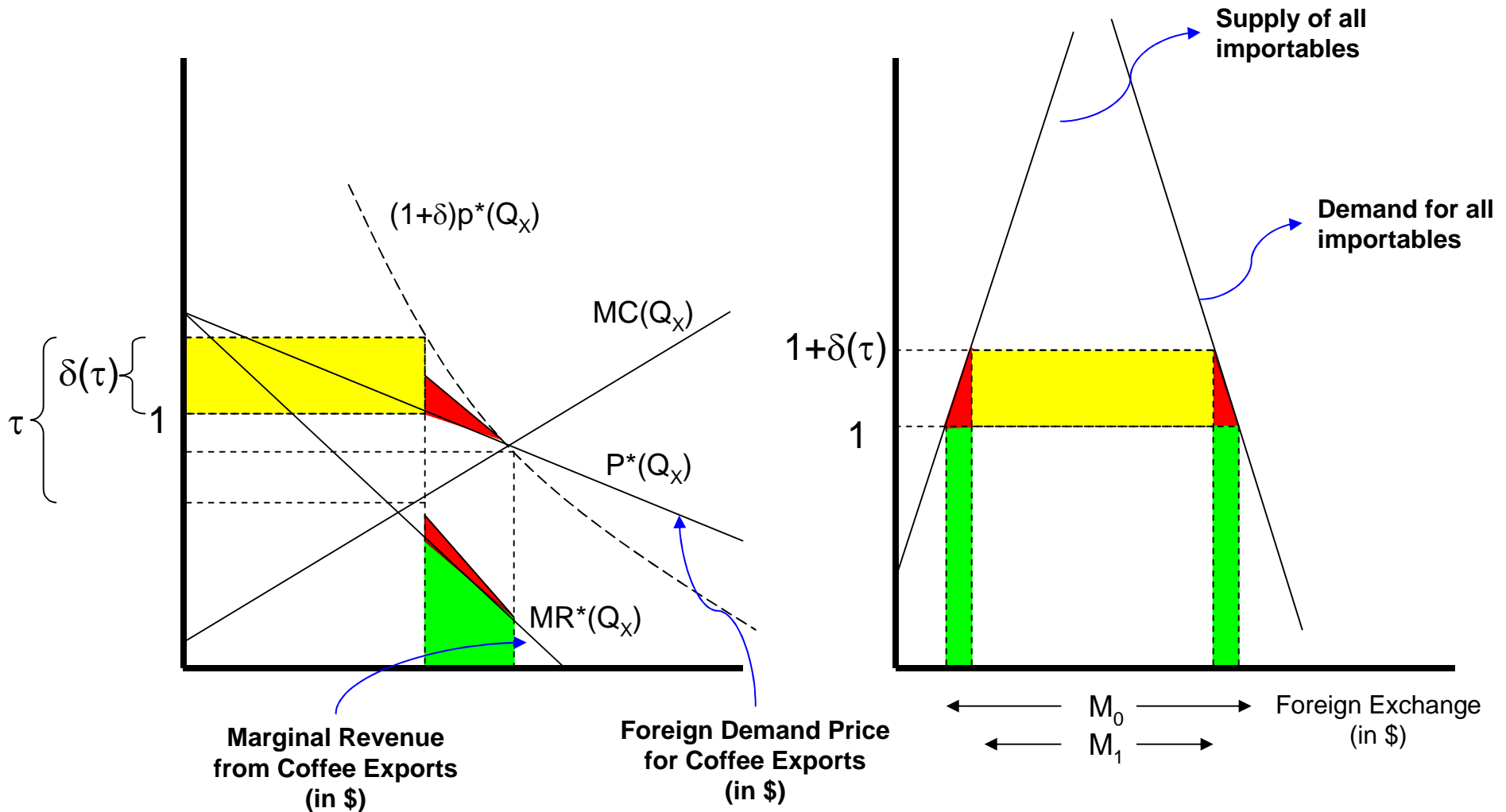
4. Social Security

- A topic of currently lively interest in US and many other countries.

- Much debate about shifting from "pay – as –you – go" to "individual accounts"

- My complaints (here) are based on the US debate.

- First, it is often said that a huge transition problem exists.

- Money from workers L goes directly to retirees R under "pay – as –you – go".

- But with individual accounts, workers' money goes to their own accounts. Who then will pays retirees?

- The problem is easily solved if government sells bonds to the entities holding workers' accounts. This solution to the transfer problem was used in Chile and in other countries.

- Many of those who recognize the above solution think, then, that yes, the transition problem is solved but now the equilibrium is just the same as before, i.e. workers pay, retirees receive.

- This, too, is wrong. A major improvement is that the tax wedge has been greatly reduced.

Before:
- wages of 100
- social security taxes of 12
- Income taxes of 18
- Net wages of 70

After:
- wages of 100
- Income taxes of 20
- Net wages of 80

Distortion reduced from 0.3 to 0.2

Distortion squared reduced from 0.09 to 0.04

- Then advocates of individual accounts talk a lot about the higher rate of return that the accounts will get from investing in corporate securities.

- At the same time, they say this will greatly stimulate economic growth.

- Wrong again, unless government deficit is reduced.

- Start with individual accounts buying government bonds (as above)

- Now with same deficit, government sells same bonds to the accounts, but account managers resell the bonds in the capital market and buy equities.

- The likely result is a modest rise in the interest rate on bonds, and a modest rise in equity prices (reduction in theirs yield)

- But no reason to assume any significant effect on capital formation

- A final note. I like individual accounts because they:

  - reduce labor market distortions

  - stimulate investment and growth (assuming government deficit is reduced)

  - insulate the solvency of the system from changes in life expectancies, birth and immigration rates, change in interest rates, etc.

General Equilibrium comes to Applied Welfare Economics

Arnold Harberger

UCLA

International Institute of Public Finance

Paphos, Cyprus, August 2003